



PRINCIPES

Journal of the Palm Society

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THE PALM SOCIETY

A non-profit corporation primarily engaged in the study of the palm family in all its aspects throughout the world. The Society relies on voluntary contribution for support, and membership is open to all persons interested in the family. Requests for information about membership or for general information about the Society should be addressed to the Executive Secretary.

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JOURNAL OF THE PALM SOCIETY

An illustrated quarterly devoted to information about palms published on the first day of January, April, July, and October, and sent free to members of the Palm Society.

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Cover Picture

Washingtonia filifera in Palm Spring Canyon, California, photographed in April, 1922, soon after the Canyon was made into a state park. Photograph by Peter Bisset courtesy of the United States Department of Agriculture.

Mailed April 3, 1958

Society News

The Society Loses Two Members

Dr. Harold L. Lyon of Honolulu, Hawaii, passed away on May 15th, 1957. Dr. Lyon was born in Hastings, Minnesota, on October 14, 1879. He obtained his B.S., M.S. and Ph. D. degrees at the University of Minnesota, remaining to teach botany there for several years. He then went to Hawaii as Assistant Pathologist at the Experiment Station of the Hawaii Sugar Planters' Association. He progressed to Pathologist, then was in charge of the department of botany and forestry from 1918 to 1936, at which time he became Director of the Experiment Station, serving until 1948. He was Director Emeritus from 1948 until his death. Dr. Lyon was a member of many botanical and horticultural societies, among them the Botanical Society of America, the Genetic Association, the Orchid Society. He was president of the Hawaii Botanical Society in 1926 and of the Hawaii Academy in 1931.

Norman A. Reasoner of Bradenton, Florida, died on December 29th, 1957. Mr. Reasoner had been in botanical and horticultural work all his life, carrying on the work of his father, Egbert, and his uncle, Pliny Reasoner, names which were famous in Florida plant circles. Reasoner Brothers (later Reasoner's Tropical Nurseries), begun in 1881, is the oldest nursery in the state under a single family operation. The elder Reasoners introduced the pink grapefruit to world markets; they also introduced hybrid hibiscus from Hawaii, and many palms from the far places of the earth. Dr. Henry Nehrling, in *My Garden in Florida*, frequently mentioned palms he had obtained from the Reasoners; some of these have been lost to cultivation in Florida and await re-introduction.

Norman Reasoner was first president of the American Hibiscus Society, life member of the American Rose Society, member of the Florida State Horticultural Society, Florida Nurserymen and Growers Association, and the Mango Forum.
L.H.W.

Seed Bank News

To date some thirty members have taken advantage of this service. It should be remembered that seeds are collected only when fresh crops become available. In this way you can be assured of the best possible germination.

Through the kindness of certain Society members, it is now possible to offer seeds of four more palms: *Erythea Brandegeei*, *Sabal texana*, *Trachycarpus Takil*, *Licuala grandis*. The first three are among the hardiest of palms and *Licuala grandis* has proven itself this year in one of Florida's worst winter seasons. N.D.L.

REMEMBER: Seeds are sent only when fresh. No stock is kept on hand.

Additions to Library

Dr. R. E. G. Pichi-Sermolli, eminent botanist of the University of Florence, Italy and former collaborator with the late great Odoardo Beccari, has presented to The Palm Society a collection of pamphlets and reprints of articles on palms, some of which are now almost unobtainable, and all of which have value to the student of palms. The Society is most grateful to Dr. Pichi-Sermolli.

Titles of these publications are:

By Beccari & Pichi-Sermolli: *Subfamiliae Arecoidearum Palmae Geron-togae*, 1955.

By Beccari: *Manipolo di palme Nuove*
(continued on page 73)

EDITOR'S CORNER

Palms claim the attention of scientists in several fields of interest. In this issue our contributors include an entomologist and a fisheries biologist in addition to those who work more directly with plants. Mr. R. M. Baranowski, originally from Utica, New York, is a graduate of Utica College of Syracuse University. He has done graduate work at the University of Connecticut and has been Assistant Entomologist at the University of Florida Sub-Tropical Experiment Station since October, 1956. His article on the royal palm bug results from his experience with the pest in Florida.

Donald S. Erdman, also a former New York resident, graduated from Cornell University, where he majored in fishery studies. Since graduation in 1942, he has been associated with the Fish Division of the United States National Museum in Washington, D.C., with the U.S. Fish and Wildlife Service in Montana, and engaged in a private commercial and exploratory fishing program in the Gulf of Nicoya on the Pacific Coast of Costa Rica. In addition, he has collected fishes and mollusks for the Chicago Natural History Museum and taught fishery biology in Puerto Rico where he has been Fishery Biologist for the Fishery and Wildlife Section of Puerto Rico's Department of Agriculture and Commerce since 1954. The fruits of *Manicaria* that he finds on the coast of Puerto Rico and writes about in this issue may have puzzled other beachcombers.

Dr. Michalowski, who writes on the ecology of palms, was born in Poland and is a graduate of schools in Estonia, Poland, and the Sorbonne in Paris. At present, he is botanist with the USOM to Paraguay and Professor of Plant Geography and Ecology at the University of

Asunción. Professor Michalowski, though hospitalized at the moment as a result of a jeep accident, is normally more active and writes from a background of investigation in Argentina, Brazil and Paraguay.

Names of plants sometimes appear frightening to the uninitiated. Some time ago Dent Smith suggested that an article by William J. Dress concerning the names of plants might be adapted for readers of *PRINCIPES*. The original appeared in *Baileya* 3:59, 1955. Dr. Dress, who is taxonomist at the L. H. Bailey Hortorium of Cornell University and editor of *Baileya*, has most kindly obliged with the adaptation that appears in this issue. Dr. Dress received his botanical training at Cornell University but majored in the classics as an undergraduate at the University of Buffalo. He thus brings to his subject an understanding of both plants and names.

Other contributors have written for *PRINCIPES* previously and their biographies appeared in the first volume of the journal.

* * *

As sidelights on Dent Smith's recollections of *Washingtonia*, two news reports deserve comment. The first, contributed by Miss Jeanne Le Grand, age seven, was sent to the editor (her uncle) after it had been guarded for some time in a secret hiding place. Although date and name of the newspaper are now missing, the contents are essentially intact and it is known that the clipping came from a San Diego, California, newspaper in 1957. The article concerns the recent felling of San Diego's oldest landmark, a 188-year-old *Phoenix* sp. designated as California Historical Landmark No. 67 by the state in 1932. The tree was called the Serra palm after Father Junipero Serra, who

(continued on page 63)

The California Habitat of *Washingtonia Filifera*

Recollections of the Desert and its Native Palms

DENT SMITH

Washingtonia filifera is the only palm native to California. Its natural distribution there is in the mountainous canyons debouching into the Colorado Desert, about some of the waterholes in the more open desert and in a thin straggling belt along the foothills of the Little San Bernardino Mountains. There are perhaps as many as forty well-separated native stations in its California range as well as two or three in Baja California and the quite unique station across the Colorado in Arizona. The binomial *Washingtonia arizonica* is sometimes still applied to the Arizona palm, though Bailey considered it not distinct from *W. filifera* even while recognizing that much variation did exist in each of the two *Washingtonia* species he accepted as valid.

The California species (*W. filifera* H. Wendl. ex Wats.) and the Mexican species (*W. robusta* H. Wendl.) have both been planted in many parts of the globe, and both are widely cultivated in California where one common name for either species is simply "fan palm." Even a casual glance, however, serves to distinguish the species when adult, for the trunk of *W. filifera* is massive (about 3 ft. in diameter at breast-height or a little more) whereas the trunk of *W. robusta* is never so stout but is always relatively slender except for the sometimes flared-out butt. The same thing applies when the shag of down-folded dead leaves conceals the bole, for the shag of the massive palm is itself more than twice as massive as that of its Mexican congener. There are of course

other differences, as in the brighter green foliage of *W. robusta*, its shorter leaf petioles and in the color and armature of these, and still others that would elude a casual observer. The specific names of the two species, as now understood, have been somewhat confusing in the past, for *W. robusta* is not robust in the sense of being stout; moreover, it is extremely filiferous while still young, and the juvenile plants of the two species are not always easily distinguished. Not long since, the two specific names and the habitat of each species were often exactly reversed. The history of the genus itself, and the species too, has been complicated in the matter of names, which was partly owing to the lack of type localities. Luckily for me, I am concerned here with only one palm, *W. filifera* of the Colorado Desert and its margins, and have to deal only with its native occurrences in California.

The Colorado Desert, contrary to the implication, is not in Colorado but in southern California, taking its name from the mighty river that bounds it on the east. It lies south of the Mojave Desert, separated from it by the Little San Bernardinos and other ranges. At its northwestern extension it is separated from coastal California by the pass (San Gorgonio) that lies between high ranges of mountains, and from thence it extends in an ever-widening expanse east to the Colorado and south to the Mexican border. Drive eastward from the Pacific through this pass and you are at once in a different world; you are on the moon, and if not exactly the moon

itself, you are surely in some strange transplanted corner of Arabia.

Or you were, in times by no means distant. Only a little over three decades ago most of this desert, comprising some 8,000 square miles, was of solitude and emptiness all compact. All of it excepting the Imperial Valley, part of the Coachella Valley and a few more or less civilized oases, was a lure and a challenge only to prospectors or other such adventurous souls. It was dangerous, forbidding and inexplicably alluring all at the same time. The most part was a vast and excessively dreary plain of sand, cactus and creosote-bush contained between grim mountains, yet in places phenomenally varied by sand dunes, "devil's gardens," dry washes populated with eerie smoke-trees, beds of shining gypsum, startling rock formations, labyrinthine badlands, even the so-called "mud volcanoes," and, in its sunken bosom a dead sea, the Salton. All in all, the unlikeliest place for palms on this planet or any other, but this thirsty land was the Desert of Improbabilities and the improbable palms were there in keeping with its nature. Not so strange, then, to come upon a clearly defined beach where the waves of the Gulf had rolled in geologic times, and not an imaginary mirage-like beach but one from which the waters had vanished, seemingly, only yesterday instead of perhaps a million years ago.

About one quarter of the desert lies below sea level. Through the centuries the Colorado River has overflowed many times into this depressed basin, forming each time a lake which eventually evaporated, and the lines of old beaches are still discernible at various levels. In 1905-1906 the entire river reversed its normal course to the Gulf and flowed into the basin, creating in this most recent incursion a weird lake with an area of nearly 500 square miles

and a maximum depth of 84 feet—the same Salton Sea, now somewhat shrunken, of modern maps. Engineers finally subdued the river in 1907 and put it back in its bed before the waters could drown the Imperial Valley and all the rest of the huge area below sea level.

The original habitat of the palms, according to one speculative version, was about the margin of the marine waters when all that depression was occupied by the Gulf of California, and indeed there is a thin, sporadic belt of palms, or there was in my day, along the base of the Indio Hills just above the ancient beach line. That the palms are of the desert there can be little doubt. I have just cited one instance of it, where they grew along ledges without benefit of canyon walls. I think of other places in the open desert where I visited the palms or camped under them—the Twelve Apostles, Two-Bunch Palms, Twenty-nine Palms. I vividly recall Seven Palms, an old waterhole frequented only by prospectors, about seven miles north of Palm Springs; paradoxically there were about twenty palms at this windblown, sun-ridden, sand-blasted oasis, manifestly created by the Devil along with the general area surrounding it. Nowhere, however, did the palms occur unless there was a supply of water, usually bad, in the form of a spring, a stream, a seepage, a mere trickle on alkali-encrusted ground, or else invisible ground water. Their presence was a sure indicator of water either on the surface or not too far below it—not, like the presence of mesquites, an indicator of a water table too low to be hopefully available.

The name "desert palm," sometimes applied to *Washingtonia filifera*, may seem an anomaly, for the plant has no xerophilous properties whatsoever; that is, it has no built-in water storage capacity nor any other defenses against



Fig. 29. A scene in Palm Canyon. Photograph by Stephen H. Willard.

prolonged drought. The name is apt, nevertheless, for the reason that the desert canyons and other desert sites are uniquely its habitat. There is not one instance, so far as I know, of a natural occurrence of the palms in coastal California except for reported fossil remains. The westernmost native station, or nearest approach to the coast, was in Snow Creek Canyon near the northwestern end of the desert (imperfect or past tenses frequently employed here because the writer does not know where the aboriginal palms still survive); there were seven or eight palms, as I recall, with only a thin trickle of water rising to the surface, and the influences at work in this location were predominantly of the desert rather than of the mountains.

Back there in 1924 I roamed that transplanted bit of Arabia in a stripped-down flivver equipped with half-deflated balloon tires, penetrating into many a canyon on foot and camping at many a waterhole. I got on good familiar terms with the palms as one result of all this wandering, and came to have an abiding reverence for them. They were a goal for practical reasons, too; usually their presence meant water and always shade, and not seldom the difference between life and death. During midsummer a man traveling on foot under that murderous sun cannot live without water more than three or four hours; the time is still shorter if he is toiling up grade, as on the miles of rising talus-slope in the mouth of some immense wide-mouthed canyon. But perhaps I should explain how I came to be fraternizing with lizards and competing for existence with coyotes in that inhospitable region.

By dint of house-to-house peddling of dubious goods, during the course of which I must have rung every doorbell between Pasadena and Santa Monica at least twice, I amassed about one thou-

sand dollars, which convinced me that I was independently wealthy; so, with this stupendous grubstake, I decided to throw off the shackles of sordid commerce and become an author-explorer. Accordingly I gathered up my family, consisting of one wife and one baby, and headed for Palm Springs where we established ourselves in a stylish shack whacked together with packing-box boards and canvas. I explored the desert, wrote reams of high-toned literature which was uniformly, even rudely, rejected by sundry magazines, and achieved only ignominy instead of renown. The grubstake and likewise the grub came to an inglorious end in just over eight months, but not before I had managed to drive, walk or crawl into every cranny of that desert not made inaccessible by terrain or lack of water. Of course thousands of people have viewed the famous stand of native *Washingtonia* in Palm Canyon, just a short drive south of Palm Springs, but the multitudes have never glimpsed the palms in the remoter canyons or at such unsung waterholes as Seventeen Palms. This last is not to be confused with Seven Palms. Even today, I suspect, one can still share with a handful of Indians and "desert rats" whatever thrill goes with the quasi-discovery of several lonely palms far up in Magnesia Spring Canyon—unless some understudy of Death Valley Scotty has dynamited the canyon and erected an air-conditioned castle complete with TV and swimming pool.

Something akin to this brand of progress has long since converted the once tiny resort of Palm Springs into one of the plushier of world-renowned playgrounds. It has become a city, no less, replete with paved streets, costly cha-teaux, smart shops, and all the super-charged adjuncts of civilization. Its swimming pools are as numerous as spines on a biznaga, though the only

water in sight. c., 1924, was in an irrigation ditch. The simple and charming village that was my desert headquarters had then but the one and only Desert Inn, two or three dusty lanes, a general store which was also the post office, and a permanent population of three or four whites and some thirty Indians. In winter this was augmented by the seasonal advent of several hundred people, many of them guests at the Desert Inn and the rest health-seekers or loafers scattered about the village. Come summer, everyone who could cleared out to avoid temperatures occasionally rising above 120°F. in the shade. Of the village washingtonias a small group near the wooden bathhouse over the hot springs was supposed by the Indians to be natural, and in fact an old woman pointed them out to me as indigenes like herself; but were I to return today in an attempt to sort out the native palms from those now cultivated, very likely I'd get lost in the strange new city and besides get pinched for vagrancy by a cop in a natty uniform.

Since 1924 no small part of the open desert has undergone a transformation equally drastic. *Phoenix dactylifera*, that other palm ideally adapted to desert oases, now roams in seemingly endless date groves the former wastes where grew only greasewood, spiteful chollas and other xerophytic plants. New resorts have sprung up, and romanticizing the desert has become a sort of cult that plays into the hands of ambitious promoters. Water skiers and outboard racers ply the Salton Sea, that former synonym for utter desolation and death. Trailers are hauled into the mouths of once inviolable canyons and campers camp there. Sunday drivers fan out over every passable road; smart-aleck slickers venture beyond them, sometimes ending up in serious predicaments. Notwithstanding all these encroachments, over half the desert re-

mains untouched and unseen by the horde, the far dry reaches and the funereal mountains as full as ever of peril to the careless and challenge to the dreamer. Anyone fond of foolhardy risks can still achieve his sure demise by starting with only a quart canteen of water, any July day, for some uncertain water hole but five miles away and then losing his bearings. All too often even nowadays, in the southwestern deserts, the reckless and innocent alike still die of thirst in the furnace heats of summer. Some of these needless deaths occur because the danger had been believed exaggerated.

How does any of this relate to the palms? It relates directly, for their true home is in this grim but fascinating land and in the canyons of the bare, baleful mountains that are part of it. Its mood, its topography, its water or lack of it, its every aspect, all have to do with the palms and their manner of life in the varied footholds it has provided for them. Footholds, certainly, and only the barest of such, is the right word for many of the native stations. Two or three palms growing far back in some blistering, blighted canyon where it dwindles beyond its fan of boulder-strewn detritus, with only *Atriplex* and ocotillos for company, inspire a different kind of awe from that felt by the tourist gazing at the stately groves in Palm Canyon where an incredible stream of water flows in the midst of other-worldly magnificence. No, our mere foothold is a different kind of miracle, minus prodigal array of greenery and minus visible water. Perhaps one of its two or three palms is growing high on the canyon wall, in a niche of sun-baked red granite, eternally beyond the reach of water. Or so it appears, but you know that the appearance lies and that the roots are supplied with moisture, brought to them by an uptilted stratum of rock. The awe

proceeds from feeling yourself a discoverer of a natural wonder, although the odds say you have been preceded, and from coming upon, perchance unexpectedly, grand and noble palms where no palms should be; huge forms of life they are, massive, not little or pretty like violets, but big, bigger than your father or even your grandfather, and longer lived, and venerable, and more eloquent in their virility and magnitude than any puny form of beauty is eloquent. In this thermal cleft of Hades you have come upon defiantly grand palms that seem dreamlike but yet real, and you feel that you have surprised the stuff of which the most moving poetry might be made. If your canteen is not empty and the temperature below 110° , you vaguely think of Ozymandias and other such dithyrambs without even knowing quite why.

Should rhetoric seem to have the upper hand here, then picture yourself starting to hobnail your way from Palm Springs up into the head of Chino Canyon where, you've been told, are a few wild palms. Not today, for I hear that a subdivision for nabobs has been planted in its mouth, but back there in the Paleozoic year 1924. It's seven miles up there and seven back, so you fill your two-gallon canteen. Nothing to it until you come to the base of the wide alluvial fan filling the canyon mouth. The palms at the head, where San Jacinto abruptly begins its mighty soar to 10,000 and more feet, are out of sight, but in that deceptive dry air the mountain wall looks only half a mile distant and the intervening slope looks only a little out of level. Actually the mountain is three miles away and you soon find that the gentle slope is steep and made steeper by a sun hot enough to scorch the ears off a jackrabbit. The very lizards whiz madly from bush to lee of boulder to avoid singeing their feet. In

summer no rattler ever ventures out under the sun; experiments with them have shown that a ten-minute exposure at noonday kills them outright. If you see a sidewinder as you toil up the slope, it will be hugging the sparse shade under a bush or a boulder. No shade, no rattlesnake.

Before you reach the palms up there near the mountain wall, the water in your canteen will be half way to the boiling point. Your pulse pounds insanely at your temples, and you wonder if you must die absurdly while taking a short walk. Those black shapes up ahead resolve into palms with green crowns. They are well advanced out under the same sun that does you violence, and they make your fears seem asinine and shameful. You come up to them near a warm spring; they are few in number, not of the tall or imposing kind, and their trunks are clothed to the ground with a heavy thatch of appressed dead fans. But, as a sequel to the miles of glaring talus-slope and its scant starved vegetation, the vivid green crowns salve your abused gaze and proclaim that hopeless desolation has found its master. Now you know that you will live to a ripe and jaunty old age.

Only a stone's-throw up the canyon, beyond the palms, the desert suddenly ends as if fenced off. Willows spring up, then merge into a thin copse of cottonwoods, plane trees and alders continuing on up to the cliff face down which a flattened band of water traces a film. Right here under the mountain mass the ground moisture is obviously plentiful, so you searched the copse for palms. There were none, of course, for you had ventured a few rods beyond the desert's own domain. The palms would have none of this negation of the desert, demanding to be at home in their austere overlook out there in the fire. In



Fig. 30. Below standard but contemporary with the text, says the author, is this 1924 photo he made in a palm canyon with a battered 2A Kodak fitted with groundglass back for film pack.

among the leafy trees, you found instead of palms a stretched-out six-foot diamondback which you would have treaded upon with your next step. It obligingly held itself motionless while you crushed its head with your stick. You cut off its head, trudged home with it, nailed it up on an outer wall of your palatial home, skinned it, buried the carcass, dug it up six months later expecting to see a bare skeleton, and found the flesh uncorrupted by that dry soil.

Palms grew natively in every canyon near Palm Springs—in Tahquitz, Andreas, Eagle, Murray and most profusely in Palm Canyon itself. Each of these canyons had its own special features and charms. Though greatly varying in quantity of water and in form of rock and cliff, the scenery was striking in every one. That rarest of phenomena in such places was the stream of clear mountain water that coursed through Andreas Canyon, forming little cascades and rock-bound pools overhung by tall palms with clean trunks. Here the palm fronds stood out in singular beauty against cliffs of granite sunbaked to shades of red and brown that somehow made the foliage appear a more vivid green than it actually is. Murray Canyon I remember chiefly for the stand of palms uniformly clothed, from their crowns to the ground, with an immensely thick shag of bleached-out, tinder-dry dead leaves. Most of these straw-colored columns were thirty to forty feet tall, each with a diameter of about ten feet. What a conflagration one careless match could have caused in this grove! Because the dead foliage clung to the trees with such persistence, it struck me as odd that the ground here should be covered, as it was, with a foot-thick carpet of dead leaves. In this canyon and others where the same heavy thatch of crunchy

fans littered the ground, I trod with no little trepidation for fear of rattlers.

Eastward across the desert from Palm Springs lies Thousand Palm Canyon, a worthy objective in the foothills of the Little San Bernardino range. Mind, this is 1924 and no road goes to the canyon. We can make it as far as Indio and worry later on about the rest. The Coachella Valley is not one endless date plantation as now, but already there are a few prosperous date "ranches." Near Indio we hail an acquaintance who is a grove owner; he gaily waves back from his barrel of water, in which he is immersed up to his chin with all his clothes on—a customary way to cool off a bit. After Indio the Model T chugs as far as it can and the rest of the way is on foot. Rounding a spur of the hills, the canyon suddenly opens its wide jaws and there at once are the palms in patches and groves, and singly too. The first palms are well advanced on the plain, venturing out as far as their roots find moisture. Most are tall trees with bare trunks and only the minimum of shag up there under the crowns. The trunks of short but old trees are likewise bare. But I would be on much safer ground to switch out of the present tense.

Thousand Palm was not a continuous forest but a succession of thickly populated groves separated by acres of open spaces. Besides these groves there were outposts of stragglers, groups of three or four palms, thin files of others, following the erratic pattern of underground moisture. The sun-struck and nearly bare expanses separating the dense groves from one another supported only a few starveling creosote-bushes and other such exponents of cruelest drought. Even so, several parched gulches tributary to the canyon each contained a few palms in perfect vigor. The ground under the compact stands was thatched with dead fans made

slippery by excessive dryness. No other plants grew in this brittle carpet of leaves that crunched and slithered disconcertingly underfoot.

Gazing desertwards from about mid-way among the palms the view had the fascination of unreality: pale desolation falling away downgrade to the Salton, relieved here and there by the groups of stately palms advancing upon it under a pitiless cobalt sky. The scene was utterly alien, and yet a moving one finding no adequate reflection in words. From this point the two-mile height of San Jacinto was out of sight, but the gaunt Santa Rosas flanking its bulk loomed up anemic and skeleton-like in a sort of lunar loneliness far across the waste. I made no attempt to guess at the number of palms in Thousand Palm Canyon. Whether 3,000 or only 999, the day was too hot even for guessing.

I have some uncommonly warm recollections of Twenty-nine Palms, a natural oasis in an elevated basin north of the Colorado Desert and south of the Mojave (although sometimes held to be actually in the latter desert). I started for it on an infernally hot day in August by a route from Indio. This route should not have been attempted in any kind of car, for Twenty-nine Palms was then readily reached by a fair road up through the Morongo and then over an easy stretch east of the Joshua trees. But no, I had to do it the hard way, and was lucky to come out of it alive. The road worsened steadily in the hills north of Indio, becoming steeper, rockier and strewn with small boulders some of which obliged me to jack up the flivver. The rear wheels spun on loose stones and eventually the radiator boiled away all my extra supply of water and even the drinking water from two waterbags. Only a miracle could extricate the '21 Ford and me from this stupid plight,

and that is exactly what happened. It happened, that is, in God's good time, when I knew beyond doubt that I was finished. A banging and a screeching preceded the freight wagon that finally drew up beside me, and the teamster replenished my water supply from his barrels, mumbling about idjets and cursing all the while. After his parting shot to the effect that next time he'd see me in hell first, I went on up that miserable excuse for a road. Still shaken up by the close call, I took the first faint but wrong tracks to avoid deep wagon-ruts. This was a bad mistake that culminated in a whole new series of nightmarish misadventures, but, after floundering about all night, I emerged next day on a traveled road leading to the Virginia Dare gold mine. Where the car ground at a snail's pace up the steep sandy rise to the camp, some foul ball had put up a sign lettered: "Welcome to Dale. Slow down to 50 m.p.h." An off-shift miner took me in hand and saw me off on the right road to Twenty-nine Palms, first priming me with a belt of rotgut which, he assured me, would be good protection against sunstroke in my topless jalopy.

Shortly a scattering file of palms appeared on the skyline, and five minutes more brought me to the poolside in the center of Twenty-nine Palms. The colony of palms, numbering less than twenty-nine, was far removed from any other and presumably marked the northern limit of distribution in California. The supposition that the occurrence was natural is, however, subject to question, for the Indians who formerly lived on the site may have introduced the palms from the southern desert a century or more ago.

Two burros were foraging in the reedy bog about the waterhole, and I looked around for their owner. I had

not far to look, for there he was—the most dessicated prospector I ever saw—reclining against a bank in the dappled shade of a cottonwood. When I saluted him with the remark that the temperature must be close to 120, he snorted and said I oughta be glad of it; he had camped there the past winter and one night ice busted his canteen plumb in two. I should try camping there, come January, and I would wish it was July. Fact was, he said, some skunks stole his shed for firewood and he like to froze hisself solid. There were two or three dilapidated shacks about, apparently abandoned, so I had to discount the revelation.

We talked listlessly about the palms, which this withered old hoss called pams to rhyme with hams, then drifted off to the subject of desert water and again back to the palms. Water there was fine, he told me, but other places it had a little arsenic in it. Too much in some places, would pizen anybody or anything but a pam. Pams liked arsenic. Pizener the water the better they grew. Well, I surely cannot vouch for the arsenic, but it is a solid fact that the palms flourished at places where the water was too vile to drink. Excessive alkalinity was apparent in the sickly white crust about many springs and seepages and along the margins of feeble streams in canyons. Saline waters were commoner than not at the sites where palms spontaneously occurred, and often the content of noxious salts was high enough to cause a drinker to vomit.

Here again at Twenty-nine Palms the aptness of the term "desert palm" was made forcibly manifest. Twenty or so tallish, bare-trunked palms were dotted about this waterhole set down in the midst of a vast sun-stricken plain ringed by the ghosts of mountains. This region for its funereal quality, sheer immensity, and intensity of heat, could have vied

with some awesome corner of the Sahara itself. Momentarily I almost expected to see a column of the Foreign Legion or a camel caravan advance upon the oasis. None appeared just then, but in time they did when the movies went on location there.

We two transients did not suspect that a town of 6,000 population would spring up here. Over the years that have since elapsed I had heard rumors of such an incredible development and at last have had them confirmed by a brochure received from the Chamber of Commerce of Twentynine Palms (no hyphen now). From it I learn that this former haunt of desert rats and Indians is "a well-zoned city" containing a bank, stores, churches, theaters, bowling alleys, an art gallery, *etc.*, and that "Twentynine Palms welcomes farsighted industrialists." My last visit there was in July, 1925, on another blistering day when, so far as I could make out, the entire population consisted of me and some lizards and the palms.

Not so well-known or readily accessible as some of the stations that I have already mentioned are others that, because of either remoteness or difficult terrain, should be still primeval and unspoiled by human encroachment. One such unspoiled palm-locality is Corn Springs, an old watering-place frequented only by Indians and nomadic miners, on the north flank of the Chuckwalla Mountains. It is easily reached by a modern low-slung car—or it was as lately as 1946 when I camped there overnight while on my way from Palm Springs to Death Valley. But I see that my allotted space has been overrun, wherefore I shall mention only briefly some other stations in the hope that they still remain inviolate and that someone of an inquisitive mind and adventurous spirit will want to seek them out.

Often there will be but two or three

palms. Nearly all the place-names will be found on the old U. S. Geological Survey maps accompanying the Water-Supply Papers. First, there is wide-mouthed Deep Canyon, about 14 miles southeast of Palm Springs; the palms are far back in the canyon where it narrows to a gorge. A different "Thousand Palm Canyon" opens on Coyote Creek above Collins Valley, and a different "Palm Canyon" penetrates into the San Ysidro Mountains. In this same quarter of the desert there were spotty occurrences of palms far up Coyote Creek Canyon and in some of the unnamed side-canyons. Other localities on the Water-Supply maps, in various parts of the desert, are Mountain Palm Spring, Palm Wash, Burnt Palms Spring, two waterholes forty miles apart each called Dos Palmas Spring (the better-known one easily reached by road from Mecca), Agua Caliente, still others. The palms at Figtree John's, if there is

still a place of that name, were planted by John himself. I had heard that there were a few palms in Martinez Canyon, but failed to find any; and I often heard vague reports of palms in unnamed canyons and at waterholes, mythical perhaps, which were beyond my powers to investigate.

To explore every last large or small canyon and rift in the Colorado Desert would have been impossible by any ordinary means, whereas the thing might be accomplished nowadays by helicopter. Jeeps and sand-buggies are good up to a point, but cannot overcome dry washes with vertical sides and certain other obstacles. When one considers that the Arizona station of sixty or more trees was not discovered until 1923, it seems highly probable that some California occurrences of only two or three palms may remain still hidden and unseen by man since the dawn of time. At least I like to think so.

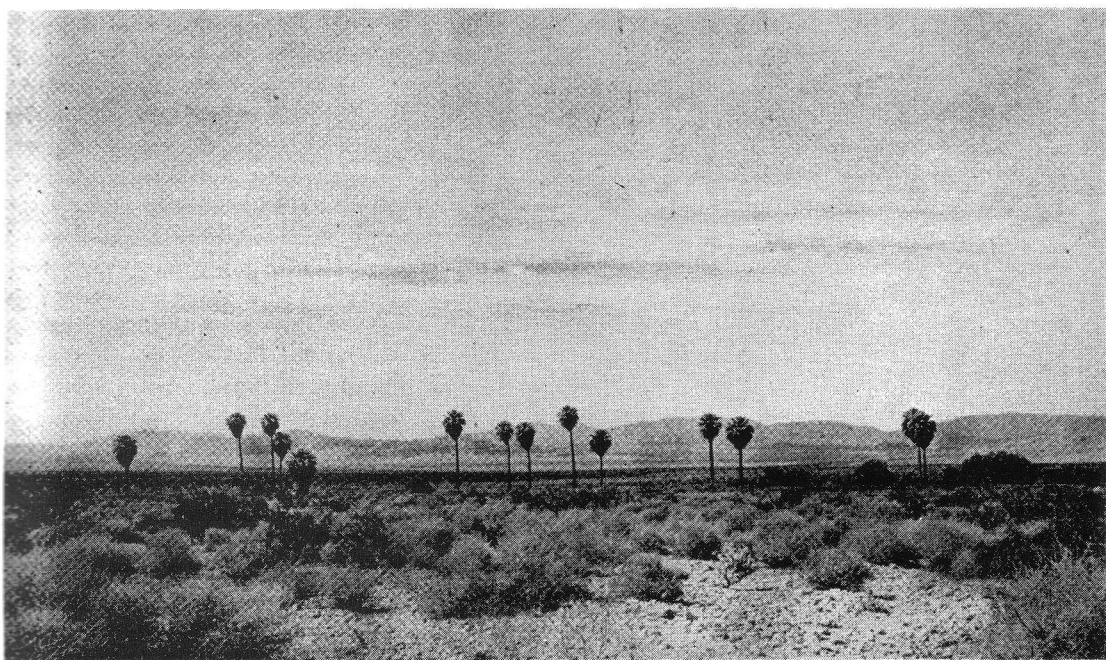


Fig. 31. Twenty-nine Palms as it appeared in 1924. Photograph by Smeaton Chase.

The Ecology of Paraguayan Palms

MIGUEL MICHALOWSKI

Botanist of the USOM to Paraguay (STICA), Professor of the University of Asunción

A traveler in South America might be surprised to find that palms are abundant in Paraguay. There he would find 40 to 50 species, among them about 20 known nowhere else. Farther to the south, in Uruguay and Argentina, neither the number of species nor the number of individuals is as large and the 35th parallel is considered the southern limit of palms in Latin America.

The Paraguayan palms are still awaiting detailed study. This short essay does not pretend to be such a study. It does, however, present a general ecological classification which may prove useful for future students. Two principal ecological groups of palms are evident in Paraguay: solitary palms which grow as scattered individuals, never forming communities, such as the *pindo* (*Arecastrum Romanzoffianum*) and the *palmito* or *yeyi* (*Euterpe edulis*) also called *assai* in Brazil; and social or gregarious palms which form communities called *palmares* in Paraguay.

These communities formed by palms are included within the phytosociological order which I call palmetalia and are of two distinct types: the palmetion silvarum composed of palm forests known in the vernacular as *monte palmar* formed principally by a species of *Copernicia* (known locally as *caranday*) and the palmetion camporum composed of palms scattered in the grass plains never forming forests and known in the vernacular as *campo palmar*. The most typical representative of the last alliance is the *mbocayá* (*Acrocomia Totai*). Therefore the *campo palmar* form-

ed by the *mbocayá* is known in Paraguay as *mbocayaty* —*ty* meaning "a great quantity" in the Guaraní language. Many localities in Paraguay bear this name attesting to the importance of the community.

Several parallel series can be found in each type of palmetion. Among the erect palms, we meet with three series:

- I —relatively pure communities of tall palms such as the *copernicias* which sometimes reach a height of 25-30 meters and for which the term *macropalmetum* may be used.
- II —communities of palms such as *Acrocomia Totai* and the *copernicias* with an average height of 8-15 meters, the *mesopalmetum*.
- III —communities of dwarf palms belonging to the genera *Acanthococos*, *Attalea*, *Diplothemium*, and *Syagrus*, the *micropalmetum*.

The climbing palms, of which *Desmoncus rudentum*, known locally as *urubamba*, is the most typical representative, form a fourth series which may be designated the *palmetum scandens*.

The introduction of the term *micropalmetum* requires explanation. Communities of woody plants in Paraguay take three forms: a) the forests, known locally as *monte alto* or technically as the *arboretum*; b) communities of tall shrubs, the *monte bajo* (*matorral*) or *macrofruticetum*; c) communities of dwarf shrubs, the *microfruticetum*, with species of *Campomanesia*, *Myrcia*, and other genera of Myrtaceae, *Calliandra brevicaulis*, *Jacaranda decurrens*, and

others, most of them with large subterranean trunks showing only the leaves above the surface of the soil. All the palms of the micropalmetum possess the same peculiar characteristic of subterranean trunks with aerial rosettes of leaves. They deserve especial attention as plants to be grown as ornamentals in pots or tubs.

Within each of the groups of palms mentioned, there are some well defined ecological types in two major categories, the shade-loving or umbrophytic palms, and the sun-loving or heliophytic palms. These types are summarized in the accompanying chart and are amplified in following paragraphs.

Shade-loving or Umbrophytic Palms

Shade-loving palms may be placed in three categories, the first of which is not given an ecological name.

1. A group of tall solitary species (12-20 meters high) which cannot be considered as elements of the macropalmetum since they never form communities. Here belong *Arecastrum Romanzoffianum* and *Euterpe edulis*, both with mesophytic characteristics, preferring red soils and a pH between 5.5 and 6.5.

2. The mesopalmetum—palms with a height of 2 to 4 meters, all possessing hygrophytic or even hydrophytic tendencies, the species of *Bactris* often growing in water. These palms frequently form dense communities in the river gallery forest (*sotos*), their pH range being rather wide. The following species predominate: *Bactris Anisitsii*, the *mbocayá mi* or *caranda*; *Bactris bidentula*, *maraja do Igapo*; *B. inundata* or *tucum*; *Geonoma Schottiana* or *guarica*.

3. The micropalmetum—dwarf palms with the same ecological requirements as the foregoing group. The typical representative is *Scheelea parviflora*

with subterranean trunks and leaves reaching a length of 2 to 4 meters.

Sun-loving or Heliophytic Palms

The sun-loving palms occur on virgin soils of saline and non-saline nature and on tilled soils as well. Those of the latter are considered first.

A. Palms of Tilled Soil.

The most typical representative of this group is *Acrocomia Totai*, which belongs to section *Sentocomia*. According to a popular expression "the *mbocayá* follows the plow," and for this reason the principal area of *Acrocomia Totai* coincides more or less with the central region of Paraguay, the region of farming. It is strange that this species, so abundant in the country and possessing a high economic value (the fruits are rich in oil, the leaves provide forage), is practically undescribed. The *acrocomias* of Paraguay are not uniform. Some of those ascribed to *A. Totai* above probably belong to *Acrocomia sclerocarpa* (also a *Sentocomia*) while others could be placed with *A. Mokayayba*, a species of section *Tectocomia* which replaces *A. Totai* in the north. A study of these species offers a fine field for future investigation.

B. Palms of Virgin Soils.

On saline soils, which could be classified as light brown solotized latozols with a pH reaching 7 and 8, we meet with the mesopalmetum and the macropalmetum. The mesopalmetum is composed of species of *Trithrinax* (*T. campestris*, *T. biflabellata*, and others) all called *caranda*. They often form extremely dense communities of shrubs (*matorrales*) together with the *algorrobos* (species of *Prosopis*, a leguminous tree), and are very abundant in the Chaco region of Paraguay. Some *copernicias* should also be placed in this group. The species appear either in the

Ecological requirements Types of growth		Heliophytic Palms			Umbrophytic Palms	
Social Palms	Solitary Palms	Mesophytic	Halophytic	Xerophytic	Mesophytic	Hygrophytic to Hydrophytic
		<u>Scheelea princeps</u>			<u>Arecastrum Romanzoffianum</u> <u>Euterpe edulis</u>	
	Palmetum scandens					<u>Desmoncus rudentum</u>
	Macropalmetum	<u>Acrocomia Total</u> <u>A. Mokavayba</u> <u>A. sclerocarpa</u>	<u>Copernicia</u> sp.			
	Mesopalmetum	<u>Butia Yatay</u> <u>*B. Yatay</u> var. <u>paraguayensis</u> <u>B. capitata</u> <u>*Scheelea quadrisperma</u> <u>S. phalerata</u> <u>S. quadrisulcata</u> <u>*Syagrus Dyerana</u>	<u>Trithrinax campestris</u> <u>T. brasiliensis</u> <u>*T. biflabilata</u>			<u>Bactris unaensis</u> <u>*B. Anisitsii</u> <u>B. bidentula</u> <u>B. glaucescens</u> <u>B. inundata</u> <u>Geonoma Schottiana</u>
	Micropalmetum	<u>Syagrus sapida</u>		<u>*Attalea guaranitica</u> <u>*Acanthococcos Hassleri</u> <u>Diplothemium leucocalyx</u> <u>*D. Anisitsii</u> <u>D. Hasslerianum</u> <u>*Syagrus campicola</u> <u>*S. lilliputiana</u> <u>*S. arenicola</u> <u>*S. amadelphe</u> <u>*S. campylospathe</u> <u>*S. apensis</u> <u>*S. Hassleriana</u> <u>*S. Wildemaniana</u>		<u>Pyrenoglyphis piscatorum</u> <u>Scheelea parviflora</u>

*Endemic species are marked with an asterisk

*Endemic species are marked with an asterisk

form of a *campo palmar* or in the form of a *monte palmar*, the latter being either a very dense one (as at Colonia

Risso) or composed of rather scattered individuals (at Puerto Rosario).

The macropalmetum is composed of

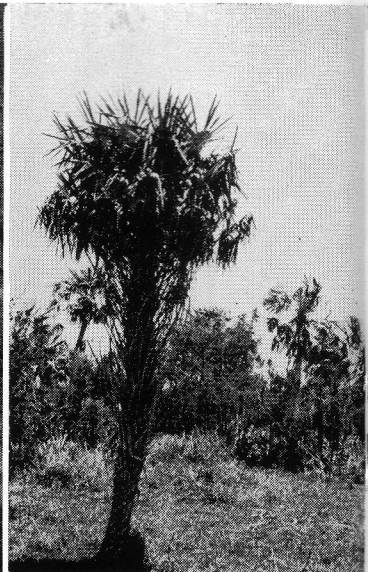
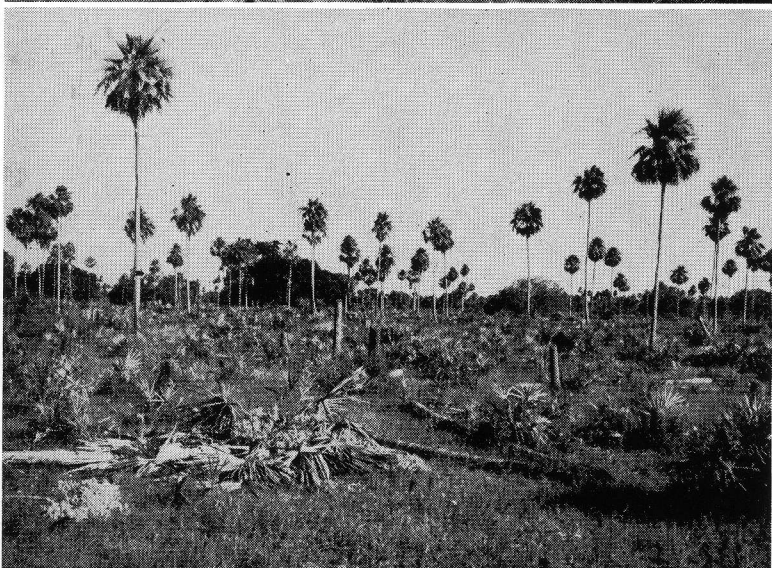
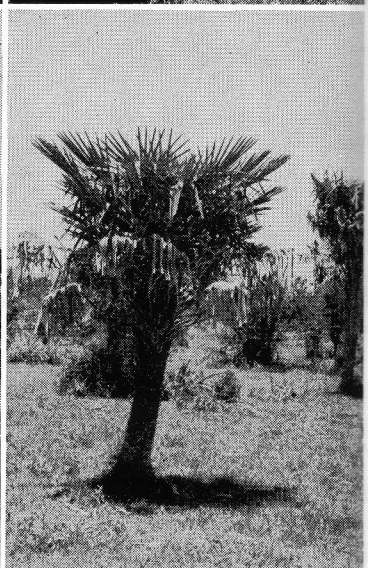
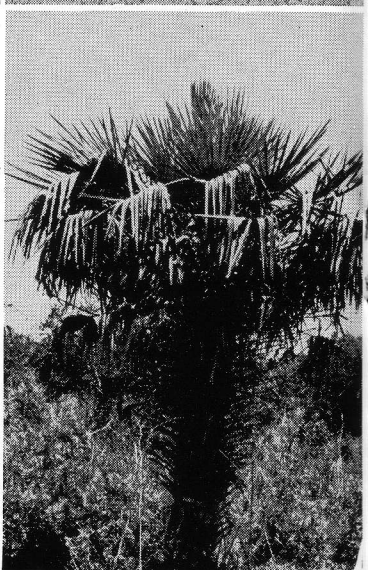
various species of *Copernicia* which are still awaiting correct identification. After several trips made in Brazil and Paraguay, I was able to establish the following geographical distribution of *Copernicia* species. *Copernicias* are common in the Brazilian state of Matto Grosso but appear also in the northern regions of Paraguay on the borders of the Paraguay River between Puerto Sastre and Fuerte Olimpo. Trees of this region reach a height of 25 to 30 meters, usually forming palm forests. Other *copernicias* form palm forests in the north between the rivers Aquidaban and Apa and extend through the Chaco toward Bolivia. Here the trees are only 15-20 meters tall. A palm that has been called *Copernicia australis* is the southernmost species, abundant in the central region and in the region of Pilar with trees reaching a height of 8 to 15 meters.

Three kinds of *Copernicia* or *caranday* palm are recognized by the people of Paraguay: the white palm, lowest of all with soft spongy wood, the red palm, and the black palm which is most appreciated of all. Whether the first two kinds could be distinguished as *Copernicia alba* and *Copernicia rubra* is a matter requiring further investigation. Argentinian writers (Cabrera and others) considered them as one species, preferring the name *Copernicia alba*. It seems to me, however, that we have to deal in this case with parallel ecological forms recorded in the literature as the three principal species mentioned above. According to Hassler, the black palms are the aged individuals while the white and red ones are the younger plants. The problem is not yet resolved and has some economic significance. Some years ago, the Paraguayan government granted a commercial firm a patent to extract the wax of the caranday. The

palm was mentioned in the patent as *Copernicia cerifera*. A rival firm objected, insisting that this species does not exist in the central region (working field of the first firm) being replaced there by *C. australis*. The government was obliged to declare the patent null and void until botanical agreement could be reached.

On non-saline soils we find both the mesopalmetum and the micropalmetum. The first is formed by *Butia Yatay*, which requires a pH of 4-5.5 and grows on red soils in the north (Concepción) and in the south (Misiones) where it forms *campos palmares* called *yatay-ty* in Guaraní. It should be emphasized here that terminological confusion results due to the liberal use of the vernacular name *yatay*. The Paraguayans distinguish the following types: the true *yatay* (*Butia Yatay* in the strict sense reaching 5-6 meters in height, although the Uruguayan-Argentinian species *B. capitata* reaching 6-8 meters is likely to be found in the south); the *yatay-mi* (small *yatay*, *mi* being Guaraní for small) which is only 1-2 meters in height and is probably *B. Yatay* var. *paraguayensis*. Other palms having nothing in common with *Butia* are also called *yatay*. They are *yatay pony*, *Diplothemium Anitsitsii*, a prostrate palm (*pony* being Guaraní for prostrate), and *yatay guasú* (*guasú*—big), *Scheelea quadrisperma*.

The communities of the micropalmetum, abundant in Paraguay and composed of xerophytic species confined to weathered rocky soils with a pH of 5-6.5, are very interesting. Species listed below occur in pure stands or mixed with representatives of other families (Myrtaceae, Annonaceae, Bromeliaceae). The classical locality for this association is the meseta of the Sierra de Amambay in the northeast, although



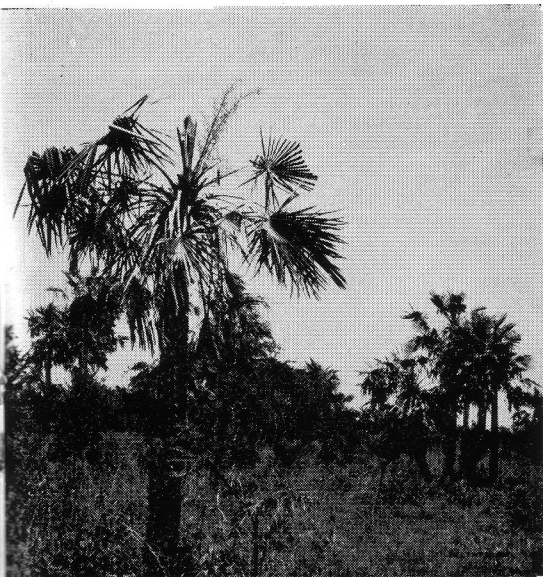


Fig. 32, top left:

A pure stand of *caranday* (*Copernicia*) at Puerta Casada, Paraguay, seen from the air.

Fig. 33, center left:

The black type of *Copernicia* probably representative of older specimens nearing the senescent stage.

Fig. 34, bottom left:

Typical handsome specimens of mature *caranday* of the red type found in abundance in the Gran Chaco.

Fig. 35, top center:

The white type of *Copernicia* is apparently a juvenile stage of *caranday* distinguished at this age by persistent petioles which later fall completely leaving the trunk clean. This and other photographs of white types are from the Río Salado region of Paraguay.

Fig. 36, center:

A flat-topped *caranday* of the white type which results from the harvesting of terminal leaves before they expand fully. These soft, yellow, chlorophyll-deficient leaves are excellent materials for weaving baskets and hats.

Fig. 37, bottom center:

A white type which has started to recover from the flat-topped condition.

Fig. 38, top right:

A white type *caranday* that has very recently been denuded of most of its useful leaves for purposes of weaving.

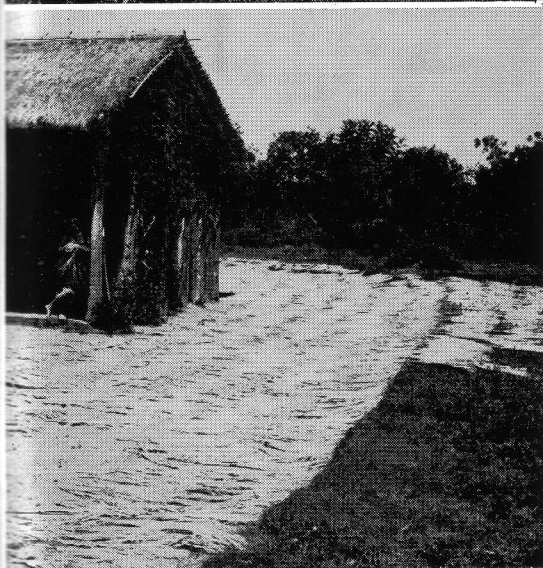
Fig. 39, center right:

Leaves from the terminal bud of *Copernicia* being sun-dried outside a hat-weaver's house, Río Salado region of Paraguay.

Fig. 40, bottom right:

Repairing a bridge over the Río Salado, a typical use of the black type of *caranday*. The hard, tough, woody, black trunks also serve as telephone poles, beams, and as timber in other manners.

Photographs by E. D. Kitzke



it appears also in the central cordilleras and in the south in the region of Itapua. *Syagrus sapida* is represented in the region of Misiones and appears also in the north.

The most important integrating species are *Acanthococos Hassleri*, *Attalea guaranitica*, *Diplothemium leucocalyx*, and *D. Hasslerianum*. The first, known as *ape hu* (*ape*, surface; *hu*, black), is a handsome species with leaves 0.5-0.8 meters long. It is recommended for use in pots. Recent investigations in Brazil show that the palm is probably the source of valuable vegetable oil. The second, *vuacuri* or *coco de la cordillera*, is an intermediate species passing into the mesopalmetum. There are dwarf forms reaching a height of 6 to 8 meters. The fruits are edible. The third, *Diplothemium leucocalyx*, is a species typical of the central cordilleras with leaves 1-2 meters long. *D. Hasslerianum* or *apepu* (a large surface) with leaves 1-1.8 meters long occurs in the north-east.

In addition to the above, some ten species of dwarf palms included in the genus *Cocos* by Barbosa Rodrigues but placed in *Syagrus* by Beccari occur in the association. The most interesting of these is doubtless the lovely *Syagrus lilliputiana*, a palm only 10 centimeters in height with leaves 30-40 centimeters

long. Hochreutiner called this palm a "treasure of the Paraguayan flora." Its area is confined to the northeast in the region of the Capiibary River.

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Fig. 41. A typical *mbocaya-ty* of *Acrocomia Totai* in Paraguay. Photograph by M. Michalowski.

The Arikury Palm

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The arikury palm, native in the state of Bahia, Brazil, has been in cultivation for a number of years yet it is not common in Florida or elsewhere. Those who are familiar with this palm seem divided in their opinion on its merits. It is true that it lacks the nobleness of a royal palm, the graceful beauty of a queen palm, and the sleekness of a solitaire palm. But it does have its own type of beauty and gracefulness. The seeds germinate readily, its culture is not difficult, the plants flower and fruit at an early age, and most important, it is a dwarf species adaptable to planting in small yards. For these reasons it deserves considerably more attention than it has heretofore received.

Technically it is known as *Arikuryroba schizophylla* (Mart.) L. H. Bailey. The name *Arikuryroba* is a Brazilian Indian vernacular name and *schizophylla* means "split leaf." Originally the species was placed in the genus *Cocos* by Martius in 1826 as *C. schizophylla*. Barbosa Rodrigues placed it in a new genus, *Arikuryroba*, in 1891 but called it *A. Capanemae*. Beccari, in 1916, recognized the latter as being the same as Martius' species, *C. schizophylla*, but he shortened Barbosa's name to *Arikury*. In 1930, Bailey transferred the epithet to *Arikuryroba* where it now stands.

The common name is arikury palm. Dahlgren lists twelve other names, mostly Brazilian and representing variations of spelling and pronunciation of *Arikury*. According to Blatter, the leaflets are made into hats and the juice of the unripe fruit is used for treating in-

flammation of the eyes. The fruits are edible and are said to be found sometimes in the local markets in Brazil.

The arikury palm is not mentioned by early writers on palms of Florida—Nehrling, Dahlgren, and Simpson—nor by later writers such as Jordahn and Loomis. It was not included in the first University of Florida bulletin on palms ("Native and Exotic Palms of Florida," *University of Florida Agricultural Experiment Station Bulletin* 184. 1926) but was included in the 1931 and later editions of this bulletin. Blatter, in *Palms of British India and Ceylon* (1926), has a short description as well as a photograph of *Cocos schizophylla* on page 531. L. H. Bailey listed synonyms and gave the history of nomenclature for the species in *Gentes Herbarum* 2:195-199, 1930. He also included a photograph of the plant growing at the Atkins Garden, Soledad (Cienfuegos), Cuba, and a photograph of a cluster of fruit and an inflorescence, both from plants growing in the Botanic Gardens, Georgetown, British Guiana.

The United States Department of Agriculture does not appear to have offered plants for distribution, although there have been several introductions listed in the USDA Plant Inventory. The first, as *Cocos schizophylla*, was in 1913 when seeds were collected by Dorsett and Popenoe in Bahia, Brazil. In the 1930's seeds were sent from the Atkins Garden on five occasions (P.I. 88107, 90897, 91755, 101131, 105727). Plants growing at the USDA Plant Introduction Garden in Miami at the pres-

ent time result from P.I. 101131 received in 1934. In the same year, Dr. Fairchild sent seeds from the Botanic Gardens in British Guiana (P.I. 104681).

According to Dr. Duncan Clement, the first arikury palms grown at the Atkins Garden were from seeds obtained from the Royal Palm Nursery in Oneco, Florida in 1918 or 1919 and the USDA introductions mentioned above were from these plants.

It is probable that Reasoner's Royal Palm Nursery was the first to introduce and to cultivate this palm in Florida, perhaps in the early 1900's or more likely between 1910 and 1915. The source of the material is unknown, but plants or seeds from this nursery were distributed to botanical gardens and nurseries in Florida and Cuba. The original plants for the late Col. Robert Montgomery's collection in Coconut Grove were obtained from Royal Palm Nursery in 1932 (as *Areca Aliciae*). Mr. Ray Vernon, Superintendent of the collection, states that these plants were fairly large when they were obtained, indicating that they may have been ten to fifteen years old. The Sub-Tropical Experiment Station in Homestead also obtained its original plants from the Royal Palm Nursery in 1933. Seeds and plants have been distributed by the Station since 1948. The Fairchild Tropical Garden also distributed plants in 1949 and 1954. The Garden's specimens, originally obtained from the Montgomery collection, were planted out in 1938.

CULTURE

Plants at the Sub-Tropical Experiment Station produce fruit in the fall months, usually in September or October, but in some years as early as August and in other years as late as December. Fresh seeds, after the fleshy pulp has been removed, are planted in a loose

mixture of half vermiculite and half peat moss. The seeds will germinate in two to three weeks. After several months when seedlings are four to six inches high, they are potted in individual containers. When two to three years old and about two feet high, they can be planted in the ground.

Being a dwarf palm, the arikury can be grown in a large pot as a tub specimen. In England, where this palm was introduced in 1846, it has been used as a pot plant in greenhouses and conservatories. The species is well adapted to landscape use. It can be planted in the border among other plants, giving it a space about six feet in diameter for the leaf spread, or it can be used as an accent plant or planted next to the house with smaller shrubs in front. Partial shade, especially under a large spreading tree, provides the best condition for growth but plants will tolerate full sun. *Arikuryroba* is considered a tropical plant. In Florida, therefore, it is limited to the southern part of the state which is free of prolonged cold spells. Old plants have been invaded by a fungus at Fairchild Tropical Garden (*Principes* 1:65. 1957) which would indicate perhaps that the palm may be rather short-lived. Frequent fertilizing and watering during the winter and spring dry months will encourage faster growth. Old leaves should be cut off as close to the trunk as possible when they die.

DESCRIPTION

The stem of *Arikuryroba schizophylla* is solitary, reaching 5 or 6 feet with age. The trunk is slender, 6-8 inches in diameter, tapering upwards because of an accumulation of leaf bases which stand erect and are dark purple-black in color. The crown is large, rather dense, of numerous pinnate leaves 4-8 feet long and 3 feet wide which eventually are gracefully arching. The petiole, which is 2-3 feet long, is flat above and rounded



Fig. 42. A 20-year-old specimen of *Arikuryroba schizophylla* growing in the United States Plant Introduction Garden at Chapman Field, Coconut Grove, Florida. Photograph by Harold F. Loomis.

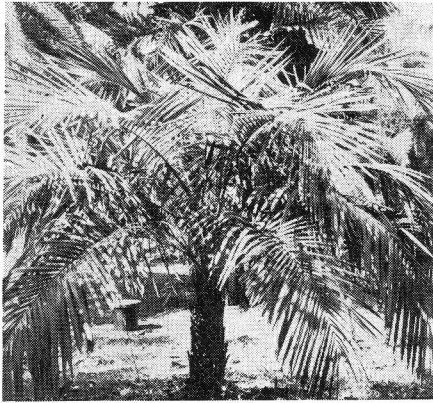


Fig. 43. A young tree of *Arikuryoba schizophylla* six and one-half years after planting out at the Sub-Tropical Experiment Station, Homestead, Florida. Photograph by John C. Noonan.

below, colored dark purple-black especially on the margins. Somewhat weak but nevertheless sharp, upward-curving spines $\frac{1}{4}$ - $\frac{1}{2}$ inch long are produced along both margins of the upper part of the petiole, these becoming smaller and further apart or absent toward the blade. The rachis is round below with a prominent elongated pointed ridge above.

Forty pairs or more of thick and somewhat stiff dark green pinnae to 24 inches long and $1\frac{1}{2}$ inches wide are linear in shape but usually taper toward the apex. The latter is long-pointed with an asymmetrical tip because of the way in which the pinnae unfold. This tip eventually breaks off leaving the apex truncate. The midrib is prominent above with isolated elongated tufts of brownish membranous scales beneath. Several lateral veins are somewhat obscure below. Juvenile leaves of young plants have terminal lobes 4-6 inches wide which split to the middle or below. The lower and older leaves fall by rotting away and breaking off near the base of the petiole leaving the basal part (1 foot or more) which may remain

attached to the stem for many years. The leaf sheath is a brown papery structure to 12 inches long which becomes twisted or curled inward on the upper part. Sheaths persist on the trunk thus adding to the shaggy condition.

Flowers appear in winter or early spring, sometimes as early as December but usually from February to March and when plants are only 3-4 years old. The inflorescence, which is shorter than the leaves, is produced from axils of lower leaves, usually 3 appearing at the same time. The spathe is double. An outer one only 6-8 inches long, 2-pointed at the apex and split on one side, does not emerge from the leaf axil and is, therefore, mostly hidden. The inner spathe, which opens on the ventral side, is 2-3 feet long and 3-4 inches wide, prominently grooved or ridged on the outside, pale yellow-orange and with yellowish-brown scales that rub off. The spadix is as long as the outer spathe, emerging from it about in the middle, and is 2-3 feet long, 8-10 inches wide. Erect at first, the compressed peduncle gradually becomes pendant in fruit. It consists of many ascending branches about $\frac{3}{4}$ inch apart and 4-10 inches long which are dull yellow-cream or yellow-orange with scattered dark-colored scalelike hairs.

The flowers are sessile, slightly fragrant, dimorphic, unisexual. Female flowers are relatively few in number (4-16) on the lower part of the branches. Male flowers are very numerous and tightly clustered on the upper two-thirds of the branches but also a few are scattered among the female flowers, usually 1-2 adjacent to each female flower. The male flowers are $\frac{3}{8}$ inch in diameter with spreading perianth parts, the 3 very small sepals $\frac{1}{32}$ inch long or less, the 3 dull yellow-orange, thick petals linear or oblong, acute $\frac{1}{4}$ inch long and $\frac{1}{16}$ inch wide. Stamens are 6 in num-

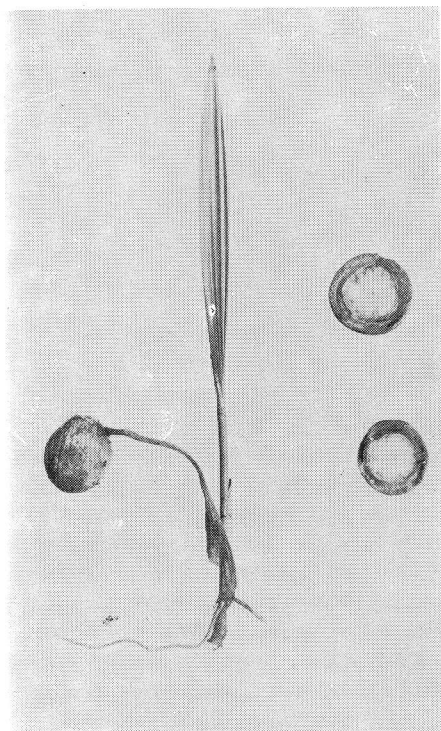


Fig. 44. Fruit of arikury palm in cross section (right) showing the fleshy exocarp, hard endocarp, and ruminant endosperm and seedling (left) still attached to the seed by the germinal cord. Photo by John C. Noonan.

ber, free and spreading, the filaments and anthers each to $\frac{1}{8}$ inch long, the anthers linear and versatile. The abortive pistil has 3 spreading styles. Much larger female flowers are $\frac{1}{4}$ inch long, ovate or ovoid or shortly conical with the perianth appressed and imbricated around the ovary. The 3 sepals and 3 petals are broadly triangular, similar in size and shape, each to $\frac{3}{16}$ inch long and wide, acute, the sepals thick, the petals thinner and more papery. Staminal nodes are united in a low, minutely toothed ring. The 1-celled ovary is subglobose with 3 erect appressed styles.

Fruit matures in the fall months, September to December, the fruiting clusters generally bearing numerous

fruits in grapelike clusters. Each fruit is $\frac{3}{4}$ to slightly over 1 inch wide, ellipsoid or almost globular but generally a little longer than wide, bright orange-yellow when ripe, with a cupular perianth at the base. The outer fruit coats are fleshy, fibrous, juicy, and with an apricot flavor; the endocarp is hard and bony with 3 germinating pores near the basal end. The seed, with hard solid ruminant white endosperm, fills the cavity of the endocarp and the seed coats are papery. In germinating, the germinal cord grows downward 2-3 inches into the soil and will lift the seed off the ground or out of the potting medium. Root and plumule emerge from the basal portion of this structure.

Flower and fruit characteristics are typical of the cocoid group of palms where it belongs in the tribe Attaleae of the subfamily Cocoideae. *Arikuryroba* is thus related to *Cocos*, *Butia*, *Arecastrum*, *Attalea*, and *Jubaea*.

EDITOR'S CORNER

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is said to have planted it on July 2, 1769, the day after his arrival in San Diego. Eighty feet high, the Serra palm succumbed at last to a fungus infection and had to be removed. The trunk will be stored in sections in Balboa Park.

The second report, sent to Mrs. Wait by Walter Hodge, is reprinted in full from Los Angeles.

PALM FRONDS SUFFOCATE MAN

LOS ANGELES, Dec. 10 (AP)—A man trimming a palm tree in a cemetery was suffocated when a mass of palm fronds slipped down the trunk of the tree and completely enveloped him.

The body of Melchor Vargas, 30, was found yesterday 40 feet up the tree under a huge circle of fronds that had been loosened by his trimming and had slipped down some six feet.

Vargas, father of six children, was still fastened in his safety belt. Investigators said the fronds, weighing several hundred pounds, had pinioned his arms. He apparently had been dead for several hours.

On the Gender of Scientific Plant-names

WILLIAM J. DRESS

American horticulturists who are not familiar with either a classical or modern foreign language are often puzzled by the presence of, and the rules governing, gender in the scientific names of plants, and except for pronunciation, this factor is more likely than any other to make the use of such names seem difficult. Modern English itself retains little trace of grammatical gender, so the very concept may seem strange to those who speak and read only English. Even the professional taxonomist familiar with Latin, however, occasionally encounters difficulty in determining the gender of particular generic names and sometimes even he is led astray.

The following discussion of this minor but often troublesome aspect of nomenclature is rather general, for it seems unlikely that there are many readers of *PRINCIPES* whose horticultural or botanical interests are confined to the palms alone. Certain rules which may not be pertinent to any existing palm-names but which may have application to the names of other plants (or, possibly, to palm-names yet to be published) have therefore been included. Though the names of palms have been used as much as possible, they are necessarily limited in number and it has not always been possible to find among them examples to illustrate particular points.

Most modern scientific names are derived from Latin words or from latinizations of Greek words, and, since gender is an integral element of the grammar of both Latin and Greek (as

well as of many modern languages), it is also an integral element of these scientific names. In Latin, three genders are distinguished—masculine, feminine, and neuter—and all nouns are considered to fall into one of these three categories. The gender of nouns, furthermore, is either “natural” or “grammatical.” Natural gender indicates the actual sex of the object denoted by the noun: *vir* (man) and *equus* (horse) are both male, and therefore grammatically masculine; *femina* (woman) and *equa* (mare) are female, and therefore grammatically feminine. Grammatical gender, on the other hand, is only a formal distinction as to sex, in objects or concepts where no sex actually exists: *mensa* (table) is a feminine noun; *mons* (mountain) is masculine; *flumen* (river) is neuter. For convenience, the terms “masculine,” “feminine,” and “neuter” will herein be abbreviated to “m.,” “f.,” and “n.” respectively.

Now, the name of a genus of plants is always a noun, and, as such, must have gender. Generic names which are words borrowed directly from Latin or, in Latin form, from Greek (whether or not originally used as names of plants) retain the gender which was assigned to them by the ancients (e.g., *Euterpe* [f.], *Calamus* [m.], *Rhododendron* [n.]). Most generic names, however, are modern compounds, formed from two or more Latin or Greek words, and in their present form were unknown in classical times. Such compounds assume the gender of their last component word (e.g., *Ceroxylon* [n.], from the Greek works *keros* [m.], meaning

"wax," and *xylon* [n.], meaning "tree").

A third group of names includes those taken from the names of persons living in relatively recent times (i.e., not mythological beings or actual persons of classical times). These are ordinarily formed by adding "-a" or "-ia" to the personal name, and are considered feminine, whether honoring a man or a woman (e.g., *Washingtonia* [f.], named for George Washington; *Roystonea* [f.], named for Roy Stone, an American engineer).

Still other names may be taken or derived from languages other than Greek or Latin (e.g., *Cocos* [f.], from the Portuguese; *Areca* [f.], from the vernacular of the East Indies). These are often called "barbaric" names, because the term *barbarus* as used by the Romans meant "foreign." It is interesting to note that the Romans applied this originally Greek term to anything or anyone not Roman or Greek, but the Greeks always included even the Romans within its meaning.

The name of a genus may also be formed in an arbitrary manner (e.g., *Lobivia* [f.], an anagram of Bolivia; *Trilisa* [f.], an anagram of the generic name *Liatris*). Neither the barbaric names nor such contrived names have any prescribed gender in Latin, of course. When thus used as generic names, they are treated as though they were good Latin, however, and the original author of each name is privileged to ascribe to it the gender he chooses. When he has failed to indicate clearly any gender for it, the choice of the next subsequent author who does so should be accepted.

The name of any species is a binomial—that is, it consists of two words (e.g., *Livistona chinensis*); the first is the generic name, the second is the specific

epithet. As has been already pointed out, the generic name is a noun with a definite gender assigned to it. The specific epithet is either another noun or an adjective, modifying or describing the generic name. (Whatever may be said here concerning the specific epithet will apply equally to any sub-specific epithet also—whether in the category of subspecies, variety, or form, or even of a cultivar—so long as it is a Latin and not a vernacular name.)

When the epithet is a noun, it may stand in apposition to the generic name, like an attributive noun in English (e.g., *Phoenix rupicola*, "the rock-dweller Phoenix"; *Ceroxylon Beethovenia*, *Beethovenia* being the name of a genus in which this species was at one time placed, and here used as a specific epithet more or less to commemorate that previous placement; *Sabal Etonia*, *Etonia* being an Amerindian name for this palm); or, it may be a noun (frequently the name of a person) in the genitive—equivalent to the English possessive case—(e.g., *Veitchia Merrillii*, "Merrill's *Veitchia*"; *Archontophoenix Alexandrae*. "[Princess] Alexandra's *Archontophoenix*"; *Bactris savannarum*, "Bactris of the savannahs"). Such possessive nouns usually terminate in one of the following inflections: -ae, -iae, -i, -ii, -is, -arum, -orum, -ium (-um). Whether in apposition, or in the possessive, such words, being nouns, have their own gender independent of that of the generic name, and therefore in no way indicate the gender of the latter. It is in this way that many apparently ill-assorted combinations (in respect to gender) occur, such as *Arctium Lappa*, *Cypripedium Calceolus*, *Liriodendron Tulipifera*, *Sedum Rosea*. In each of these instances the gender of the specific epithet is different from that of the generic name: old pre-Linnaean names, once used as

generic names, have here been made to serve as specific epithets.

When the specific epithet is an adjective, the termination of that word changes according to the gender of the generic name with which it is coupled; in Latin, an adjective always "agrees" in gender with the noun which it modifies or describes. The adjective *albus* (white) may be used to illustrate the variation in form which the specific epithet may undergo when it is used in genera of different genders: *Rosa* [f.] *alba*, *Hyoscyamus* [m.] *albus*, *Allium* [n.] *album*. In these examples, the termination of the specific epithet in each instance happens to be the same (-a, -us, -um) as that of the noun (generic name) it modifies. However, *alba*, *albus*, and *album* are respectively the feminine, masculine, and neuter forms of this word and remain so even though the generic names with which they are associated do not also have the endings "-a," "-us," and "-um." Thus, we have the combinations *Lychnis* [f.] *alba*, *Aster* [m.] *albus*, *Rhododendron* [n.] *album*.

Latin adjectives as a group have almost as great a variety of possible terminations or endings as do the nouns, though each one is constant in so far as its own masculine, feminine, and neuter forms are concerned. In some instances there may be no difference between the masculine and feminine forms, and in some others the form is the same for all three genders. The following will exemplify these various sorts and serve as models for the inflection (variation from gender to gender) of similar adjectives.

Masculine	Feminine	Neuter
<i>albus</i>	<i>alba</i>	<i>album</i>

(also *glaucus*, *mexicanus*, *nanus*, *pauciflorus*, *pumilus*, *regius*, et al.)

<i>niger</i>	<i>nigra</i>	<i>nigrum</i>
(also <i>glaber</i> , <i>pulcher</i> , <i>ruber</i> , <i>scaber</i> , et al.)		

<i>miser</i>	<i>misera</i>	<i>miserum</i>
(also <i>asper</i> , <i>filifer</i> , <i>setiger</i> , <i>tener</i> , et al.)		

<i>acer</i>	<i>acris</i>	<i>acre</i>
(also <i>campester</i> , <i>paluster</i> , <i>silvester</i> , <i>terrester</i> , et al. Some of these have alternate masculine forms (e.g., <i>silvestris</i> , <i>terrestris</i>) and then are similar to <i>laevis</i> in their variation.)		

<i>laevis</i>	<i>laevis</i>	<i>laeve</i>
(also <i>acaulis</i> , <i>domingensis</i> , <i>gracilis</i> , <i>humilis</i> , <i>mollis</i> , <i>nobilis</i> , <i>tenuis</i> , et al.)		

<i>atrox</i>	<i>atrox</i>	<i>atrox</i>
(also <i>adsurgens</i> , <i>bicolor</i> , <i>elegans</i> , <i>repens</i> , <i>simplex</i> , <i>sabaloides</i> , <i>urens</i> , et al.)		

<i>elator</i>	<i>elator</i>	<i>elatus</i>
(also <i>durior</i> , <i>latur</i> , <i>minor</i> , et al.)		

An adjectival specific epithet, then, reflects and frequently reveals the gender of the generic name. In *Rhapis excelsa*, the feminine ending of *excelsa* indicates that *Rhapis* is a feminine name, for example: *Penstemon ovatus* and *Dictyosperma album* are similarly revealed as masculine and neuter names, respectively. Adjectives which do not vary in form (e.g., *atrox*, *ingens*) are of no help as gender-indicators, of course.

Apart from actually learning by rote or from experience the genders of individual names of plants, one may be guided by certain general rules for determining the grammatical gender of Latin nouns. Exceptions to such rules are numerous, however, and not always reasonably explained. Neither all the rules nor all the exceptions can be practically set forth here, but those offered should help anyone who knows "little Latin and less Greek" to acquire at least

a feeling for the subject of grammatical gender.

Feminine Names

Generic names ending in "-a" and "-e" are usually feminine (e.g., *Erythea*, *Euterpe*). However, a group of names ending in "-ma", and, in particular, those ending in "-derma", "-nema", "-sperma", "-stemma", "-stigma", "-stoma", are of Greek derivation and are neuter (e.g., *Acrostigma*, *Eustoma*, *Ptychosperma*); however, even some Greek roots ending in "-ma", like "-gramma" and "-osma" are feminine (e.g., *Cryptogramma*, *Diosma*). Plant-names terminating in "-is" are almost invariably feminine (e.g., *Rhapis*, *Kentiopsis*, *Nomocharis*); even *Hemerocallis*, which really is not, "should be treated as feminine in order to bring it into conformity with all other generic names ending in '-is'," according to the present code of nomenclature. Names with terminations such as "-as", "-es", "-ops", and "-x" will also usually prove to be feminine (e.g., *Alphanes*, *Chamaerops*, *Thrinax*), but exceptions are numerous. The rules recommend also that a few names whose classical gender is masculine should be treated as feminine to conform to historic botanical usage: *Adonis*, *Diospyros*, and *Strychnos*. Similarly, *Orchis* and *Stachys*, which were masculine in Greek but feminine in Latin, are recommended to be treated as feminine now.

Masculine Names

Modern compound names ending in "-us (-os)" are, as a rule, masculine (e.g., *Chrysalidocarpus*, *Lithocarpus*). Even compounds ending in "-anthus (-anthos)" and "-chilus (-chilos)" (e.g., *Chionanthus*, *Dianthus*, *Lissochilus*), which are Greek neuter nouns, "have generally been treated as masculine [in the past], hence botanists are recommended to assign that gender to them," to quote the recommendations of

the *International Code of Botanical Nomenclature* (1956). Some original Latin plant-names ending in "-us" are also masculine (some of horticultural importance are: *Acanthus*, *Amaranthus*, *Crocus*, *Daucus*, *Helleborus*, *Hyacinthus*, *Juncus*, *Lupinus*, *Phaseolus*, *Raphanus*, *Ricinus*, *Rosmarinus*, *Rubus*, *Zizyphus*), but the majority are feminine in gender, in spite of the ordinarily characteristic masculine termination. The more common of these feminine names are: *Aesculus*, *Alnus*, *Buxus*, *Carpinus*, *Cedrus*, *Cissus*, *Citrus*, *Cornus*, *Corylus*, *Cupressus*, *Dictamnus*, *Elaeagnus*, *Eunonymus*, *Fagus*, *Ficus*, *Fraxinus*, *Hyssopus*, *Juniperus*, *Laurus*, *Malus*, *Melilotus*, *Mespilus*, *Morus*, *Myrtus*, *Pinus*, *Platanus*, *Populus*, *Prunus*, *Pyrus*, *Quercus*, *Rhamnus*, *Sambucus*, *Syagrus* (now a genus of palms), *Taxus*, *Ulmus*. Compounds terminating in these names (e.g., *Cephalotaxus*, *Nothofagus*) are feminine also. This apparent anomaly exists because names of plants were usually considered feminine by the ancients, though exceptions to the general rule occur.

Neuter Names

The commonest word-endings which can rather surely be expected to indicate a neuter name are "-um" and "-on" (e.g., *Rhapidophyllum*, *Borassodendron*). However, compound words ending in the Greek terms "-pogon", "-codon", "-odon", "-stemon" (e.g., *Andropogon*, *Platycodon*, *Penstemon*), and a few others such as *Erigeron*, are masculine; but those ending in "-mecon", meaning "poppy" (e.g., *Dendromecon*), are feminine. Latin names (of plants) ending in "-er" are generally neuter also; those most likely to be encountered are *Acer*, *Cicer*, *Papaver*, *Piper*, and *Zingiber* (*Amelanchier* [f.] is of "bar-

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Chamaedorea Falcifera

HAROLD E. MOORE, JR.

A recent survey of the species of *Chamaedorea* native in Guatemala has brought to light specimens that represent a new species described here as *Chamaedorea falcifera*.* The specific epithet is a Latin adjective meaning "carrying a scythe or sickle" and is used because of the curious sickle-shaped fruits. Although it is not in cultivation, *C. falcifera* would be an attractive addition to those already grown. Its home is in the dense wet lowland forests at low elevations (to 300 meters) in the department of Izabal where Dr. Julian A. Steyermark collected it in several localities.

Most chamaedoreas have black fruit that is green when immature. *Chamaedorea falcifera* has orange fruit, similar in this respect to *C. neurochlamys* recently introduced from British Honduras by James E. Smith, and to *C. concolor* of eastern Mexico. Indeed, these three species, plus others of Central America and northern South America form a rather homogeneous group within the genus, characterized not only by their orange fruit (sometimes purplish-black when completely ripe) but as well by the strong nerves that are prominent on the flowers when these are dried, and by the unusual manner in which the corolla of the male flowers opens. The petals are united and compressed into a long narrow base, then expanded and again united at their tips so that the only way for pollen to escape or for insects to enter is through lateral slits where the petals are free. A few other species of *Chamaedorea* have orange or red fruits (among them *C. radicalis* described in

Principes 1: 147. 1957) but the male flowers have petals that are free to the tip. It is not yet possible to present a complete key for distinguishing all the species related to *C. falcifera* but the accompanying illustration shows its nature.

The type of the species is a fruiting specimen in the Chicago Natural History Museum collected on Cerro San Gil, along Río Frío, Department Izabal, Guatemala, altitude 50-75 meters, December 19, 1941, *J. A. Steyermark* 41640. A male specimen in the same museum, designated as paratype, was collected between Bananera and "La Presa" in Montaña del Mico, Department Izabal, Guatemala, April 9, 1940, *J. A. Steyermark* 39191. The species has also been collected in jungle bordering Quebrada Roseúl, lower slopes bordering eastern part of Cerro Santa Cruz, northeast of San Felipe in Department Izabal, and somewhere in the eastern portion of Verapaz and Chiquimula.

*Chamaedorea falcifera** is a species with slender solitary stems 1-6 meters high, 5-7 mm. in diameter and short internodes 1.5-3.2 cm. long. From 3 to 5 pinnate leaves have cylindric sheaths briefly oblique at the apex and 6-9 cm.

**Chamaedorea falcifera* sp. nov. *C. concolori* affinis; inflorescentiae masculae rachillis paucis pendulis, femineae rachillis paucis, fructibus falcatis acutis 1.1-1.4 cm. longis; pinnis utrinque 3-4, horum nervis primariis 3, secundariis utrinque 1-3. Guatemala: Dep't. Izabal; along Río Frío, alt. 50-75 m., Dec. 19, 1941, *J. A. Steyermark* 41640 (F, typus), between Bananera and "La Presa" in Montaña del Mico, alt. 50-150 m., Apr. 9, 1940, *J. A. Steyermark* 39191 (F, paratypus).



Fig. 45. *Chamaedorea falcifera*. a, leaf $\times \frac{1}{2}$; b, top of sheath $\times \frac{1}{2}$; c, staminate inflorescence $\times \frac{1}{2}$; d, section of staminate rachilla $\times 3$; e, staminate calyx $\times 10$; f, staminate flower $\times 10$; g, staminate corolla $\times 10$; h, staminate flower in vertical section $\times 10$; i, stamens in side, back, and front views $\times 10$; j, pistillate inflorescence $\times \frac{1}{2}$; k, fruit $\times 2$; l, seed $\times 2$; m, seed in vertical section $\times 2$; n, base of fruit with abortive carpels $\times 8$; o, abortive carpels in vertical section $\times 8$; p, abortive carpels in cross section $\times 10$; q, pistillate flower reconstructed $\times 5$. Flowers drawn from reconstituted material with nerves less prominent than when dry. Illustrator: Marion Ruff Sheehan.

long. The petiole is pale below as is the rachis, the former measuring 6.5-12 or rarely as much as 33 cm. in length, the latter 10.5-23 cm. long. Pinnæ are 3 or 4 on each side, rich shining green above, paler dull green below. All have acute to acuminate tips and are sigmoid (elongate S-shaped) in outline, the terminal pair is broadest and 14-16 or rarely 21 cm. long on the upper margin, 5.5-9 cm. along the rachis with one side lower than the other; lower pinnæ are progressively smaller, those near the middle 11-14 or to 21 cm. long, 2.5-3 or to 4.5 cm. wide, those at the base 7.5-9 (rarely to 18) cm. long, 1-1.5 (rarely to 3) cm. wide. Each pinna has prominent central and submarginal nerves and 1-3 pairs of inconspicuous secondary nerves on each side, at least the central nerve somewhat elevated and keeled on the upper surface. Arching inflorescences nodding at the tip appear below the leaves, the male subtended by 3, the female by 4 tubular brown bracts, the lower of which is inserted about 1 cm. above the flattened base. Peduncles measure 16-21 cm. long, the staminate bearing 4-7 spreading-pendulous slender green branches 6-14.5 cm. long from a rachis 1-2 cm. long, the female with 4-8 slender stiffer branches

5.5-13 cm. long from a rachis 1.5-2 cm. long, these branches becoming vermilion as the fruit matures. Strongly ribbed (when dry) yellowish-green male flowers are about 2 mm. high and essentially superficial and spirally arranged on the branches of the inflorescence, the sepals united in a deeply and imbricately 3-lobed calyx 0.75 mm. high, the petals shortly united and laterally compressed into a linear base, then expanded and again united by their tips so that the corolla opens by lateral slits. The 6 stamens are about as high as the 3-angled truncate pistillode, with very short filaments and anthers that are entire at the tip, divided at the base. Female flowers have not been available for study but the nerved (when dry) perianth persists at the base of the fruit, the calyx being 0.7 mm. high and shallowly 3-lobed, the petals imbricate and about 2 mm. high. There is no evidence of staminodes. The fruit is orange, sickle-shaped and acute at the tip, measuring 1.1-1.4 cm. long, 3-4 mm. in diameter. Fruit coats are thin but the mesocarp is rather strongly fibrous, the endocarp membranous, enclosing a seed 9 mm. long, 2 mm. in diameter, with the embryo borne at the middle.

PLANT NAMES

(continued from page 67)

baric" origin, not original Latin). Neuter names are also to be found among those ending in "-ma" as is noted in the discussion of feminine names.

No really workable generalizations can be made for generic names having terminations other than those already noted—the genders of such names must be learned by practice and by consulting reliable authorities. Unfortunately, the reliability of many otherwise trust-

worthy texts is only relative in the matter of grammatical gender; even the most revered taxonomists, past and present, have occasionally gone astray in this tangled forest. Some names and name-elements have been so consistently assigned an incorrect gender, in fact, that the International Code recommends that certain of these continue to be so treated, "in accordance with botanical custom." Such of these which apply to commonly cultivated plants have been mentioned above.

Sleeve Palm Fruits on the Puerto Rican Coast

DONALD S. ERDMAN

The water-borne and sea-eroded nuts of the sleeve palm (*Manicaria saccifera*) were first brought to my attention in January, 1957, by a local fisherman at Pitahaya, Puerto Rico, a fishing hamlet on the southwestern end of the island about four miles west of La Parguera. He handed me a nut which he had just picked up from the beach and said that these nuts grew on the bottom of the sea and are cast up on the beach at certain times of the year. Since it obviously was not a marine plant, my curiosity was aroused. For identification of this fruit, I am indebted to Dr. Harold E. Moore, Jr., of Cornell University.

In March, 1957, my seven-year-old daughter found several more of these round grayish nuts which were about 1½ inches in diameter at Papayo Beach about one mile east of La Parguera. These nuts were not new to her because she and her schoolmates had collected them to eat the inside layer of white meat which is like mild coconut. Unfortunately, these nuts were all old and either cracked, dry, or moldy inside.

N. L. Britton, in *Botany of Porto Rico and the Virgin Islands* (vol. 1:120. 1923) says "The fruits of the South American Palm *Manicaria saccifera* Gaertn. are occasionally washed up on the sea beaches of Porto Rico." According to local fishermen who call this nut *coco del mar* or *coquito*, the nuts are washed up on the beaches of Puerto Rico from July to November, or during the hurricane season. The beaches at Papayo and Pitahaya are protected from open surf because they lie behind offshore reefs. The nuts are presumably

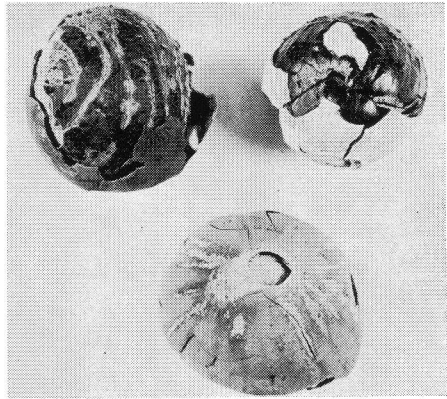


Fig. 46. Sea-eroded fruits of *Manicaria saccifera* washed ashore in Puerto Rico, about two-thirds natural size.

deposited high up on the beaches during the highest flood tides which always occur during that time of year.

The more southerly winds occurring during the hurricane season probably account for the northerly current drifts of flotsam from the south. From published charts of the South Equatorial Current, it would appear most probable that these nuts come from Brazil or the Guianas. To date I know of them only from the southwestern end of the island and have not seen them elsewhere on the coasts of Puerto Rico.

The occurrence of cuttlebones (*Sepia*) on the north coast of the island of Anegada in the Lesser Antilles (Erdman, "Vagabond Cuttlebones" in *The Nautilus* 70:106. 1957) is an interesting corresponding result of the effects of the North Equatorial Current. The probable origin of these cuttlebones is North Africa.

The Royal Palm Bug

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Fig. 47. Portion of royal palm leaflet showing type of damage caused by *x. luteolus*.

The royal palm bug, *Xylastodoris luteolus*, was described by Barber in 1920 from specimens collected in Cuba. The first record of its occurrence in the United States was reported by Mozzette in 1921. At that time it was causing severe damage to royal palms in Coconut Grove, Florida. There has been no further report of serious damage from this pest until very recently. During the spring and summer of 1957, the royal palm bug increased in numbers sufficiently to cause damage throughout the range of its host in Florida.

The royal palm bug is a member of the family Thaumastocoridae (Hemiptera: Heteroptera). This is a rather small family that has recently been revised by Drake and Slater (1957). *Xylastodoris luteolus* is the only member of the family known to occur in the United States and it has been reported only from Florida.

The adult is a very small flat insect, about 2.0-2.25 mm. (1/12 in.) in length, pale yellow in color with red eyes. The adults are winged, carrying the wings folded flat over the thorax and abdomen. The immature insects vary in size from 0.7 mm. to 2.0 mm. (1/36 to 1/12 in.). All of the instars are yellow and possess the characteristic red eye color. The egg is an elongate structure approximately 0.5 mm. (1/50 in.) in length and oval in cross-section. It is

pale tan in color and has a flat white operculum at one end.

The royal palm bug is a sucking insect that feeds by inserting its stylets into the plant tissue. The plant tissue around the entrance point of the stylets turns yellow due to the destruction of the cells caused by the withdrawal of sap. (Fig. 47) If the infestation is severe, entire leaflets will turn yellow and eventually brown.

Many of the heavily infested trees in the South Florida area are characterized by a stratified appearance. The newest of upper fronds are green, not yet showing evidence of damage. The next lower group of fronds is brown. These fronds unfolded when the royal palm bug population was high. Below these fronds are old green fronds that developed before the royal palm bug population built up enough to cause observable damage. The lowest fronds on the tree are brown due to natural processes concerned with aging.

The royal palm bug primarily attacks the newly opened fronds. It is doubtful that the bud is directly injured. As soon as the frond breaks away from the terminal bud and the leaflets start to unfold, the adults migrate to this new growth. At this stage the population on the new fronds is made up mainly of adults although occasionally a few immature stages are found. The females deposit the eggs in the cover of membranous scales on the ventral surface of the leaflet midrib. The eggs hatch in 8-9 days and during the next several days various stages will be found on the leaflets. The time for development, from the hatching of the egg to

the last molt into the adult stage, varies from 23-37 days. It is of interest to note that, during the period when the royal palms were under observation, new fronds were produced at about the same rate as new generations of royal palm bugs.

Observations indicate that most damage is found on older trees. Several small trees have been examined in areas where large, old trees were heavily infected, but only a few bugs were found. No small trees have been found with entire fronds injured as is the case with the larger trees.

Tests for the control of the royal palm bug conducted by the author and D. O. Wolfenbarger indicate that diel-drin 50% wettable powder, one-half pound per 100 gallons of water or chlordane, 40% wettable powder, two and one-half pounds per 100 gallons of water will provide adequate control.

Good coverage is essential. The spray should be directed primarily at the new growth and at the base of the fronds. Since the eggs take from 8-9 days to hatch, a second application is desirable about 10-14 days after the first. None of the materials tested had a long enough residual effect to kill the first instars after hatching.

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- Drake, C. J. & Slater, J. A., "The phylogeny and systematics of the family Thaumastocoridae (Hemiptera: Heteroptera)." *Annals of the Entomological Society of America* 50: 353-370. 1957.
- Moznette, G. F., "Notes on the royal palm bug." *Quarterly Bulletin Florida State Plant Board* 6: 10-15. 1921.

ADDITIONS TO LIBRARY

(continued from page 39)

Polinesiane Conservate Nell'Erbario di Kew, 1915; Nuove Specie di Palme Recentemente Scoperte alla Nuova Guinea, 1888; The Palms of the Batanes and Babuyan Islands, 1908; Palme Novae Antillane II, 1908; Notes on Philippine Palms II, 1909; Palms of the Island of Polillo, 1911; Neue Palmen Papuaensis I & II, 1914; Neue Palmen Mikronesiens, 1914; A New Species of Calamus from Amboina, 1917; On a New South Polynesian Palm, with Notes on the Genus *Rhopalostylis* Wendl. et Drude, 1917; Recensione delle Palme del Vecchio Mondo Appartenenti alla Tribu delle Coryphae, 1920; Le Palme delle Nuova Caledonia, 1920; Palms of the Philip-

pine Islands Collected and Distributed by A. D. E. Elmer, 1919; Symbolae Antillane seu Fundamenta Florae Indiae Occidentalis, (edited by Ignatius Urban), n. d.

"Yes, indeed it has been a very great pleasure to receive PRINCIPES, a great experience in one's old age to learn so much new material on those lovely plants. My daughter Dorothy found a few years ago a handsome variegated palms of a species new to me. Somewhere I have an Ektachrome of it which I will send to the Society if I can find it. The plant was killed at Dr. Imle's home after he left Costa Rica by a careless weeding gang."—C. H. Lankester, Cartago, Costa Rica.

NOTES ON CULTURE

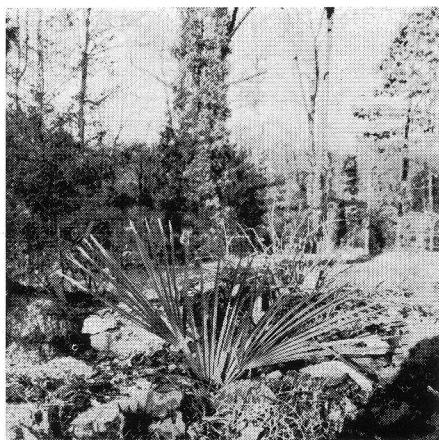


Fig. 48. *Sabal minor* at Gladwyne, Pennsylvania, in November 1957.

As PRINCIPES is prepared for press, it is too early to assess the results of the severe cold fronts that extended deep into Florida this past winter. That damage was severe, there can be no doubt. A later report will be forthcoming on the effect of the cold. In the meantime, it may be of some comfort to note two reports of palms in northern regions. The first comes in the way of photographs taken in Gladwyne, Pennsylvania, by Mrs. Mary G. Henry who wrote

Mr. James Keenan writes from the Royal Botanic Garden, Edinburgh, Scotland about the specimen of *Trachycarpus Fortunei* which grows in the open there and which is illustrated as fig. 50.

"Its origin is unknown and thus its age can only be an estimation. It is believed however to have been transplanted into its present position from a tub somewhere about the turn of the century. Shortly, more information may become available for the present Curator of the Garden, E. E. Kemp, contemplates transferring the plant to another



Fig. 49. *Sabal minor* at Gladwyne, Pennsylvania in December, 1957.

about her *Sabal minor* in PRINCIPES 1:124. 1957. Figure 48 shows a plant originally from Alabama that has been growing outdoors in Pennsylvania since 1951 as it appeared in November, 1957. Figure 49 shows the same plant as it appeared on December 6, 1957.

position on account of an altered layout in the vicinity. Mr. Kemp has been interested in the transplanting of large established specimens for some time and considerable success has been achieved with species which rarely survive transplanting in normal practice. Readers of the journal will no doubt be interested to be kept informed if and when the operation takes place.

"Of most interest, of course, is the plant's hardiness in this northern clime. Although often encountered in the more favoured southern counties of Devon

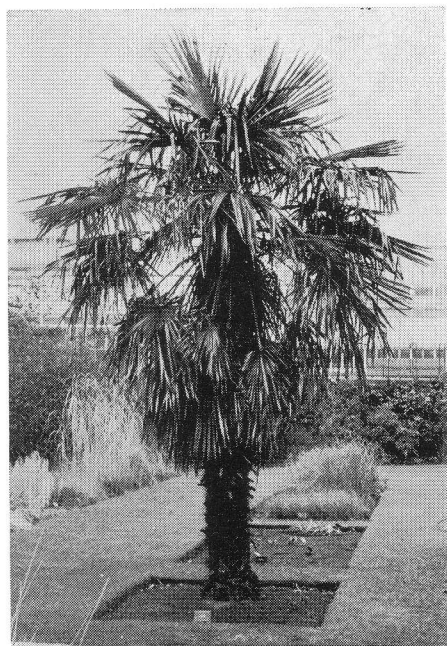


Fig. 50. *Trachycarpus Fortunei* growing out-of-doors in the Royal Botanic Garden, Edinburgh, Scotland.

and Cornwall, it is rarely seen in Scotland: no doubt because of its suspected tenderness. The general observations on Edinburgh climate which follow will show that it can scarcely be called tender. These observations should be read as being approximate averages for this century.

"November, December, and January, with daily mean temperatures of 40.7° F. and forty hours of sunshine monthly constitutes the bleakest period of the year. December averages 24 winds of gale force: nearly three times as many as in any other month. It is in the latter part of this period that snow falls although this often extends into February or even March. As much as ten inches of snow has been recorded although three to five inches is more usual. The winter of 1941 with 28° frost on one occasion is the lowest on record

but 20° frost is not uncommon in most winters.

"June, July, and August, with daily mean temperatures of 57.8°F. and an average hundred hours of sunshine a month are popularly regarded as the summer months. June is the sunniest with an average 189 hours, but the warmest is July when the daily mean temperature is 65.8°. In this month, temperatures as high as 85°F. have been recorded.

"The prevailing wind is southwest or southeast and northeasters are rare. The annual total rainfall is 26.5 inches and of this 3.5 inches falls in August, the wettest month of the year. April with 1½ inches is the driest although most deaths from drought occur in May."

* * *

Our treasurer Nat De Leon, has sent some comments on the germination of palm seeds in water (*Principes* 2: 5. 1958):

"I have used this method of germination and find it works fine with fresh seeds having a thin pericarp. Among the seeds successfully germinated in this manner were *Copernicia Torreana*, *Euterpe precatória*, *Gaussia attenuata*, *Licuala Rumphii*, *Pritchardia pacifica*, *Pseudophoenix vinifera*, and *Veitchia Montgomeryana*. I was forced to discontinue this method of germination with seeds when freshness was in doubt. As the seed starts to age, because of unfavorable conditions in which to germinate, the embryo starts to shrink. After four to seven days of soaking in water, the embryo cap separates and the embryo floats out of its cavity. Such seeds may not have germinated anyway, but I was obliged to use the safer method of dry sowing. I do, however, soak all seeds coming in for 24 to 48 hours, depending on the condition of the embryo based on random samplings."

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A MEMBER in Japan is very much in need of a copy of Dahlgren's **INDEX OF AMERICAN PALMS**. Age and condition immaterial, if text is intact. He is willing to pay any reasonable price. If not willing to sell your copy, will you lend it? I will be responsible for its safe return. L. H. Wait, Exec. Secretary.

FOUR LICUALA grandis, average 13 inches; thirty *Dictyosperma rubrum*, up to 4 ft.; twenty *Phoenix Roebelenii*, up to 2 ft. Early's Nursery, 6121 S.W. 79th Ct., South Miami, Fla.

WANT TO BUY: Gentes Herbarum, Vol. II, Fascicle 4; Vol. VII. Fascicles 2 and 4, to complete my set. Or, will exchange my duplicate Vol. VIII, Fascicles 2, 3, and 6, for the above. J. C. McCurrach, 810 S. Ocean Blvd., Palm Beach, Fla.

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NEW MEMBER, interested in enlarging my palm collection, will trade hardy species available in Texas for other hardy types, or pot-sized tender palms suitable for terrace. After losing two 350-acre citrus orchards in 1949 & '51 freezes, am now trying system used by the Indians in Sierra Madre mountains of Mexico, where orchards have survived many freezes. Will send mimeographed account of this method to anyone interested. Larry Lightner, Box 671, Brownsville, Texas.