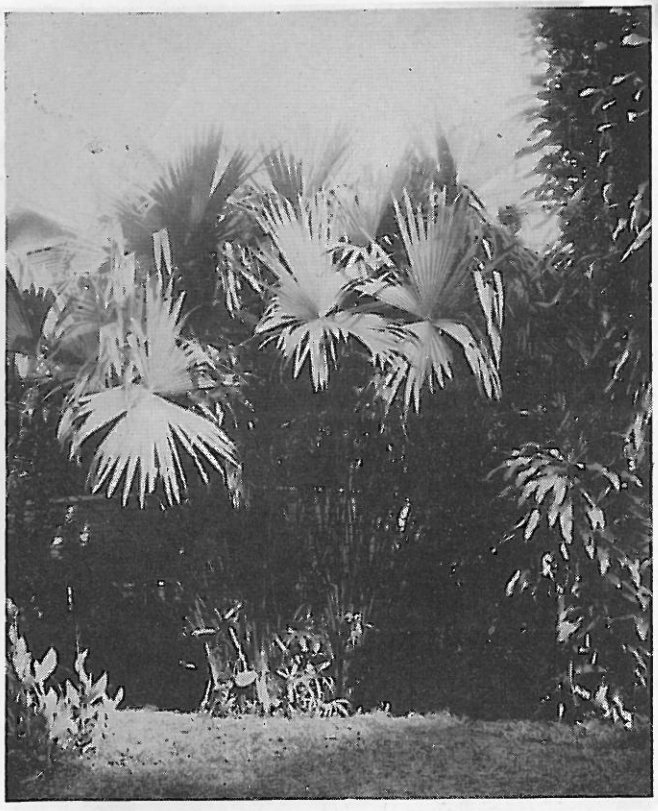
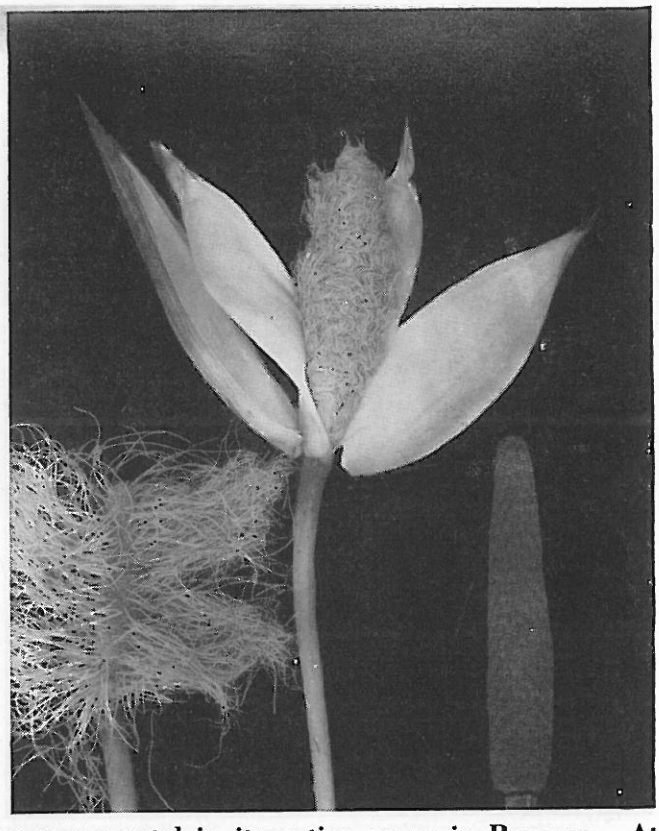




The Panama-hat plant—a vigorous specimen used as an ornamental in its native range in Panama. At right, inflorescences of the Panama-hat plant. In the center is an inflorescence—technically a spadix—newly exposed by the spreading of the four leaf-like spathes, which tightly enclosed it. The twisted white filaments that cover over the spadix are staminodia or sterile stamens of the female flowers. At lower left the spathes have fallen and the staminodia spread out before dropping off. At lower right the staminodia have also fallen, revealing the little greenish flowers, male and female together, over the spadix.

The Panama-Hat Plant

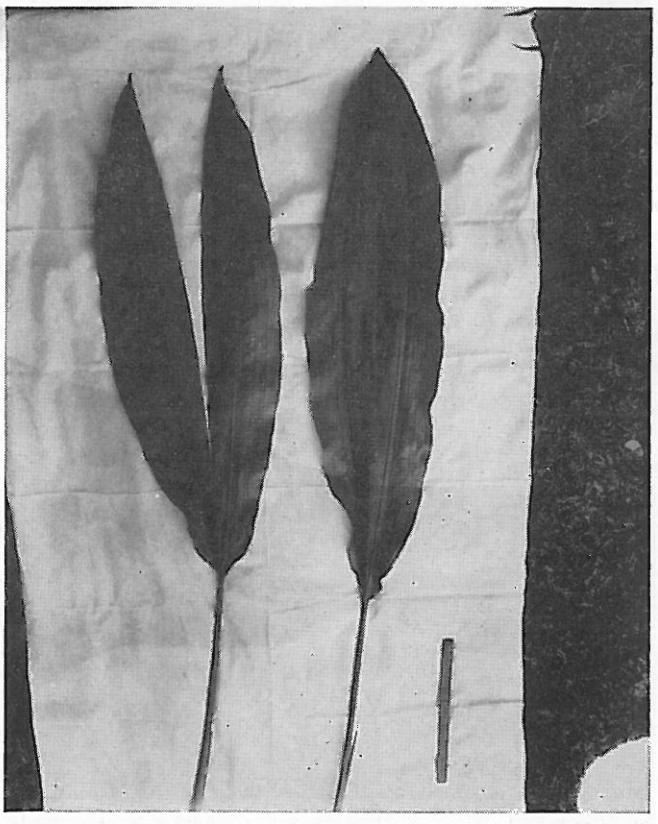
By ALEXANDER F. SKUTCH

ALTHOUGH the plant from which Panama hats are made resembles a trunkless, fan-leafed palm, actually botanists classify it in the distinct but closely related cyclanthus family. The Panama-hat plant, *Carludovica palmata*, grows wild from southern Mexico to Peru. It attains its best development in low, wet districts, especially in the lush, second-growth vegetation that springs up in abandoned banana plantations and other neglected clearings, along river banks, and at the edge of the forest, where it thrives in company with other great-leafed plants, including shell-flowers and wild plantains. In heavy forests it is less frequent.

The stems, which are largely subterranean, branch underground to form great, compact clumps. From each springs a cluster of long, slender, cane-like, green leaf-stalks, which in vigorous plants hold the leaf-blades from ten to fifteen feet above the ground. Each blade, three or four feet broad, is creased by numerous folds that radiate from its point of attachment at the top of the petiole. Deep indentations, which reach nearly to the center, divide it into three or four principal lobes, each of which splits up toward the margin into a number of slender, ribbon-like extensions. To make hats, the leaf-blades are gathered before expansion, when their tender tissues are still folded together like a Japanese fan. Then they tear easily into long strips of the width appropriate for hat-making. Although formerly manufactured as a cottage industry in parts of Central America, most Panama hats now come from Ecuador, to be sold, perhaps, to tourists who pass through the Panama Canal.

The flowers and fruit of this odd plant are as interesting as its foliage. The cylindrical inflorescence is borne on a short stalk that emerges between the bases of the long petioles. It is at first enclosed by about four, long, broad, leaf-like spathes, whitish on their inner faces. These soon fall away, revealing a compact mass of twisted white filaments that cover over the inflorescence. The long white threads, sterile stamens of the female flowers, spread out, then soon drop off, exposing a multitude of crowded little green flowers devoid of petals, symmetrically arranged, male and female together, over the entire surface of the fleshy axis, an interesting plant.

Ripening and ripe spadices of the Panama-hat plant. In four of the spadices the outer layer has begun to peel off from the top downward, revealing the yellow fruits, each the size of a large pea, embedded in the bright red tissue.



Leaves of *Cyclanthus bipartitus*. At the right is a newly expanded, undivided leaf; at the left a similar leaf, which at a touch split along the central line of structural weakness. The ruler, lower right, is one foot long.

When mature, the fruits are embedded in the outer layer of a thick cylindrical body about nine or ten inches long by one and a half to two inches in diameter. The exterior of this fruiting spadix is green and sculptured in a symmetrical pattern by the protruding ends of the fruits. The thick, fleshy tissue in which the individual fruits are embedded now splits away from the central axis, beginning at the top and curling outward and downward. It is bright red, and so, at first, is the naked axis from which it has just separated, forming a splash of brilliant color conspicuous from afar. As the red rind of the spadix peels off it exposes the yellow fruits, each the size of a large pea, and filled with many tiny, flattened, whitish seeds. Although these mucilaginous fruits are almost tasteless to the human tongue, they are eagerly devoured by birds. Among these is a tanager of which the male is jet black, with a scarlet rump even more brilliant than the fruiting spadix that attracts him. By these winged carriers the little seeds of the Panama-hat plant are spread far and wide.

The cyclanthus family is restricted to the American Tropics, where about fifty species are known. Most of these are included in the genus *Carludovica*, hence are close relatives of the Panama-hat plant, although in appearance and mode of growth they are quite distinct from it. Instead of rooting in the ground, their slender, elongate stems cling to the trunks of trees by means of aerial roots. The long leaves, standing out from the supporting trunk on slender stalks, divide somewhere above the base into two tapering, pointed lobes. These bifid leaves have a pleated surface and are easily recognized; they are abundant in the lowland rain-forests of tropical America. The inflorescences of these aerial species of *Carludovica* resemble that of the Panama-hat plant but are generally smaller.

Cyclanthus bipartitus, which gives its name to the family, is a most interesting plant. Widespread in tropical America, it grows lushly in low ground, often along streams, and not infrequently in company with the Panama-hat plant. The stems are largely subterranean, and the big leaves stand nearly upright on stout petioles to a height of six or eight feet. Each leaf-blade, when it first expands, is entire and broadly lanceolate in shape, tapering to both ends. There are two principal veins, which diverge from the base and converge again at the tip. Far from having a strengthening vein along its middle line, the tissue of the leaf is here weaker than elsewhere. A touch causes it to split along the center, almost or quite to the base, and it then takes the form responsible for the name *bipartitus*. In the absence of human experimenters, wind, rain, animals brushing past, or perhaps even internal strains are sufficient to cause the young leaf

to divide into the two segments typical of those that have been long expanded.

It is of interest to compare the leaf of *Cyclanthus* with other big leaves that develop as a single, continuous tissue and then split up. The blades of developing palm leaves form a single sheet thrown into many parallel folds; by the death and break-down of the tissue along some of the creases, they divide into distinct segments before expansion, thus giving rise to fronds like that of the coconut palm with its many ribbon-like divisions. In most palms the splitting occurs along the creases on the outer or lower side of the embryonic leaf; the upper creases remain intact, hence each segment of the mature leaf is folded downward. But in a few exceptional palms it is the upper creases that give way while the lower ones persist, and the pinnae of the frond are folded upward. In the banana and some related plants, the leaf usually unrolls as a single huge sheet of tissue, but everywhere except in the most sheltered spots it is soon torn by the wind from margin to massive midrib, the number of tears depending upon the intensity of the breeze. Although the direction of the veins and absence of transverse strengthening allow the banana leaves to split easily, there is no structural modification that causes them to divide between one pair of lateral veins rather than another. In its time and manner of splitting, the cyclanthus leaf stands midway between those of palms and those of bananas. These exotic plants that serve us are full of fascination.