

In Search of Wax Palms

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In my mind's eye I have travelled often in the Andes of Colombia, taking the road between Ibagué and Cartago, which winds past mountain gorges and high waterfalls on its way up and over the Quindio Pass. There was no road over the pass when Alexander von Humboldt, one of the most renowned naturalists and explorers of all time, made his journey in 1801. Then there was only a treacherous trail, which, at higher altitudes, Humboldt referred to as "a tunnel left open to the sky" (Bombard, 1937). In a journey that probably lasted ten to 12 days, Humboldt began at Ibagué to the east of the pass at 1300 meters, crossed the Cordillera Central at an altitude of over 3500 meters, and then descended to Cartago by the Cauca River. During this time the Quindio Pass was noted for its dangers: torrential rains could leave one mired in a vertical sea of mud, and as there were no towns or even isolated dwellings along the route, it was necessary to carry supplies for a month. Even today the journey can be treacherous: the road over the pass is regularly closed due to landslides, and newly erected crucifixes are still found along the way.

On his journey over the pass, Humboldt discovered the wax palms, so named for the layer of waxy substance covering their trunks; the generic name *Ceroxylon* is derived from two Greek words, *keros* (beeswax) and *xylon* (wood). Humboldt found these palms growing at extremely high elevations, from 1500 to 3000 meters. This in itself is unusual, as the vast majority of palms occur in the warm lowlands of tropical

or subtropical regions. But in addition, the wax palms of the Quindio region reach heights of over 60 meters, making them the tallest palms known: in the time of Humboldt, these trees were thought to be the tallest of living plants. Subsequent explorers described the sheer beauty of *Ceroxylon*. The wax of the trunks is said to give these palms a white, glistening quality similar to marble. Édouard André, who crossed the pass in 1876, remarked that by moonlight the wax palms looked like ". . . pillars of a cathedral; no breeze stirred the foliage of their majestic crowns, which shot up 60 meters into the air (Bombard, 1937).

In November, 1974, Dr. Harold E. Moore, Jr. and I set out for the Quindio Pass, travelling by jeep from Bogotá. We were accompanied by Sr. Roberto Jaramillo M. of the National University in Bogotá, who was our driver and guide.

My own desire to visit the pass was simply to travel the route my imagination had taken so often, and in so doing to see in an awakened state the magnificent wax palms. Dr. Moore's purposes for the trip were more concrete. André had reported two species of *Ceroxylon* in the vicinity of the pass: one on the eastern side, the other to the west. However, accompanying descriptions were not complete enough to confirm the actual identity of the two species on either side of the pass. There was further confusion concerning the specific names to be applied to the wax palms of the Quindio region, as a succession of explorers had coined a variety of epithets. These prob-

lems could only be resolved by collecting reasonably complete material from *Ceroxylon* specimens on both sides of the pass.

We arrived in Ibagué on an overcast afternoon, and from there began our ascent up the eastern flank of the Cordillera Central to the Quindío Pass. As is the rule throughout Colombia, the highland areas on either side of the pass are almost completely denuded of their natural vegetation. We saw instead extensive plantations of coffee and bananas which covered even the steepest slopes; as we ascended, these plantations were replaced by open pastures where cows and sheep grazed. Here and there new forests of introduced pines and *Eucalyptus* had been planted, but in most places the soil was laid bare to erosion. Yet even these alterations in the natural landscape could not detract from the splendor of those first wax palms we saw. As the sky began to break, they appeared across the open face of the mountains, ancient sentinels straight and unbelievably tall, their trunks glistening in the afternoon light.

Species of *Ceroxylon* and other related genera are dioecious, the male and female flowers being found on separate trees. To our joy we saw a number of female trees bearing ripe, red fruits. However, we could find no trace of flowers on either the fruiting female or the male trees. All the wax palms that we saw on our ascent stood on steep slopes at a good distance from the road (Cover). As the afternoon was half gone, we decided to postpone our collecting until the following day.

On our approach to the pass we entered a thick belt of fog. In the faded light we could barely see the gnarled outlines of stunted oaks and laurels etched against the sky, their branches burdened with epiphytes. These trees were the remnants of a cloud forest that

had once covered the crests of the mountains (Fig. 1). Suddenly the road dipped down and we began our roaring descent. It was almost dark when the fog lifted and we could once again see wax palms on either side of the road. These were distinct from the palms we had seen on the eastern side of the pass: they were considerably shorter and their trunks were of a darker hue. Yet such variations could conceivably occur within disjunct populations of a single species. Variations in reproductive, rather than vegetative, characters are far more significant in differentiating species. Essentially, we needed to know whether the two apparent species were isolated reproductively, as well as geographically. In this context it was most significant that the phenology—the time of flowering and fruiting—of the palms on either side of the pass was distinct. At this time (November) we observed that the palms to the east were not in flower, while the females bore mature fruit; on the western side, both male and female trees were in flower, while an occasional female bore fruits that were green and immature. These differences in phenology made us virtually certain that there exist two distinct species of *Ceroxylon*, one on each side of the Quindío Pass.

It was midmorning of the next day when Dr. Moore and I finally reached a flowering male *Ceroxylon* near the bottom of a steep ravine (Fig. 2). We had spent several hours that morning searching for suitable trees on the western side of the pass and getting permission to fell one; most of the wax palms here were located in the midst of coffee plantations (Fig. 3), where felling a tree for botanical specimens would leave a swath of costly destruction.

Cutting a *Ceroxylon*—as indeed the case with most palms—is a laborious process: the dark fibers running through the outer cortex are like steel wires. Our



1. Remnants of cloud forest below the divide on the western side of Quindio Pass, Colombia.



2. The male tree that provided specimens of *Ceroxylon alpinum*. Photo by H. E. Moore, Jr.



3. *Ceroxylon alpinum* is left in coffee plantations on the western side of Quindio Pass at about 1900 meters elevation above Calarcá.

axe was nearly dull before the palm finally crashed to the ground, its trunk landing across a stream at the bottom of the ravine, with its crown on the other side. Using the trunk as a bridge, we crossed the stream and discovered that the palm had toppled over a *Cecropia* tree, which throughout the American tropics is well known for harboring stinging ants. This *Cecropia* was unfortunately no exception, and dissecting the crown of the adjacent *Ceroxylon* was agonizing work. For anatomical studies we obtained the entire sequence of developing inflorescences, each one found within the axil of a leaf; in addition, we collected seven sets of open inflorescences and leaves for herbaria in South America, the United States, and Europe. All of this amounted to a sizeable load, which we hauled up the steep slope of the ravine to the jeep.

Our work was not finished for this species, as we still had to collect the

fruits and flowers from a female tree. Unable to find a female *Ceroxylon* outside of the coffee plantations, we spent the afternoon in search of a tree climber. The wax palm is an almost impossible tree to climb, as it is not only tall, but smooth and slippery as well. My attempt to scale one, using a climbing rope and spikes attached to the heels of my boots, failed miserably: the sheer hardness of the trunk prevented the spikes from entering (Fig. 4). We had no better luck finding a tree climber. In the mountains we were told to inquire in the nearby town of Calarcá, located at the base of the western slope; in Calarcá people suggested that we ask in the mountains. The volunteers at the fire station could not help us, wax palms being a bit out of their line. We had heard that there were boys who climbed wax palms to collect leaves for Palm Sunday, but this was November and the priest in Calarcá would not begin recruiting until March.



4. Climbing *Ceroxylon alpinum* is slippery work. Photo by H. E. Moore, Jr.

The next day our luck improved. Don Roberto found a young mechanic who was willing to attempt a climb. Ascending the western slope once again, we discovered a short female that was both in flower and fruit. Nevertheless, climbing this tree would not be easy. The man first attempted to use our climbing rope and spikes, but finding these more cumbersome than helpful, he decided to rely on his arms and legs. To our astonishment, the man worked his way up the tree almost to the crown and pulled down several racemes of immature fruit. However, he was unable to make it up to the crown where the flowers were located. Fortunately we could collect fallen flowers on the ground.

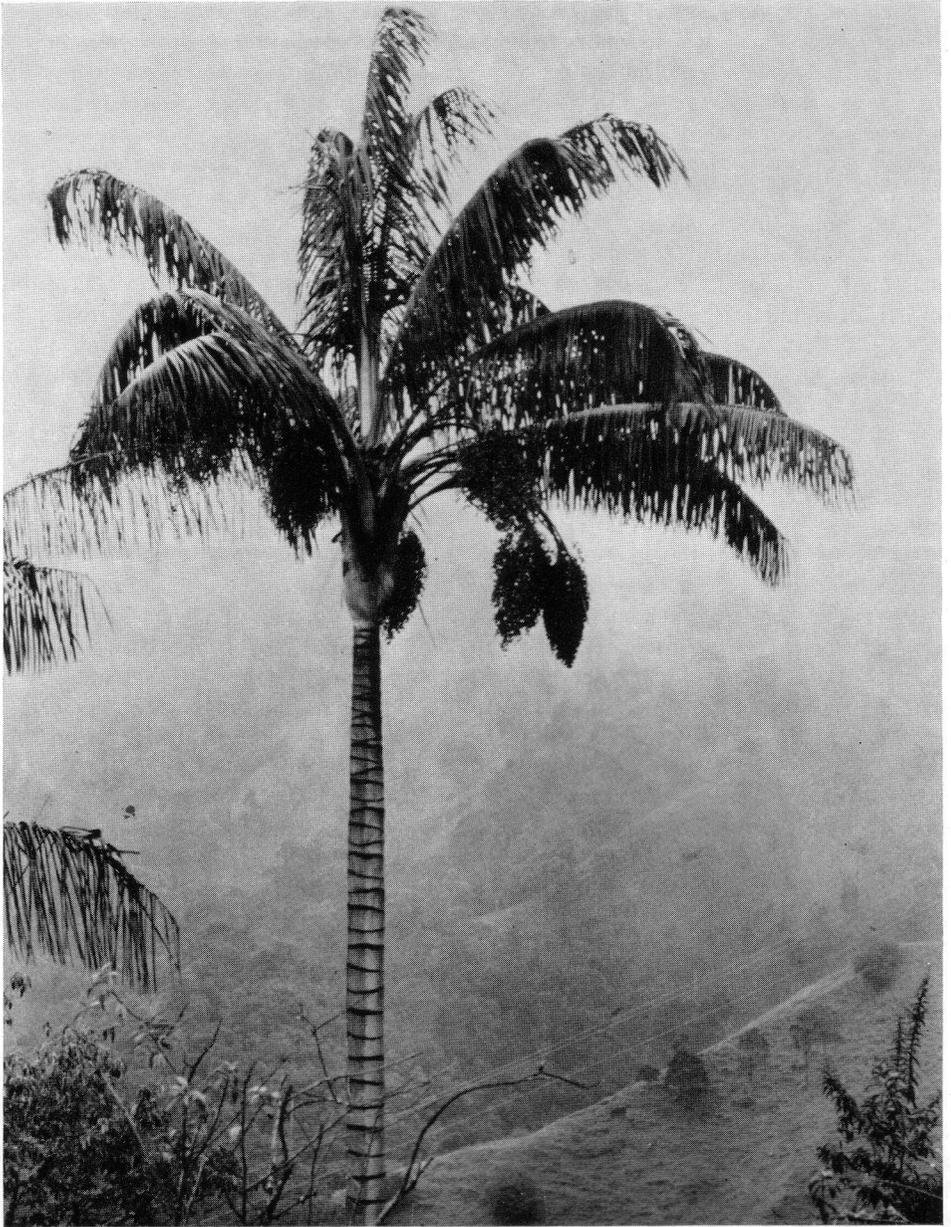
At noon we returned over the pass to the eastern side, where the more magnificent species of *Ceroxylon* occurs. We were now able to discern additional differences between the two species. The species to the west has a silver tone to the underside of the leaves, which is yellowish in the eastern species. We further noticed that the fruit of the western species is rough and mottled in texture, while that of the eastern species is smooth. Numerous other differences were ultimately discovered upon thorough examination of the specimens at Cornell University (Moore & Anderson, 1976).

Having found no male palms in flower, Dr. Moore and I decided to collect specimens from a fruiting female located on a steep slope several hundred meters above the road (Fig. 5). Climbing at this altitude was not easy for us lowlanders, and we were already winded by the time we arrived at the foot of the fruiting palm. As we began to cut the tree, we half expected the sudden appearance of an angry landowner, though we had been unable to locate anyone to give us permission to cut. But the echoes of our axe were soon muffled by the rain that

started to fall, and we were left alone. At last the palm came down as we had planned, with its crown uphill, but this did not prevent the entire tree from plowing down into a patch of forest some 200 meters below. Undaunted, we followed the palm down the mountain, collecting fallen fruits along the way. It was beginning to get dark when we finally emerged from the patch of forest, carrying leaves, fruits, and developing inflorescences. Heavily laden, our descent along a goat trail in the rain gave us some appreciation of Humboldt's experience. We arrived exhausted at the base of the slope just as the rain came to an end. We stopped to watch the sunset. A wind picked up as the light began to fade, and across the mountains there was a flicker of palm leaves.

Many unanswered questions remain concerning *Ceroxylon*. Over a dozen species ranging through the Andes from Venezuela to Bolivia have been described within this genus, mostly on the basis of incomplete materials. Collectors in the past have been confronted with two difficulties: reaching the isolated localities where species of *Ceroxylon* occur, and then obtaining complete botanical specimens upon arrival. As a result, it is likely that several species of *Ceroxylon* have been described repeatedly: at one site a collector may have based his description of a species on the leaves and fruit, while another collector at a different site may have relied on leaves and flowers to describe the same species.

In order to begin to resolve the taxonomic complications within the genus, Dr. Moore and I made every attempt to collect complete botanical specimens of the two species of *Ceroxylon* in the vicinity of the Quindio Pass, where the genus was first discovered. At a later time I returned to the region and made further collections of the wax palms, thereby assuring us a complete representation of



5. The female tree that provided specimens of *Ceroxylon quindiuense*. Photo by H. E. Moore, Jr.

the leaves, flowers, and fruits of both species. Incidentally, during this second visit I discovered that the "eastern" species actually has a few scattered representatives on the western side of the

Quindio Pass. But these occur at high elevations (ca. 2800 meters), well above the uppermost range of the "western" species (ca. 2000 meters).

With complete materials of both spe-

cies now available for examination, we have been able to resolve the confusion concerning the specific names to be applied to the wax palms of the Quindio region. We found that the species predominant on the western side of the pass corresponds to a description published in 1804 of a species called *Ceroxylon alpinum*. This name is attributed to Aimé Bonpland, who was Humboldt's companion during his travels in South America. However, there has been some confusion, as Bonpland later described the same species under the name *C. andicola* in 1805. Furthermore, in 1879, André published another name, *C. ferrugineum*, and his accompanying description likewise corresponds to the species originally described by Bonpland. According to the *International Code of Botanical Nomenclature*, the first name that is validly published has precedence. Therefore, *C. andicola* and *C. ferrugineum* become mere synonyms and the correct name of the species is *Ceroxylon alpinum*. As it was the first species of the genus to be described utilizing the generic name *Ceroxylon*, *C. alpinum* is considered the type species for the genus.

We found that the wax palm which occurs predominantly on the eastern side of the pass corresponds to a species described in 1859 by another famous botanical explorer, Hermann Karsten, who assigned it the name *Klopstockia quindiuensis*. Karsten considered this species

sufficiently distinct to be placed in a new genus. However, the diagnostic features of leaves, inflorescences, flowers, and fruits reveal that Karsten's *Klopstockia quindiuensis* is closely related to the *Ceroxylon alpinum* of Humboldt and Bonpland: it is clear that both should be considered members of the same genus. In 1860, a German botanist, Hermann Wendland, recognized this and transferred *Klopstockia quindiuensis* to *Ceroxylon quindiuense*. The generic name *Ceroxylon* was published before *Klopstockia*, so the last name becomes a synonym and is no longer used.

A technical description of the wax palms in the vicinity of the Quindio Pass, *C. alpinum* and *C. quindiuense*, has been provided elsewhere (Moore & Anderson, 1976). But these descriptions represent just the beginning of our understanding of this fascinating group of palms. While a number of so-called species of *Ceroxylon* may in fact be mere synonyms, it is likely that there remain others that are unknown in the vast reaches of the Andes. But without a clear idea of that which has already been discovered, how will we know for certain what is new?

LITERATURE CITED

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