

The Palm Society

Bulletin No. 5

May, 1956

Please address communications to the editor:
Dent Smith, 2514 S. Peninsula Drive, Daytona Beach, Florida

The Recent Meeting

The meeting of the members took place as scheduled at the Fairchild Tropical Garden on April 17, 1956. Out of a total of 140 members at the time, 116 were present either in person or by proxy. Of the 116 present or represented, 28 were present in person. Only 24 members were unrepresented.

Grateful acknowledgment is made to the Fairchild Tropical Garden for permitting the Society to use the facilities there. Warm thanks are due, and gladly given, to Mrs. Lucita H. Wait and the other ladies who assisted with the buffet luncheon preceding the meeting, namely, Mrs. Geo. F. Adams, Mrs. O. C. Corbin, and Mrs. H. F. Loomis.

Adoption of Bylaws

A Constitution and Bylaws were adopted at the meeting. They are short and simple, and were designed not to be hampering. Among other things, they provide for biennial meetings of the members, so that the Officers and Directors are elected for a period of two years. They are reproduced in full on the final two pages of this bulletin.

Election of Officers

The following officers were elected without opposition:

Dent Smith	President
Dr. R. Bruce Ledin	Vice-President
Mrs. Claire Hargert	Secretary
Miss Margueriete Martin	Treasurer

Following the election the president stated that, though he considered the post an honor, he could see his way clear to serve but one year of the two-year period. The editing of the Bulletin is in itself exacting and time-consuming, entailing as it does much correspondence, stuffing of envelopes, daily trips to the post office, and other minor chores, all of which add up very nearly to a full-time job. The president is willing to discharge the duties of two posts for one year - that of president and that of editor. After that time a choice must be made between one or the other as a matter of practical necessity. The bylaws empower the Directors to appoint a successor to any vacated office. The president could serve out his two-year term of office only if some other member able and willing to edit the Society's publications can be found.

Election of Directors

The bylaws authorize a total of not less than five nor more than thirteen

Directors. At the meeting eleven Directors were unanimously elected, as follows:

Mr. Paul H. Allen, Tegucigalpa, Honduras. He is a former Director of the Fairchild Tropical Garden, has discovered and published new palms, and now holds a teaching post at the Escuela Agricola Panamericana.

Mr. David Barry, Jr., Los Angeles, California. He is the owner of the California Jungle Gardens and for many years has accomplished noted work with palms, cycads and other plants. He also maintains a remarkable collection of palms.

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Dr. I. D. Clement, Cienfuegos, Cuba. He is the Director of the Atkins Garden, an independent department of Harvard University, near Cienfuegos. See our Bulletin No. 4 for a list of the palms in this great garden.

Mr. William Hertrich, San Marino, California. Curator Emeritus of the Huntington Botanical Garden. He is the author of "Palms and Cycads," an illustrated work dealing with such of those plants as are growing or have been grown in that famous garden.

Mrs. Alvin R. Jennings (widow of Col. Robert H. Montgomery), Coconut Grove, Florida. She maintains a palmetum reputed to contain the largest private collection of palms in the United States. She has been a mainstay and guiding spirit of the Fairchild Tropical Garden since its inception.

Mrs. A. C. Langlois, Nassau, Bahamas. Together with Mr. Langlois she has made extended collecting trips for palms into the jungles of Central America, and together they own a large and quite unique collection of palms.

Dr. R. Bruce Ledin, Homestead, Florida. He is a Horticulturist at the Sub-Tropical Experiment Station near Homestead. A palmetum is maintained at the Station.

Mr. Harold F. Loomis, Miami, Florida. He is in charge of the U. S. Plant Introduction Garden, Coconut Grove, Florida, which is known for short as "Chapman Field." One of the country's largest palm-collections is to be found there.

Dr. Harold E. Moore, Jr., Bailey Hortorium, Cornell University, Ithaca, N. Y. He is the leading palm specialist and taxonomist actively engaged today in this great and formidable field. Now in Europe studying the palms in various herbaria.

Mr. H. Bertram Smith, Melbourne, Florida. He is a retired Wall Street stockbroker turned amateur plantsman. He has a fine and extensive collection of palms.

Dent Smith, Daytona Beach, Florida. He is an amateur grower of palms, striving to cultivate specimens of every genus and species obtainable. For the past five years his time and attention have been devoted to this one major activity.

The election of both Mrs. Jennings and Dr. Moore was made subject to their acceptance. The others had already indicated a willingness to serve.

The members have given the Directors, while in office, effective control of the Society. They are not figureheads, but on the contrary have very real powers. A majority of them may appoint Officers to fill any vacancies and may even remove any or all of the Officers "for cause."

Finances

The monthly cost of stencilling, mimeographing, collating, stapling, paper, envelopes, stationery, postage, etc., is now approaching \$150 a month. It is increasing as the number of members increases. At some point the per-member cost will begin to decrease, especially with a change to a printed periodical, but that point has not yet been reached. The per-member cost is now extremely high because the Society, as such societies go, is still very small. Large societies have a low per-member cost because everything they buy - paper, printing and supplies - comes much cheaper in large lots, and even their postage is obtained at the most favorable rates.

Moderate annual dues of \$5 would produce, with our present membership of about 150, only \$750 annually or about \$62 monthly. The latter figure would fall considerably short of the cost of one bulletin, to say nothing of the cost of mailing it or of any other expenses. Moderate dues, then, are impractical for this reason if for no other. But there is another. Some members may be legally restrained from exporting dollars and it is a massive fact that some could not regard dues of \$5 as moderate in their circumstances. These facts do not invalidate their interest in or use to this Society. We are all of us, supposedly, interested in the palms, and should be determined to have as members everyone with an equally genuine interest, without regard to the state of his pocketbook.

It was accordingly decided at the meeting to rely upon voluntary contributions for the Society's support during an experimental period of one year from that date, in the hope that this method of obtaining any necessary funds could be made permanent. The bylaws authorize the fixing of annual dues after the experimental period only if the trial method fails to support the Society's work.

We have not yet solicited funds from the members, but are now obliged to do so. Please use the enclosed envelope, addressed to the Treasurer, for a contribution if able to make one. There is no compulsion to send anything, but we are fully convinced that the members are of a type who will respond as well as their circumstances will allow. Having contributed once, no one will be asked to again for a year.

A letter has been sent to the Commissioner of Internal Revenue asking for a ruling as to whether contributions made to this Society by the members are deductible if they itemize their deductions in their personal income-tax returns. No reply has yet been received, but we are prepared to take any steps necessary to obtain a proper ruling - for the law making deductible any contributions to non-profit scientific and educational organizations would seem to apply in our case.

Correspondence

Please address the Secretary for general information about the Society or membership in it, and please send to her the names of any prospective members - as follows:

Mrs. Claire Hargert
195 Halifax Drive
Ormond Beach, Fla.

Please address the Treasurer when sending donations or writing about any financial matter - as follows:

Miss Margueriete Martin
P. O. Box 7173
Daytona Beach, Fla.

Membership

As of May 2, 1956 the Society had 155 members. This figure is about 1 for each day of its existence. Should it continue to grow at the same rate, which seems a little too optimistic, about 365 members would be added in one year.

Dr. Richard A. Howard, Director of the Arnold Arboretum, has suggested that the Roster of Members include full addresses so that correspondence may be facilitated. This is the practice in many horticultural societies. Our next Roster will include mailing addresses as well as names, except in any case of a request not to publish the address. Please notify the editor if you wish your full address excluded, as otherwise it will be published.

Seed-and-plant Exchange List

This list will be sent only to those members who have requested that their names be placed upon it. It has not yet been sent out because it now contains only seven names. To make it worth the effort, there should be at least twice this number. Please notify the editor if you wish your name added to it.

The genus *Pritchardia* was monographed by Professors Odoardo Beccari and Joseph F. Rock, the latter completing the work and seeing it go to press after Beccari's death in 1920. Among the great names in the world of palms - von Martius, Barbosa Rodrigues, Burret, Bailey and others - the name of Beccari takes very high rank and compels respect. The "General Discussion," reproduced below from the monograph, was written by Odoardo Beccari. We chose to reprint it here partly because of his classification of the Cuban "belly palm," known to us as *Colpotherinax Wrightii*, as a *Pritchardia*. Most botanists have not accepted it as such, nor is it intimated here that anyone should or should not.

General Discussion of the Genus *Pritchardia*

Distribution

This fine group of palms, of which up to a quite recent date but few representatives were known, now numbers thirty-one well characterized species and some very distinct varieties.

This great increase in the number of known species of *Pritchardia*, is chiefly due to the recent discoveries of Professor Joseph F. Rock of the College of Hawaii, who has carefully explored the islands composing the Hawaiian group, in search of their indigenous palms and has been extraordinarily successful in discovering a large number of new and fine species, of each of which he has taken special care both to collect and prepare complete specimens in flower and in fruit.

This material, generously placed at my disposal by Professor Rock, forms the principal basis of the present monograph.

The Pritchardias constitute one of the most characteristic genera of palms belonging to the Polynesian Flora, which, with some of its scattered members, occupies a very extensive geographical area in the islands of the Pacific, but has attained its greatest development in the Hawaiian archipelago. With the exception of Pritchardia, no other genus of palms occurs in Hawaii, although the western Polynesian islands contain a good number of others.

The Pritchardias first described were Pr. Martii and Pr. Gaudichaudii, both from Hawaii, and were considered as belonging to the genus Livistona. The generic name Pritchardia was afterwards established for a palm growing in the Fiji Islands, Pr. pacifica, and it was later discovered that Livistona Martii and L. Gaudichaudii were referable to the genus Pritchardia of which Pr. pacifica is the type. Another Pritchardia, Pr. Thurstonii, was also found in Fiji. Perhaps some other palms akin to these are living in the archipelagos nearest to Fiji. Two species have been found in the distant Dangerous Archipelago (Pr. Vuylstekeana and Pr. pericularum), but at least twenty-three well distinguished species, that is 74 per cent of all the genus are endemic in the Hawaiian group. A very characteristic Pritchardia, Pr. Wrightii, has found its way into the new world. This is one of the most extraordinary facts known of geographical distribution of palms, comparable to the presence in America of a Raphia, but even more to that of the characteristic Coccinea in South Africa, the Jubaeopsis Caffra.

COLPOTHRINAX
WRIGHTII

Pritchardia Wrightii is a palm which grows only in Cuba and near the southern coast of the little Isla de Pinos. This palm, although distinguished among all its congeners as a species, is so similar to them in leaf-structure, flowers, and fruits, that it is impossible not to admit that this species had a common origin with them. It is also a singular fact, unique to my knowledge among the palms, that the three segments of the corolla detach themselves from the corolla tube at the moment of flowering, leaving the stamens uncovered, in Pr. Wrightii in exactly the same manner as in all its congeners.

In what manner the fruits of the progenitrix of Pr. Wrightii were enabled to cross the wide spaces of ocean interposed between the nearest Polynesian Islands inhabited by the Pritchardia and the American continent, is a mystery. And this mystery is greatly increased by the fact that these fruits must have surmounted the mountain chain which separates the Pacific from the Atlantic, unless we assume that in some more or less remote geological epoch, the configuration of the western coast of the American continent, was very different from what it is at present, and that the vast expanse of the Pacific was broken by lands now submerged, thereby lessening the immense distances now interposed between the most eastern islands of Asia and the New World.

I am willing to admit with Guppy that the dispersal of the fruits of many plants may have been assisted locally by pigeons, and that through their agency, the geographical area of the Pr. pacifica may have been amplified, and even that by such means forms related to that species may have been produced. In the special case of Pr. Wrightii one may perhaps suggest the hypothesis, already put forth by me, of the transfer of the fruits of certain plants by means of the violent volcanic phenomena which must surely have occurred during the elevation of the Andean ranges. Nor is the probability to be excluded, that at such a time a communication by water may have been established between the two oceans, and that the fruits of a Pritchardia of

Polynesia may have been carried to, and finally deposited on, an island in the Caribbean Sea. Guppy however supposed that even the fruits of the large-fruited species of the Hawaiian Islands may have been transported by ocean currents, as he notes that those of *Pr. Gaudichaudii* are of such a nature as to allow them to float for at least five weeks. But that this and other Hawaiian species with similar large fruits can have originated from small fruits such as those of the Fijian *Pr. pacifica* and *Pr. Thurstonii*, I find it hard to believe. It seems to me more likely that the opposite is the truth, that is, that the Fijian species may have been derived from those of Hawaii, and also that the two species of the Dangerous Archipelago may have been derived from the same source.

There is not a shadow of doubt that the *Pritchardias* are generically closely related to the Asiatic *Corypheae*, *Livistona* and *Licuala*, and especially to the *Pritchardiopsis* of New Caledonia; but on the other hand the genera *Washingtonia*, *Brahea*, *Erythea*, and *Copernicia*, all proper to the western part of North America, exhibit an equal degree of affinity to the *Pritchardias*. If one considers the great scarcity, indeed the almost total absence of *Corypheae*, in all the Polynesian archipelagos, with the exception of *Pritchardia* and *Pritchardiopsis*, we may regard the latter as surviving members of a type of palms, once widely diffused, but now almost wholly swallowed up with the hypothetical lands of the Pacific.

The great precinctiveness of the species of *Pritchardia* in Hawaii proves that their dispersal, even locally, is difficult. No species of *Pritchardia* is found represented on more than one island. It happens sometimes, however, that ripe fruits of some species of *Pritchardia*, *Gaudichaudii* for instance, falling on the ground take root around the mother plant and form small stands when they grow up. *Pr. Beccariana* alone according to Professor Rock is to be met with as numerous scattered individuals in the rain forests of Glenwood on Hawaii. But more often the trees of *Pritchardia* grow isolated, and at heights varying from 1,000 to 1,200 meters on inaccessible cliffs, exposed to terrific winds. According to Professor Rock, certain species of *Pritchardia* on Hawaii are found in the dark forests, growing among stately trees, while on the lee side of that island, they come down to 600 meters and even lower, near the sea level. On Oahu the palms are confined to the summits of ridges and to the steep slopes of valleys. The more or less globose fruits of some isolated trees may fall on the ground, roll down to the bottom of the ridge or slope where they grow, and be carried by heavy rains into the valleys below, or be caught in some crevice of the rocks; but how those palms which wave the crown of their leaves against the sky on the crests of the most inaccessible ridges, have managed to establish themselves at such a height, and what can have carried their seeds thither is as yet a puzzle. The fruits of some species, such as *Pr. Hillebrandi* and *Pr. affinis*, have a moderately fleshy mesocarp of pleasant taste, which recalls that of a date. They are small enough to be swallowed for the sake of the pulp by pigeons, such as *Myristicivora* and *Carpophaga*; these birds indeed are among the most effective agents of dispersal of the fruits of many plants in Papuasias and Polynesias. They are however unknown in the Hawaiian Islands. On the other hand it must be acknowledged that the palms which produce the above mentioned kind of fruits, especially *Pritchardia affinis* and its varieties, are the more diffused species and are represented by allied forms on islands even at a distance from the central group, such as *Pr. remota* from Nihoa or Bird Island, to say nothing of *Pritchardia lanaiensis*. Perhaps also the two species of the Dangerous Archipelago are related to *Pr. affinis*.

In consequence of these considerations it is allowable to suppose that at some time, when greater terrestrial connections existed between the remoter islands of eastern Polynesias and those of Papuasias and occidental Polynesias, the *Columbidae* may have been the agents which contributed even more than ocean currents to stock with palms the islands of the Hawaiian group; but as I have pointed out no species of *Ficus* form part of the indigenous Hawaiian flora, while the fruits of these trees are among

the best liked by that family of birds. If the Columbidae had been one of the means by which some elements of the western Polynesian flora were introduced into the Hawaiian Islands, one does not understand why no species of *Ficus* has found its way there. And then, by what means were the large fruits of *Pr. Beccariana*, *Pr. arecina*, *Pr. Rockiana*, *Pr. Gaudichaudii*, *Pr. Lowreyana*, *Pr. macrocarpa*, enabled to reach high mountains, even their most inaccessible summits? One really cannot conceive what agency can have transported thither such relatively voluminous fruits. It is a fact absolutely opposed to what happens on the high Malayan mountains, where only plants having very small seeds, easily transported by winds, or sought for by birds or other animals, have succeeded in establishing themselves. At times the natives plant some *Pritchardias* near their dwellings, but there is certainly no reason to think that they planted palms in places inaccessible to themselves. At present it does not seem that any terrestrial animals exist that feed on the fruits of the *Pritchardias*, and contribute, even indirectly, to their dissemination by carrying their fruits into nests or hiding places, such as the crevices of rocks, as do squirrels or rats. Yet it is possible that in the past this work was performed by a species of rat (*Rattus hawaiiensis*), now generally believed extinct, but which Professor Rock informs me, has been found on an islet off the coast of Oahu. The rats now met with in the Hawaiian group have only been introduced there since the days of ocean shipping. Another animal of recent introduction into this group is the mongoose (*Herpestes*), which seems, however, to contribute more to the destruction of the *Pritchardias* than to their preservation and dissemination. At least this appears to be the case. The immature fruits of *Pr. Martii*, at least, are destroyed by the mongoose to a degree that makes it difficult to procure ripe fruits for the purpose of propagation.

To give a probable account of the geographical distribution of the *Pritchardias*, it may be necessary to have recourse to the hypothesis that during a former epoch the fruits of certain species or genera of plants which possessed great facilities for reproduction were transported from one island to another by means of ocean currents or by birds--a hypothesis which involves the assumption that during this hypothetical epoch the enormous distances which now exist between the island groups in the Pacific were bridged by means of islands which have now vanished.

We cannot refuse to admit that the present geological structure and configuration of the islands forming the Hawaiian archipelago are very different from those which existed before great seismic cataclysms raised the present mountains and broke the original land into fragments. We can picture to ourselves a period of geological calm in which the area now occupied by the Hawaiian Islands was a flat plain like the Aru Islands, without volcanic cones or precipitous mountains.

This period corresponded probably to an epoch in which the various fragments of land scattered in the Pacific, the Hawaiian group being among them, were less isolated than now. During that epoch the fruits of the primitive *Pritchardias*, and also of other tropical plants, may have been deposited here and there on the islands of the group, by birds, ocean currents or even winds, thus creating a special vegetation; but when the great seismic and eruptive period arrived, the vegetation which covered the plains may have been carried, in part at least, on the mountains which were rising, and to a certain extent may have been preserved upon them. With this hypothesis a part of the vegetation now existing on the Hawaiian mountains could be considered as a surviving element of that which covered their plains before the advent of the great cataclysms which completely changed the orographical structure of the region.

Fertilization

The flowers of the *Pritchardias* open in an unusual manner. Their corollas apparently perform one function only, that of sheltering the sexual organs. They serve no vexillary purpose; that is to say, of attracting insects or birds. The flowers are small, and only by their ensemble may attract those creatures who know their meaning. The three segments of the corolla become detached from the tubular portion projecting from the calyx, and drop at anthesis, that is when the anthers are ready to scatter their pollen grains. This mode of flowering is perfectly analogous to that of certain *Ampelideae* and *Araliaceae*. The petals having fallen, the anthers, borne on short filaments, radiate from the mouth of the tube of the corolla and around the style, which projects more or less from the stamens. This contrivance seems to be very favorable to the impollination of the ovaries by bees or other flower-haunting insects, as in *Vitis* and *Hedera*. Perhaps also as in the flowers of these plants some special odor, imperceptible to our senses, serves to attract insects from a distance.

I have no positive observations in regard to any saccharine secretion in the flowers of the *Pritchardias*, as it is not easy to verify this occurrence from dry herbarium specimens. To tell the truth, though the tube of the corolla of the *Pritchardias* is of such a conformation that it might be taken for a recipient fitted for collecting nectar, and even its side walls, which are somewhat thick, would suggest a nectarifluous structure, yet in all the flowers examined I have not met with any trace of a saccharine secretion.

The pollen grains of *Pr. affinis*, which I have examined with the microscope, are, in the dry state, ellipsoidal in shape with a deep longitudinal fold, but when swelled by immersion in water, assume an ovoid-ellipsoidal or even subglobose shape; their surface is perfectly smooth, without asperities or prominences. Nevertheless the grains seem to have a tendency to agglutination, and appear to belong to the type of pollen grains best adapted to be collected by insects adhering to the body of any animal which might be in the habit of frequenting flowers, rather than to the type of pollen grains easily transported by winds. This appearance, which I have met with in the pollen grains of *Pr. affinis*, is probably common to all species of *Pritchardia*, considering the very small differences existing among their flowers. According to Professor Rock, the flowers of *Pritchardias* are much frequented by bees, wasps, and other insects; hence it is not improbable that birds also visit them to capture those insects; yet if the flowers of these palms do secrete a nectareous juice, it is presumable that the *Drepanidi*, the family of birds so peculiar to the Hawaiian Islands and which possesses a form of beak especially adapted for extracting nectar from the flowers of various plants, visit the *Pritchardias* as well, thus contributing indirectly to their fertilization.

It is also possible that some *Pritchardias* may produce two qualities of flowers from the same spadix; flowers which in appearance morphologically conform, but which are in fact functionally different. And with respect to this, Professor Rock has pointed out to me that in *Pr. Beccariana*, in *Pr. Martii*, and perhaps in some other species, only the uppermost branch of every spadix produces the fruits, while all the flowers on the lower branches fall off. Hence in these species we have spadices of a clearly heterogamous nature. But in the specimens of *Pr. Beccariana* examined I have not discovered any organic difference between the flowers from the lower branches and those from the upper part of the same spadix.

Structural Peculiarities

The diagnostic characteristics of the species of *Pritchardia* are found chiefly in the fruit, and in the indumentum which covers the leaves and the spadices. Characters which might serve to distinguish one species from another are hard to find in the flowers, as these conform to one type, with slight differences in size and in the venation of the calyx and of the corolla. Only *Pr. Wrightii* differs from the Polynesian species, its flowers being of a more fleshy nature than those of others of the entire group.

The leaves of *Pritchardia* are without stomata in their upper surface but almost always show some special covering or clothing on the lower. Only in a very few cases are they equally green and bare on both faces. The indumenta which cover the leaves and other parts of the plant are of two different kinds. One consists of a thin waxy coating, which takes the appearance of a fine white powder, easily removed, and which imparts to the petioles, to the backs of the leaves, and to parts of the spadices a powdery and glaucous shade more or less pronounced, as in *Pr. Thurstonii*, *Pr. Hillebrandi*, *Pr. Maideniana*, and *Pr. insignis*. The other far more common indumentum is due to the presence of a special kind of hairiness, or of dots like orbicular or oblong or variously shaped scales, which I have distinguished with the name "lepidia" and which are present on the leaves of many other palms. When the lepidia are very close together they form a complete covering, touching each other with their marginal cells, which in some cases take the shape of hairs, and contribute to form a continuous and thick felted clothing. In this latter case the lower surface of the leaves has a silvery or even subaureous appearance, as in *Pr. Rockiana*, *Pr. arecina*, *Pr. eriophora*, and *Pr. minor*. The greater or lesser abundance of the waxy coating, of lepidia, or of tomentum, whether on the leaves or on the spadices, should, I believe, be taken as the effect of the climatic conditions under which a plant is obliged to live, but perhaps depends to a still greater degree on the conditions of the environment in which the species was originally formed.

Species having glaucous and waxy leaves, such as *Pr. Hillebrandi* and *Pr. insignis*, may be presumed to be still influenced by the dry climate in which they were originally formed, the waxy coating being one of the most characteristic peculiarities of xerophilous plants. In the Hawaiian Islands the great rains and the thick shadows of the damp and wet forests seem to have been if not the only cause the most active stimulus in producing the subaureate or silvery clothing in the leaves of *Pr. Rockiana*, *Pr. arecina*; *Pr. eriophora*, *Pr. minor*; and *Pr. eriostachya*. The upper surface of the leaves of these species is green and devoid of any kind of hairiness and also of stomata. The hypothesis would therefore appear plausible that the great difference existing between the two surfaces is the result of a protective arrangement for the respiratory organs of the leaves, which are present on their lower surfaces only.

Also the soft and woolly hairiness that almost conceals the spadices of *Pr. eriophora*, *Pr. eriostachya*, and *Pr. minor* in their first youth, and of which they de-spoil themselves later, in part at least, is to be considered as a protective arrangement for their young flowers, against the excessive humidity of the swampy forests of the high mountains of Hawaii.

The appearance of the lower surface of the leaves of *Pritchardia* is shown in the following prospectus:

<i>Pr. pacifica</i>	Blade green with small elliptical lepidia.
<i>Pr. Thurstonii</i>	Blade waxy-glaucous and with small lepidia.
<i>Pr. Maideniana</i>	Blade waxy-glaucous and with small lepidia.
<i>Pr. Hillebrandi</i>	Blade distinctly waxy-glaucous without lepidia.
<i>Pr. insignis</i>	Blade distinctly waxy-glaucous without lepidia.

- Pr. remota.....Blade slightly waxy-glaucous and with rudimentary lepidia.
- Pr. affinis (typica).....Blade green with punctiform lepidia.
- Pr. affinis. v. halophila.....Blade green with punctiform lepidia.
- Pr. affinis v. rhopalocarpa....Blade green with punctiform lepidia.
- Pr. affinis v. gracilis.....Blade green without lepidia.
- Pr. lanaiensis.....Blade green with rusty, rather conspicuous punctiform or linear lepidia.
- Pr. glabrata.....Blade green with very small lepidia.
- Pr. macrocarpa.....Blade green with minute lepidia.
- Pr. Martii.....Blade tomentose from confluent fringed lepidia.
- Pr. Gaudichaudii.....Blade rather closely covered with silvery, scalelike, elongate, non-confluent lepidia.
- Pr. Lowreyana.....Blade green with punctiform lepidia.
- Pr. Beccariana.....Blade green and densely dotted with elliptical, fringed lepidia.
- Pr. Rockiana.....Blade subaureous-tomentose.
- Pr. arecina.....Blade subaureous-tomentose.
- Pr. lanigera.....Blade green and densely dotted with scalelike lepidia.
- Pr. eriostachya.....Blade softly scaly-tomentose.
- Pr. eriophora.....Blade subaureous-tomentose.
- Pr. minor.....Blade subaureous or grayish-tomentose.
- Pr. Vuylstekeana.....Blade equally green on both surfaces and without lepidia.
- Pr. pericularum.....Blade equally green on both surfaces and without lepidia.
- Pr. Wrightii.....Blade thinly tomentose.
- Pr. Forbesiana.....Blade equally green on both surfaces, beneath with linear, rusty lepidia.
- Pr. brevicalyx.....Blade equally green on both surfaces, sprinkled beneath with minute lepidia.

(It may still be possible to obtain a copy of "A Monographic Study of the Genus Pritchardia," Bishop Museum Press, 1921, from the Bishop Museum, Honolulu, Hawaii. -Ed.)

"That Mexican Palm"

The reader may recall having read Mr. James E. Smith's account (in Bulletin II, The Palm Society) of his collecting trip on the west coast of Mexico. He came upon large stands of a very spectacular palm which he thought might be *Scheelia Liebmannii*, but this seemed dubious because the type locality for it is in the tropical eastern part of that country. Dr. Harold E. Moore, Jr., has sent us the following comments on this palm.

"On the Trail of the Lonesome Palms' brought back some vivid memories of the region that Mr. Smith described so well. I can still see the deep green leaves of those tremendous palms near San Blas as they stand etched against the vivid blue sky. I can further sympathize with Mr. Smith in the dismay that the tall, smooth boles produce in the would-be collector. When collecting in Mexico I find a pair of forester's climbing irons with appropriate belts and other harness a great help.

"The palm is a species of *Orbignya* closely related to or more likely the same as *Orbignya guacayule* (Liebmann ex Martius) Hernandez X. At the moment I won't go out on a limb and be specific since there are still some unsolved problems in regard

to these palms and their relationship with the more southern Orbignya Cohune (Martius) Dahlgren; problems that I hope to tackle among many others when I have time to study the material previously gathered on my return from Europe. For any of your readers who are interested, Mr. Hernández has given an account of this palm in the Boletín de la Sociedad Botánica de México, 9: 17 (1949). Liebmann originally found Orbignya guacayule at Guatulco on the west coast of Mexico but thought it to be a species of Cocos. Stands of Orbignya can also be found north of Acapulco on the road to Zihuatanejo in the state of Guerrero. So far as I know, Scheelia Liebmannii occurs only on the eastern side of Mexico where it is often very abundant in the lowlands. Going from Córdoba through Tierra Blanca into the valley of the Papaloapam River one sees this Scheelia standing in the midst of cultivated fields where, like so many other palms in similar circumstances, it is left when other trees are felled in clearing."

The Palm Beetle

Devastations by the larvae of this beetle, in Florida, have made new headlines in several newspapers despite the competition from the Mediterranean fruit fly. Queries from some of our members prompted us to write to Dr. Ledin who transmits the following information obtained from Dr. D. O. Wolfenbarger, entomologist at the Sub-Tropical Experiment Station.

1. According to the literature, there is just one palm beetle in Florida, Rhyncophorus cruentatus Fab. It is the larvae of the beetle which infest palm buds and trunks.
2. It has been reported in coconut palm, cabbage palmetto and date palm.
3. Visible symptom, on the date palm at least, is the wilting of the fronds, especially the new ones.
4. There is no method of preventing an infestation except by destroying all infested material to eliminate the beetle and prevent new infestations.
5. Dr. Wolfenbarger recommends Benzene hexachloride or lindane, 2 pounds of the 10% material to 100 gallons of water, for treatment of infested palms. It should be sprayed on quite liberally to soak thoroughly the crown, the bud and all young leaves.

Mr. Ray Vernon has also supplied some facts gained from his experience at the Coconut Grove Palmetum (the Jennings estate). There the specimens attacked have been, in the order of frequency, the Phoenix first, Sabals second and Latantias a close third. The damage itself is the first notice of infestation, when the bud droops, drying out and falling over. Mr. Vernon reports that, out of 8 palms infested, 6 were saved by the use of DDT - a quart of 25% emulsion mixed in 3 gallons of water, poured directly into the bud.

Mr. Vernon also reports some experience with a different pest, the Ambrosia beetle, which has attacked the trunks of Coconuts and Pritchardias. The evidence of infestation consists of tiny holes in the trunk, with a secretion exuding therefrom, the lower leaves hanging down and dying, and the bud dying last. "This rascal is just about impregnable in his little hole. Spray the whole palm, drenching the trunk with B. H. C. and following the directions on the package. It is, however, a losing battle. We lost the 4 palms most heavily infested, but with the spray kept the beggars off the other palms in the vicinity. The woodpeckers help, digging small holes to get the insects out."

On the Use of Soil Heating Cables

The use of bottom heat for faster germination of seeds is anything but new. More than one hundred years ago growers employed layers of fresh manure in their germinating beds with good results. In this modern era, old fashioned methods have given way to electric soil heating cables.

Some four months ago the writer built a small glass house for the germination of palm seeds. One of his first acts was to purchase a rather inexpensive soil heating cable and thermostat. This was laid out according to directions in an area four feet by nine feet. The bed was filled with vermiculite, a sterile inorganic medium, to a depth of five inches. The thermostat was then set at 83° F. Seeds were set in community pots which in turn were plunged into the vermiculite bed.

On February 6, 1955, seeds were obtained of *Pinanga Kuhlii*, *Bentinckia nicobarica*, *Areca Aliceae*, and *Corozo Oleifera*. These were placed in the germinating bed in the manner described above. Seeds were given to Fairchild Tropical Garden of these species and planted the same day.

On April 16, 1955, the following observations were recorded:

<i>Pinanga Kuhlii</i>	50 out of 50 seeds germinated
<i>Bentinckia nicobarica</i>	11 out of 27 seeds germinated
<i>Areca Aliceae</i>	23 out of 28 seeds germinated
<i>Corozo Oleifera</i>	0 out of 10 seeds germinated

Eager to check these results, the writer visited Fairchild Tropical Garden to observe the progress of the seeds given them. On the surface, there were no visible signs of germination in any of the four pots. A check of the seeds in these pots revealed that only a few seeds of *Pinanga Kuhlii* were starting to send down their initial root.

The writer feels that these results are significant even though results of only three palm species were obtained. It can be safely concluded that the soil heating cable aided materially in their faster germination. Just how much time was saved will be determined when the seeds germinate at the Fairchild Garden.

There are many more seeds of palm species still in the process of germination awaiting future results. Each of these can be checked against similar plantings not employing the soil heating cables. It is hoped that others will use this method for germinating palm seeds, and that together more conclusive results can be obtained of a vast number of palm species.

Miami, Fla.
April, 1956

-- Nat J. De Leon

Dr. R. Bruce Ledin, Vice-President of The Palm Society, has compiled for us the following article consisting mainly of a list of publications on the palms.

Palm Literature

The following is a list of books and other publications dealing with palms. It is believed that this list will be of interest to the members of The Palm Society in calling to their attention various works, most of which are available, which will

aid them in their study of this group of plants. The publications dealing with palms are quite numerous and this list is in no way intended to be complete. It is mostly a list of publications with which the writer is familiar, and, with some exceptions, it deals with those which treat with a large number of species rather than a single species or a genus. It also does not deal with monographic treatments. Furthermore, the list is restricted to publications in English and which are available in this country.

Notably absent are various Floras of tropical and subtropical countries in which native palms are described. Later it is planned to make a list of such Floras for this Bulletin.

Many of the publications are available in the large bookstores. The Fairchild Tropical Garden, P. O. Box 407, Coconut Grove, Florida offers many of these publications for sale. Also, Mr. Edwin Menninger, Stuart Daily News, Stuart, Florida, advertises many of the publications for sale. (See E. A. Menninger, "1956 Price List of Flowering Trees, Vines and Horticultural Books").

If the reader knows of other works which are not listed here and he believes that they should be included, please let us know.

A. Publications dealing mostly or entirely with palms.

1. Palms of Florida, by Harold Mowry, revised by R. D. Dickey and Erdman West. Bull. 152, University of Florida Agricultural Extension Service, Gainesville, Florida, 66 pages, 1955. Originally published in 1926 as Bull. 184, it has been revised in 1931, 1936, and 1952. This publication is available free to Florida residents upon request to the Extension Service in Gainesville. It contains notes on propagation, planting, fertilizing, mineral deficiencies, pruning and descriptions of 72 species, most of them illustrated, of native and introduced palms known to be growing in Florida.

2. The Major Kinds of Palms, by Alex D. Hawkes. Botanical Papers, Fairchild Tropical Garden, Coconut Grove, Florida. Numbers I-XI, 86 pages, 1950-52. 144 genera and many species are described and many illustrated. The descriptions are "a brief synopsis" of the "principal palms to be encountered in cultivation", with emphasis on South Florida. This publication is available from the Fairchild Tropical Garden, \$5.40 bound, \$3.75 unbound. Mrs. Lucita Wait of the Garden informs me that there are only 10 copies of the bound numbers and only 7 copies of the unbound numbers available.

3. Palms and Cycads, by William Hertrich. The Henry E. Huntington Library and Art Gallery, San Marino, California, 142 pages, 1951. This book describes the palms grown in southern California and contains valuable notes on the cold tolerance and adaptability of palms to that area. It also contains valuable notes of Mr. Hertich's many years experiences in growing palms at the Huntington Botanical Garden in San Marino since 1905. It is well illustrated.

4. My Garden in Florida, by Henry Nehrling, Vol. II. The American Eagle Press, Estero, Florida, 1946. This book, until recently, was available but it now seems to be out of print. Volume II, from page 125 to 310, contains many articles dealing with palms. These articles originally appeared in the weekly paper "The American Eagle", from 1922-1929. The articles were gathered together in book form by the late A. H. Andrews who for many years was the editor of the now defunct American Eagle. The palm articles were based in part on Nehrling's experiences in growing palms, but mostly they represent interesting information abstracted from the literature.

5. The Palms of British India and Ceylon, by E. Blatter. Oxford Univ. Press, London and New York, 600 pages, 1926. A large book dealing mostly with classification and botanical descriptions of many kinds of palms. The material originally appeared in the Journal of the Bombay Natural History Society from 1910-1918. Certain palms, such as Borassus, Lodoicea, and Cocos, are treated in some detail. Well illustrated. A year or so ago this book was still available but I do not know if it can still be purchased from the publishers.

B. Chapters on palms and descriptions of palm species in general garden books.

1. Subtropical Gardening in Florida, by Nixon Smiley. Univ. of Miami Press, Coral Gables, Florida, 1951. Chapt. 12. "Palms from Round the World", p. 63-69. \$4.00.

2. Your Florida Garden, by J. V. Watkins and H. S. Wolfe. Univ. of Florida Press, Gainesville, Florida, 1954. Chapt. 5. "Palms", p. 88-100. \$5.00.

3. Ornamental Gardening in Florida, by Charles T. Simpson. Little River, Florida, 1926. Chapter on "Native palms", p. 87-92, on "Exotic palms", p. 125-142. This valuable book has long been out of print and is now a collector's item. It contains many personal observations of Simpson's experiences in growing palms and other plants in Florida.

4. The Modern Tropical Garden, by Loraine E. Kuck, and Richard C. Tongg. Tongg Publishing Co., Honolulu, Hawaii, 2nd edition, 1955. Chapt. 14. "Palms and plants of similar appearance", p. 97-106. \$6.95.

5. Tropical Planting and Gardening, by H. F. Macmillan. Macmillan and Co., New York, 5th Edition, 1954. Chapt. 14. "Selected palms", etc. p. 154-168. \$6.00.

6. 400 Plants of South Florida, by Julia F. Morton, and R. Bruce Ledin. Text House, Coral Gables, Florida, 134 pages, 1952. Contains descriptions of 27 palms. \$3.50.

7. Guide to the most interesting plants of the Atkins Garden, by I. D. Clement, V. W. Clement, F. G. Walsingham, J. W. Weeks, and K. C. Weeks, Harvard Univ. Atkins Garden and Research Laboratory, Cienfuegos, Cuba. 112 pages, 1954. Contains descriptions of 24 palms. \$2.50.

8. In Gardens of Hawaii, by Marie C. Neal. Bernice P. Bishop Museum, Special publication No. 40, Honolulu, Hawaii, 1948. Palm family, pages 81-113. 34 genera and numerous species described with keys and photographs. \$8.00.

9. Landscape Plants for Florida Homes, by J. V. Watkins. Bull. No. 106, Dept. of Agriculture, Tallahassee, Florida, 1955. Palms, p. 44-57. Free on request.

C. Publications by Liberty Hyde Bailey.

1. The Standard Cyclopedia of Horticulture. The Macmillan Co., New York, 1947. \$52.00. Vol. III, p. 2437-2445, deals with the palm family and species grown in California and Florida. Also, many palms described throughout the three volumes. Latest printing 1947, but much of the information on palms appears to be the same that appeared in the 1913 edition.

2. Hortus Second (with E. Z. Bailey). The Macmillan Co., New York. 1941. \$12.50. 778 p. Many palms briefly described.

3. Manual of Cultivated Plants. The Macmillan Co., New York, 1949. \$18.50. The palm family p. 163-177. 27 genera and 54 species described.

4. Gentes Herbarum. A serial publication containing technical articles dealing with the kinds of plants. Available only to libraries and botanical gardens. L. H. Bailey and recently H. E. Moore, have published many articles on palms. A checklist of these articles which number over 40 papers, will appear soon.

D. Proceedings of the Florida State Horticultural Society. This Society was founded in 1888 and has published the annual Proceedings since 1893. Several fine articles on palms have appeared, the earlier articles giving valuable information on early trials and cold hardiness of palms. The Proceedings may be purchased from Mr. Ralph Thompson, P. O. Box 1000, Winter Haven, Florida, or from Mr. Menninger in Stuart. Numbers prior to 1935 are \$1.00 each, from 1935 to 1949 \$2.00 each, and 1950 to the present, \$4.00 each.

1. Rolfs, Mrs. P. H. Report. Proceed. Fla. State Hort. Soc. 18: 73-79. 1905.

2. Nehrling, H. The Princes of the vegetable kingdom in our Florida Garden. Proc. Fla. State Hort. Soc. 22:145-185. 1909. An excellent article.

3. Simpson, Charles T. Palms native and exotic. Proc. Fla. State Hort. Soc. 25:167-183. 1912. An excellent article.

4. Hubbard, Edith L. Ornamentals for Winter. Proc. Fla. State Hort. Soc. 28:185-191. 1915. Many palms listed.

5. Donnelly, J. B. Ornamentals growing on the lower east coast. Proc. Fla. State Hort. Soc. 34:50-55. 1921. Includes many palms.

6. Reasoner, N. A. Little Known plant materials and their uses in securing tropical effects. Proc. Fla. State Hort. Soc. 34:41-55. 1921. Includes some palms.

7. Mc Adow, Mrs. A. A. Evergreen ornamental trees for Florida. Proc. Fla. State Hort. Soc. 37:200. 1924. Includes palms.

8. Mowry, H. Palms and their use in ornamentation. Proc. Fla. State Hort. Soc. 40:100-102. 1927.

9. Dahlberg, K. Palms for Florida landscapes. Proc. Fla. State Hort. Soc. 52:63-66. 1939.

10. Jordahn, A. C. Promising new palm introductions. Proc. Fla. State Hort. Soc. 59. 135-137. 1946.

11. Jordahn, A. C. Observations on the propagation of palms. Proc. Fla. State Hort. Soc. 62:24-242. 1949.

12. Loomis, H. F. The best palms for the dooryard. Proc. Fla. State Hort. Soc. 64:223-226. 1951. Excellent article with many new species of palms adapted to Florida mentioned for the first time.

E. Native palms of United States. Many of the books and papers mentioned above contain information on native palms. Some additional works are the following:

1. Palm trees in the United States, by Marian L. Bomhard. USDA Forest Service, Agricultural Information, Bull, No. 22, 26 pages (undated, probably 1950). This pamphlet may still be available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 15 cents.

2. The native trees of Florida, by Erdman West and Lillian E. Arnold. Univ. of Florida Press, Gainesville, 1952. \$3.75. pp. 15-19, 7 species described.

3. Native trees and palms of South Florida, by Walter M. Buswell. Univ. of Miami Press, Coral Gables, Florida, 1945. 2 pages of descriptions and 3 photographs. Out of print.

4. Manual of Southeastern Flora, by John K. Small. 1933. \$12.50. Palm family p. 236-243. 15 species described.

5. Journal of the New York Botanical Garden from 1922 to 1937 contains 23 interesting papers on native palms by J. K. Small. A list of these will appear in this Bulletin at a later date.

F. Others.

1. Index of American palms, by B. E. Dahlgren. Field Museum of Natural History, Botanical Series, Vol. 14, 456 pages. 1936. A check list of palms of the western hemisphere. Contains extensive synonymy with geographical lists, vernacular names, references, and notes on fossil palms. I do not know if this is still available.

2. A vegetative key to the native and commonly cultivated palms in Florida, by H. N. Mozingo. Quarterly Journal of Florida Academy of Sciences 17 (1): 46-54. 1954. A handy and useful key based on vegetative structures of the native and cultivated palms in Florida. A reprint of this article might be obtained by writing to the author, Botany Department, Florida Southern College, Lakeland, Fla.

3. Catalog of plants growing in the Garden, by W. L. Phillips. Fairchild Tropical Garden, Coconut Grove, Florida, 51 pages, revised 1950. A valuable check list of plants, including the palms, growing at the Fairchild Tropical Garden as of 1950. 35 cents.

4. Islands of the Great East, by David Fairchild. Charles Scribner's and Sons, New York, 239 pages. 1943. \$5.00. Many references to palms of the East.

5. The World Grows Round my Door, by David Fairchild. Charles Scribner's and Sons, New York, 1947. \$5.00. Chapt. 12 "Among the palms on the Kampong", p. 160-168. Illustrated. Many interesting observations on palms.

6. Occasional papers of the Fairchild Tropical Garden. Four papers on palms as follows:

(1). Occasional paper No. 1. Three attractive slender palms for South Florida by David Fairchild. 1938. 14 pp.

(2). Occasional paper No. 7. The rib-seed palms in Florida. The lady palms. By L. H. Bailey. 1940. 8 pp.

- (3). Occasional paper No. 15. The introduction of the Borassus palm into Florida, by David Fairchild. 1945. 13 pp.
- (4). Occasional paper No. 17. The Makapuno coconut of the Philippines, by David Fairchild. 1947. 12 pp.

These occasional papers may be obtained from the Fairchild Tropical Garden for 50 cents each. Mrs. Lucita Wait informs me that the supply is very limited.

Miami, Fla.,
April, 1956

- R. Bruce Ledin

Next Bulletin

We shall skip the month of June and bring out our next bulletin during July. This for two very good reasons: (1) the editor must give his plants some attention and also set out about 50 more palms, though whether for himself or posterity is not quite clear; and (2), the interval will give us time to get some money into the treasury to pay for the next and succeeding publications.

Constitution and Bylaws
of
THE PALM SOCIETY

- Section 1. This organization shall be known as The Palm Society.
- Section 2. The Society shall be a non-profit organization engaged in the dissemination of scientific and horticultural information, and may be concerned with any other matters or phases of interest relating to the Palm family.
- Section 3. The Society shall function chiefly by means of its publications.
- Section 4. There shall be no chapters, but the Society may lend approval and assistance to any local group or organization dedicated to an interest in the Palm family.
- Section 5. The principal office of the Society shall be in the home or office of its President, or other place designated by him.
- Section 6. Anyone professing to be interested in the Palms shall be eligible to membership, subject to rejection only by a majority of the Directors.
- Section 7. There shall be a biennial meeting of the Members on the third Tuesday of April for the election of Officers and Directors, and for the transaction of any other business.
- (a). Special meetings of the Members may be called at any time in the discretion of the President.
- Section 8. A quorum at any meeting of the Members shall consist of a majority of all the Members in good standing, whether they be present in person or by proxy.
- (a). A majority vote of all the Members in good standing, whether they be present at the meeting in person or by proxy, shall decide any matter voted upon.
- Section 9. The officers of the Society shall be a President, a Vice-President, a Secretary, and a Treasurer.
- (a). The Officers shall serve, without pay, until their successors are elected or appointed.
- Section 10. The duties and powers of the President shall be the following:
- (a). He shall conduct and coordinate the affairs of the Society in a creditable manner, by doing all things necessary to its objectives and progress.
- (b). He may appoint an editor or editors of the Society's publications, an editorial board, a membership or fund-raising committee, or any other committee deemed advantageous.
- (c). On or after April 17, 1957, he may fix or alter an amount of annual dues, subject in each case to approval by a majority of the Directors, but only if voluntary contributions from the Members prove inadequate for the support of the Society.
- (d). He may take steps to incorporate the Society should any real necessity for incorporation arise.

(e). He may hire for pay an Executive Secretary should the business and size of the Society progress to the point that such a step would become, in his judgment, necessary.

(f). He shall designate the place and time of any meeting of the Members.

Section 11. The Vice-President shall assume all of the duties and powers of the President during such time as the office of President is vacated or during such time as the President is unable to act.

Section 12. The Secretary shall be in charge of the general correspondence and office records, responding to inquiries about membership and keeping the roster of Members up to date.

Section 13. The Treasurer shall be in charge of all receipts and disbursements, keeping detailed records of both and submitting an annual report to the Society.

Section 14. There shall be a board of Directors numbering not less than five nor more than thirteen.

(a). The Directors shall serve, without pay, until their successors are elected or appointed.

(b). The Directors, being geographically dispersed, shall not be obliged to hold any meetings.

(c). It shall be the duty of the President, or in his absence the Vice-President, or in the absence of both the Secretary, to poll the Directors by mailed ballot upon any matter which they are empowered to vote upon.

(d). Matters submitted to the Directors shall be decided by a majority vote.

(e). The Directors shall have the power, by majority vote, to fill any vacancies that may occur among the Officers, by appointing suitable persons to serve out the unexpired terms of such vacated offices; to remove any Officer for cause; to appoint new Directors to serve out unexpired terms created by any vacancies and to fill any vacancies in the authorized number of Directors.

(f). The Directors shall have any additional powers specified in any other Section of the Bylaws.

Section 15. Should annual dues ever be fixed in accordance with Section 10, subsection (c), the Treasurer shall bill the Members at once for such annual dues payable for one year in advance.

(a). Failure to pay within ninety days such annual dues, if ever put into effect, shall cause the suspension of delinquent Members, and reinstatement may take place only upon payment of current dues and any arrears.

Section 16. The Secretary may drop from the rolls the name of any Member whose mail is returned unopened or whose loss of interest in the Society is made manifest by disappearance or in any other evident manner.

Section 17. The Constitution and Bylaws may be amended by a majority vote of all the Members, either at a formal meeting or by mailed ballot without the necessity for holding a formal meeting.