

as a headquarters for much work still to be done in the area.

We know now that *Thrinax rex* was accurately described by Britton and Harris. Its stately height and canopy are its most striking characteristics. A trunk extends to sixty feet in height and fifteen inches in diameter in the large specimens. The swollen base may have an accumulation of coarse fiber and adventitious roots forming a mass which reaches three feet in diameter and in one specimen to four feet in height. Petioles of the leaves were measured ten feet long and blades twelve feet in diameter were common but larger than the average leaf size. Needless to say single leaves afforded excellent protection against the rain. Specimens of *Thrinax rex* have been collected from the vicinity of "Big Level", Uncommon Hill above Fruitful Vale Post Office, and southwest of Ecclesdown, all in the parish of Portland. The palm can be considered common in these restricted

areas. It occurs at altitudes from 1200 to 2500 feet. There appears to be no preference for directional exposure and plants were found on rocky ridges as well as in debris-filled valleys. *Thrinax rex* is known to flower in early April and to have a decidedly pink tone to the inflorescence. It has been seen in full fruit in August. In January, Proctor and I found the palms barren or with old infructescences and rotted fruits.

Thrinax rex may not prove adaptable to cultivation in southern Florida. The high rainfall, continuous high humidity, the cloud cover and the scanty amount of direct sunlight of its natural location may be the limiting factors in its distribution. Fruits will be collected at the first opportunity for a second and a broader attempt at an introduction to cultivation. *Thrinax tessellata* and *Thrinax Harrisiana*, when the latter can be obtained, seem capable of surviving in the comparable environment of southern Florida.

Tallest Palms in the United States?

Quite recently a minor controversy has raged in the daily press about the location of the tallest palms in the United States, excluding Hawaii and of course Alaska. It all started, according to an Associated Press dispatch, when the Chamber of Commerce of San Antonio, Texas, "challenged Florida and California to match a 61-foot palm found in San Antonio."

Miami "came up with a 68-foot specimen," the dispatch goes on to say. This seemed a lame report from Florida, since a few of the wild royal palms in the state have exceeded 100 feet, with the tallest reaching perhaps 110 feet. Moreover, thousands of native cabbage trees (*Sabal Palmetto*) exceed 70 feet, and the trees are reported to attain to 90 feet in rare instances. Armed with a steel tape, Dr. Walter Hodge and the undersigned measured a fallen palmetto at 82 feet this past March in a hammock near Daytona Beach. Even so, Florida cannot begin to vie with California in the matter of tall palms, whether because of hurricanes in the past or other causes.

What may be the tallest living palm in the continental United States is a 140-foot specimen of *Washingtonia robusta* at the Los Angeles State and County Arboretum in California (see fig. 68, p. 139). If taller ones exist elsewhere in the land, it would surely interest Society members to see a report of the facts in this journal. Significantly there are many very tall washingtonias at the Arboretum, according to Charles Hallberg, and at least four of them tower well above 120 feet.



67. The Hispaniolan palmetto, *Sabal umbraculifera*, at Ronald Ranch near Daytona Beach, Florida. It was planted by William F. Ronald as a six-inch seedling about 1928 and is now fifty feet or more tall. During this period the native cabbage palmettoes roundabout have gained scarcely two or three feet of height. In general appearance it chiefly differs from the latter in its much more massive foliage and its heavier, straighter trunk, which is gray in color. Photograph by Dent Smith.



68. *Washingtonia robusta* at Los Angeles State and County Arboretum, Arcadia, California—a group of very old, very tall palms, the tallest approximating 140 feet. The man under the crown of the washingtonia obscured by the eucalyptus measured it at 120 feet and reported that the tallest of the palms in the foreground towered at least 20 feet above it. Photograph courtesy of Charles A. Hallberg.

Great height in the palms may be a phenomenon in the United States, but is not even news in the family; for, after all, one species of *Ceroxylon*, sometimes exceeding 200 feet, was believed for many years to be the tallest living thing on earth—before the immense eucalypts and sequoias were discovered.

DENT SMITH

Essays on the Morphology of Palms

P. B. TOMLINSON

II. THE EARLY GROWTH OF THE PALM

The palm seedling develops an anchoring and absorptive root system together with an assimilating leafy crown and soon becomes independent of the seed as its source of food. The stem usually remains inconspicuous for a considerable time. Botanists familiar with the early stages of growth of the palm after the seedling stage know that its stem grows first in girth and develops a broad woody subterranean stock before the leafy crown is visibly raised above the soil surface. In this predominance of thickening over extension growth, palms contrast remarkably with woody dicotyledons as represented by our common trees. In the latter, primary (elongation) growth always precedes secondary (thickening) growth so that tall but slender saplings are characteristic of the early stages in the life of dicotyledonous trees. This difference is a direct result of the fact that the palm stem has no means of continuous growth in thickness. In contrast dicotyledonous trees have beneath the bark an actively growing region, the cambium, by means of which the trunk continues to grow in thickness throughout the life of the tree. Consequently the slender stem of the sapling is capable of becoming a wide trunk and supporting an increasingly branched crown. The palm stem, on the other hand, has no cambium.

The peculiar growth-limiting characteristics of palms and other monocotyle-

dons are a direct consequence of this lack of thickening growth, as has recently been indicated in an interesting article by Holtum (1955). He points out that in order to support a woody trunk, which in palms may eventually be over 100 feet high, a massive foundation has first to be established. This broad, base begins to develop in the seedling (fig. 69A). The first nodes, at which the seedling leaves are inserted, are not separated from each other by long internodes (fig. 69Ba). Successive nodes are increasingly wider and equally congested so that the base of the stem comes to have the shape of an inverted cone (fig. 69 Bb). Most of this early stem growth takes place underground and all that is visible above the soil surface is the crown of leaves which often persists at this level for several years. Eventually, however, a sufficiently broad base is developed and the later internodes elongate so that the leafy crown is raised above the soil level and a woody trunk becomes visible (fig. 69 Bc). In some palms, particularly those with narrow cane-like stems, the difference in length between the early, basal internodes and the later ones which form the aerial stems may be very considerable. In other palms, such as the oil palm and the date palm, the internodes are always short and the aerial stem is developed by the superposition of a large number of short internodes.