

The Semi-Hardy Mountain Caryota

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Since the turn of the century many attempts have been made to establish *Caryota* in the semi-tropics. The incentive is the unique beauty of the palm. It stands alone among all the palms in having doubly pinnate leaves. This characteristic enriches the foliage beautifully as the number of leaflets per frond is many times that of other plumose palms. Another attraction is the abrupt severing of the tip of each leaflet, as with a fishtail, so that the palm resembles a giant maidenhair fern.

The Asian *Caryota* is now found wherever tropical palms are cultivated for ornament. This wide distribution in both the New and Old World has without doubt been helped by the durability of its seed, which, unlike that of most palms, keeps viable for months without special care.

The coconut palm is the classical test of a tropical climate. Where it grows, *Caryota* can be grown without difficulty. In the semi-tropics, where the coconut palm will not grow, the rule has been that *Caryota* will survive during mild winters but will die after hard freezes.

A typical experience was that of Robertson-Proschowsky at Nice on the French Riviera. (The struggle to establish *Caryota* outside of the tropics evidently began on the Mediterranean littoral.) Writing in 1906, in the *Bulletin de la Société Nationale d'Acclimatation de France*, Robertson-Proschowsky recorded success in growing *Caryota urens* and *Caryota sobolifera* [= *mitis*] during several mild winters. When a hard winter came along that brought the temperature to -2° C. (28.4° F.), the palms were killed. In spite of this setback he discovered that *Caryota* varies

in tolerance to cold by experiencing the loss of three other species, *C. maxima*, *C. propinqua*, and *C. furfuracea* at the higher temperature of 0° C. (32° F.). He mentioned also that he had seen an unidentified *Caryota* at Menton, near Italy, that "had finished its existence by its last flowering," adding that Menton was the most protected place along the coast.

Then years later, in the same bulletin for the year 1916 (vol. 63), Robertson-Proschowsky recorded further experiences with the *Caryota*. Three years before this second article was written, he had received from Hamma, in Algeria, several strong specimens of a *Caryota* with the horticultural name of *Caryota Rivieri*. These plants were able to withstand heavy frosts. During the period until 1916, he had repeatedly tried other plants received under the name *C. urens* and had lost them all from cold. Yet these palms from Hamma withstood frosts that even covered the fronds with snow. Although the identification of these palms remained in doubt, Robertson-Proschowsky believed that they were *C. urens*, and that the other palms previously received as *C. urens* were not of that species. He rejoiced in having at long last found a hardy *Caryota*. But sad to relate, they were all killed in an exceptionally cold winter a few years later.

In this same 1916 article Robertson-Proschowsky spoke of his surprise at finding that young plants of *C. ochlandra* died after having been planted out for three years; that young plants of *C. Rumphiana* did not at the time appear to have suffered. It was evident that some of these trials were inconclusive



1. A Chinese drawing of the Canton fishtail palm, *Caryota ochlandra*.

and not significant, as he had exposed juvenile plants for short periods only.

The two articles about the hardiness of palms on the Côte d'Azur were loaned

to me in the nineteen thirties by J. Harrison Wright, of Riverside, California. At that time Wright had assembled the premier collection of hardy palms in California. During the several decades that it took him to do this he had made several trips to Europe and had become acquainted with Robertson-Proschowsky and his garden. Wright had long ago given up hope of being able to grow such palms as *Howeia*, *Archontophoenix*, and *Caryota* in an interior valley where the mercury went as low as -7.7° C. (18° F.). However, he encouraged me to grow palms in my garden in the milder climate of the coastal plain of West Los Angeles that he could not grow. He first told me that *Caryota ochlandra*, the Canton fishtail, had been found to be hardy somewhere on the French Riviera. When I learned that the mountains around Canton, where the palm was native, reached 3600 feet and were visited by frosts, and that Canton was well inland, 85 miles up the Pearl River from Hong Kong, I became very anxious to try to grow this palm. Shortly before World War II I corresponded with a professor at Lingnan University, Canton, who sent me some seeds. Later I visited Hong Kong and from the palms on Victoria Island obtained a second batch of seeds. Now the source of these seeds has gone. The Chinese Communists will not permit their export from Canton, and the palms in Hong Kong have been destroyed by new construction, or damaged by a series of typhoons.

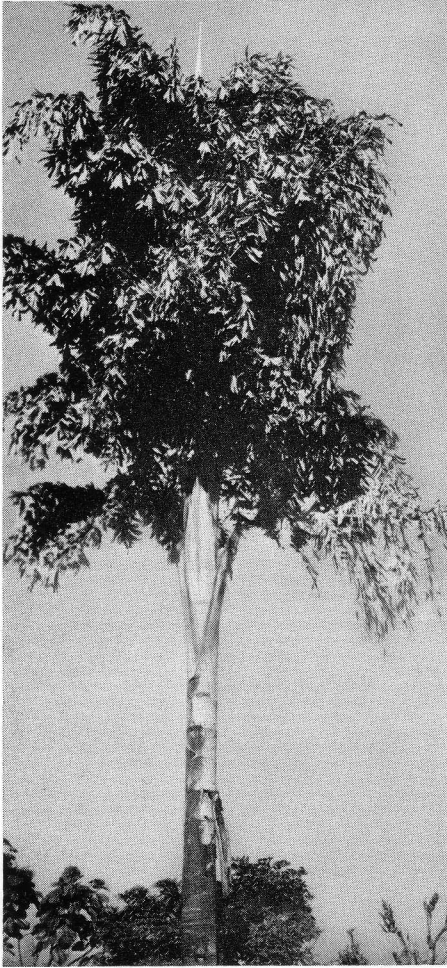
This seed produced several hundred plants of the Canton fishtail which are by now fairly well distributed among the palm fanciers of Southern California. A number of palms have reached the flowering stage. The extent of their seed production has not yet been determined, but in all probability it will be sufficient to meet future demands. In spite of the fact that a very hard freeze has not



2. *Caryota ochlandra* with *Trachycarpus* and *Washingtonia* in West Los Angeles.
Photo by Wm. Aplin.

visited Southern California since 1949, it seems reasonable to believe that this species is now established in the coastal

belt of Southern California, and that foreign sources of seed will not now be needed. I am careful to restrict the pos-



3. *Caryota urens* in the lower Himalayan foothills of northern India.

sible range of this palm to the coastal belt where proximity to the ocean is essential to avoid the hard freezes.

Caryota ochlandra is a single-trunk palm, although three of my seedling plants developed multiple trunks.

Will this palm be useful in other parts of the semi-tropical world outside of Southern California? In my opinion it will not generally be useful because most semi-tropics are periodically visited by killing frosts where growers are not pre-

pared to protect the plants. These hard frosts may not occur frequently. The intervals between them may be ten to fifteen years. When they do occur in the Northern Hemisphere the great masses of Arctic air that range south will kill these palms. These are the kinds of freezes that upset the calculations of Robertson-Proschowsky. His discovery that certain kinds of *Caryota* were more hardy than others was of little use when all were killed. The same situation will obtain on the Florida Peninsula where the coconut palm will not grow. Years may pass and *Caryota* may flourish until a killing "norther" comes. Arrangements to protect the plants during these infrequent yet critical periods would make the difference between success and failure.

The devastating freezes that descend on the French Riviera and the southeast United States, except Florida from Palm Beach south, do not visit the coastal belt of Southern California. When the "historical freezes" do occur there, as they did in 1913, 1921, 1937 and 1949 much damage is done to plants, but not as severe as in the other places. In December, 1967, the freeze that took place in Southern California was not spread generally. It did reach 26° F. (-3.3° C.) in the coastal belt near San Diego where the mountain caryotas were found to be resistant to this amount of cold.

For another example of the usual vulnerability of the more hardy kinds of *Caryota* to occasional, devastating freezes, our fellow society member, Julien Marnier-Lapostolle, grew successfully for eleven years a specimen of *Caryota bacsonensis* in his garden at St.-Jean-Cap-Ferrat, on the French Riviera. This plant was killed in 1956 by the extremely cold winter of that year. It originally came from the massif of Bac-Son in the northern section of Tonkin, in Indochina. I have two plants of this

species under glass in California that will soon be robust enough to test outside.

About twenty-five years ago I learned that a *Caryota* grew among pine trees in the Himalayan highlands. This association with pine trees suggested hardiness. I decided to try this palm in Southern California. In 1962 I traveled there by way of Ceylon. In the mountains of Ceylon where tea plants covered the slopes, I was surprised to see tall fishtail palms that raised their trunks and crowns from narrow watercourses too rough to have been cleared for tea plants. In spite of my interest in the *Caryota*, I did not ask the driver even to slow down, as elevation markers along the road indicated 3500 feet. This I considered too low for development of frost-hardiness in *Caryota*. I admired the English for the use of elevation markers on their roads. Although the English have gone, the markers remain.

A few weeks later I was about 1300 miles north of Ceylon driving on a mountain road in northern India to see the "roof-top of the world." While the car followed the curves in the road, I searched intently for elevation markers and for *Caryota* palms. Finally, at Kio-seong, marked at 4864 feet altitude, I saw a fine specimen of *Caryota urens*. This was in winter. It was cold, and little wonder, as farther up the road and around a few more ridges was Mount Kangchenjunga standing above the other peaks of perpetual snow. In addition to the altitude, the cold reflecting from this white backdrop was a factor in the development of hardiness in this *Caryota*.

Seed collecting was difficult. After a palm was found with ripe fruit, a special ladder had to be constructed of bamboo to reach it. Many months later the seeds reached me in Los Angeles. They were very dry, yet a 10% germination was obtained, which was good under the circumstances of delay. Later I

secured other seeds from Sikkim, farther north, and learned that this species is widely distributed in the Himalayan highlands, including those in Nepal.

I felt satisfied that these *Caryota urens* from the Himalayan highlands would withstand as well as has *Caryota ochlandra* the occasional heavy freezes that descend upon the coastal belt of Southern California, and, perhaps of equal importance, the six months of cool nights from November to May which are characteristic of a region that is basically a desert.

The cold of last December has done much to sustain my belief, as it did not affect these palms in the various gardens of many of our members. In one instance, a palm at Vista was covered heavily with snow and was not damaged.

It has been found that this species of *Caryota* grows two to three times as fast as does *Caryota ochlandra*. So far no relationship between rapidity of growth and hardiness has been noted.

Caryota ochlandra and *C. urens* can be distinguished from each other at a glance as the petioles of the former carry leaflets to the trunk, while those of the latter have no leaflets on the section close to the trunk.

It is very likely that the *Caryota urens* which Robertson-Proschowsky thought he had established was from the Himalayan foothills. The cold that destroyed his plants was much more severe than that of the hard freezes that visit Southern California.

In that part of Florida where the coconut palm will not grow, and along the Mediterranean littoral, the palms should be protected in times of extreme cold. If they are too tall to be covered, heaters at the base should be provided.

From central China around Canton to the northern Himalayan highlands is a wide area extending about 1600 miles from east to west, in which other species

of hardy *Caryota* may very likely be discovered and brought to horticultural use.

E. J. H. Corner in *The Natural History of Palms*, writes on page 92 that "the giant fish-tail *Caryota* in the Malayan mountains reaches 120 feet and exceeds the canopy of the oak-laurel forest." I asked Director H. M. Burkill of the Botanic Gardens, Singapore, for more information about this palm. He reports that it occurs around 5000–6000 feet, and will seldom experience temperatures lower than 50° F. (10° C.). The palm is *Caryota aequatorialis*. He doubts very much that Malayan plants would withstand frost. While this opinion is not encouraging, this palm should be tried in the semi-tropics.

Many exotic palms can withstand frost down to, say, 27° F. (–2.6° C.) without injury, provided they come from elevated areas where nights are cool, yet where frosts do not occur. An example is the Ecuadorian *Parajubaea cocoides* which is extensively planted in Quito. There, at an elevation of 9200 feet, the night temperatures descend during every month of the year to about 45° F. (7.2° C.), but not lower. When this palm is planted in California it will withstand several degrees of frost.

Many species of *Chamaedorea* will also withstand such cold, although in their native Mexican or Central American highlands the temperature may never approach the freezing level.

Nature may do a bit of acclimatizing, taking several hundred thousand years and parts of geologic periods to do so, but not man, who does not have the time. The futility of trying to acclimatize plants was demonstrated in an experiment made by the English 150 years ago in India. They thought that if they could take banana plants from the tropics of India to the semi-tropics of the Canary Islands, and cultivate them for a number

of years, the plants might become sufficiently acclimatized there so that they would be able to endure the climate of England. This neat theory did not work out in practice.

Acclimatizing, of course, is not to be confused with hardening a plant by gradual exposure after being forced into soft growth by shelter and heavy fertilization.

The beautiful, multiple-trunk *Caryota mitis* is an Asian species that, like other tropical species of the genus, does not come within the scope of a discussion of the semi-hardy mountain species. However, it has some interesting characteristics when grown in the semi-tropics. These have been recorded by Dent Smith from plants in his garden at Daytona Beach. He discovered that specimens of *Caryota mitis* vary in degree of resistance to cold. After having had one specimen withstand heavy frost that badly damaged others, he dubbed it his hardy form of *mitis*. Nonetheless, he found that all species of *Caryota* are killed by a really hard freeze such as that of December, 1962, so that differences in hardiness between species or individual plants within species become an academic consideration. In that particular freeze during a period of three days, the temperature stayed below 32° F. (0° C.) for an aggregate of 28 hours, reaching a low of 22° F. (–5.5° C.) at one time. Finally, Dent Smith discovered that his *Caryota mitis* plants have remarkable power in being able to develop new stems from the roots. He reports that his hardy form, to quote, "had 12 stems to 20' and as much as 8" diameter when it froze right down to the ground in December, 1962, stems and all. It has been gradually recovering with new growth from the roots ever since; it now has 12 new stems to about 11', and should reach its former proportions in about three more years, barring another very hard freeze."

Another specimen also has made a somewhat similar recovery after having been frozen back level with the ground.

This remarkable recuperative recovery would probably not be possible in many of the sub-tropical regions, such as Southern California where the ground remains cold at nights for months during the winter. In Daytona Beach warm weather may follow on the heels of a "norther" and stimulate the functioning of the underground part of the palm to "recover from the roots."

Since the valiant efforts of Europeans to grow *Caryota* palms along the Medi-

terranean coasts, some of the factors involved can now be defined. While it is clear that the genus is primarily tropical in its requirements, some species and some varieties of species that are native to mountain areas will tolerate several degrees below freezing. With this understanding the usefulness of these beautiful palms has been greatly extended to suitable parts of sub-tropical areas where it was not known until recently that the plants would survive. For the future, other species from the highlands of southeast Asia in all probability will be found and tried with similar results.

GARDEN TOUR

Foster Botanical Garden

The mainland visitor to Hawaii who has more than the average awareness of palms is frequently disappointed at the lack of variety being grown in the benign climate of the islands. Coconuts are everywhere, and there is also an occasional *Veitchia Merrillii* or *Prichardia* or clump of *Chrysalidocarpus*, but few other palms are apparent in this region where so very many species could be grown.

His disappointment can be quickly allayed, however, by a visit to the Foster Botanical Gardens, for here he will find variety in abundance. Located in the heart of Honolulu, adjacent to busy Nuuanu Boulevard and just a few blocks from the center of town, is one of the outstanding collections of tropical palms in the United States. The garden is outstanding not so much because of its size or the extensiveness of its collection, but because of its age and the maturity of the trees.

The garden was begun over one hundred and thirty years ago in 1855 when Hawaiian royalty deeded to William Hillebrand four acres of land which was to become the nucleus of the present garden. A physician by profession, Dr. Hillebrand was an ardent botanist and horticulturist by avocation. He produced the well known botanical treatise, *Flora of the Hawaiian Islands*, and planted many of the tropical trees which have now reached gigantic proportions and give a special character to the entire garden.

In 1867 the land was sold to Captain and Mrs. Thomas Foster who continued to develop the garden, extending it to five and one-half acres. In 1930 they bequeathed it to the city of Honolulu. Since that time, under enthusiastic and able directors such as Mr. Paul Weissich who now heads it, Foster Garden has been enlarged with the introduction of hundreds of new plants.