Fern Collecting in Southern Costa Rica

ALEXANDER F. SKUTCH

That large section of Costa Rica which lies to the south of San José, its capital city, is nearly all wild, mountainous, sparsely inhabited, forested country. The backbone of the region is the non-volcanic Cordillera de Talamanca, which rises in the craggy summits of Chirripó (12,580 feet) to the most elevated point between Guatemala and Colombia. On the highest treeless summits of this range are found the northernmost outposts of the *páramo* formation of the Andes; corresponding elevations in Guatemala support a vegetation far more Arctic-alpine than Andean in composition and appearance. The broken foothills of the Cordillera push down nearly or quite to the coasts, leaving at best a narrow coastal plain. Lofty, humid forests sweep up almost unbroken from the seashore nearly to the tops of the highest mountains. Although to the north of the Gulf of Nicoya the Pacific coast of Central America is nearly everywhere arid or semi-arid, in southern Costa Rica this side is almost as wet as the opposite Caribbean slope. Seven years' records from Pedregoso in the basin of El General show an annual rainfall ranging from 88 to 167 inches.[1]

The Pacific slopes of the Cordillera de Talamanca drain into the Río Grande de Térraba, which flows for a long way parallel to the Cordillera. The upper portion of the Térraba Valley is the valley, or more properly basin, of El General. Aside from the pioneer explora-

[1] For these records I am indebted to Don Isaías Retana, of Pedregoso.

tions of Henry Pittier and Adolfo Tonduz, made chiefly during the nineties of the last century, very little natural history work has been done in any portion of the Térraba Valley. Despite heroic efforts, these botanical collectors obtained hardly more than a sample of the rich flora of the region.

In 1935, when I decided to combine botanical collecting with ornithological studies in Costa Rica, the Térraba Valley was still difficult to reach by the usual modes of travel. The highways leading south from the central plateau went no farther than Santa María de Dota and El Copey, and except for a few months during the dry season even these roads were impassable by any vehicle swifter than an ox-cart. From Santa María to San Isidro del General, near the head of the Térraba Valley, there was still a two- or three-day journey over a difficult mountain trail crossing El Cerro de la Muerte (11,200 feet)—the Mountain of Death, so called because so many travellers, who came out of the mild valleys with nothing more adequate than a coffee sack to cover them on the high, bleak summit, made here their final bivouac. The highway builders at present struggling to pass the Inter-American Highway over this grim, gray peak have still other reasons for thinking the name appropriate.

At the time of which I write, people had hardly begun to talk about the highway. A year or so earlier, an aviation company had begun service between San José and the Térraba Valley. This offered a quick and, everything considered, cheap way of getting there. The aeroplane left San José early in the morning, carrying 15 people and a heterogeneous cargo of barbed-wire fencing, tins of kerosene, sacks of bread, bales of merchandise, and a little calf tied up in a sack with only his head exposed. Mounting above the low buildings of the capital, we enjoyed a wonderful panorama of the chain of

volcanoes to the north—huge, sprawling Irazú, extinct Barba, and Poás with two crater lakes in its truncate summit. But our route lay in the opposite direction, and soon we were soaring above the nearest of the steep mountains that rise sharply on the southern edge of the narrow central plateau. At first we flew over a broken terrain completely denuded of forest from narrow valley

CERRO CHIRRIPÓ (12,580 FT.) AND RÍO CHIRRIPÓ

to sharp ridge. Coffee plantations occupied the sheltered valleys and open pastures covered the ridges, along which ran roads of red clay.

The clearings rapidly disappeared, and a dark green mantle of forest was spread over all the rugged country, meeting the blue plain of the Pacific on our right, and rising on our left to the *páramos* of the peaks, still high above us. Here and there a long, white column of falling water shot out from some more abrupt slope and descended gracefully into the green depths of a mountain

gorge. As we continued for about a half-hour over this impressively wild, unspoiled country, I concluded that it was better to be flying easily over it than toiling by muddy trails across its endless sharp ridges and V-shaped valleys. After a while, the solid ranks of the mountains divided into two columns—the high craggy peaks of the Cordillera to the left, and the rounded, green summits of the coastal range to the right. Between them the broad Térraba Valley stretched far away toward the southeast, covered with a fleecy white blanket of mist.

The landing field, then about two miles from San Isidro, was in the midst of an extensive, open, rather sterile plain. The road to the village led between bushy fields, enclosed pastures, and stretches of unspoiled forest. I saw much of the two most abundant ferns of the region, the first being the ubiquitous—and iniquitous!—bracken, which covers whole fields with an almost impenetrable tangle far more than head-high. It jumps up again with redoubled fury when burned or cut, and is one of the most troublesome weeds with which the Costa Rican farmer has to contend. The bracken is strictly confined to cleared lands and is never seen in primary forest, where its place is taken—in point of abundance, at least—by a climbing fern, *Salpichlaena volubilis,* whose fronds twine about saplings and small trees in the undergrowth, ascending to a height of about 20 feet and forming dense tangles. The primary divisions of the fronds are pinnately compound and resemble somewhat the leaves of the ash or sumach. One cannot walk through the forests of El General without being tripped and entangled by the cordlike stipes of *Salpichlaena.* A more agreeable fern growing in the forests in this vicinity is the rare *Lophidium elegans,* a relative of *Schizaea* and *Lygodium,* whose little flabelliform blades stand up on clustered stipes in the shade.

I established my headquarters at Rivas, about 6 miles to the north of San Isidro, on the tumultuous Río Bueno Vista at an altitude of 2,900 feet. Although agricultural operations had begun to encroach upon the lofty forests on the steep slopes that hemmed in the valley, a great deal still remained; and a ten-minute walk brought me to unbroken primeval woodlands so extensive that I never explored them to their end. In a region so heavily forested as this, ferns did not form so prominent a constituent of the whole mass of vegetation as they did, for example, in the far lighter woodland on the upper slopes of the Blue Mountains of Jamaica, where I first collected tropical ferns. Yet by careful searching one could find a satisfying variety of them. The massive "sotacaballo" trees (*Pithecolobium*) on the banks of the river were nearly always laden with epiphytes of the most varied kinds, ranging from mosses, liverworts, and filmy ferns, through orchids, aroids, bromeliads, and larger ferns to epiphytic trees such as figs, *Clusia, Coussapoa,* and *Cosmibuena.* On the trunks grew *Asplenium fragrans, A. auritum,* and *Polypodium pectinatum,* while hanging limply below the horizontal branches were the cordlike fronds of *Vittaria filifolia* and *V. stipitata,* and also the broad, soft, pinnate fronds of *Polypodium chnoodes.*

Back in the forest grew *Hemitelia multiflora,* a rather abundant small tree-fern, with a slender, spiny caudex reaching about 10 feet in height, and broad, finely divided fronds. On the tree trunks, especially near the ground, were found *Trichomanes polypodioides, T. rigidum,* and a new species of *Polypodium,* as yet undescribed. These forests above Rivas had an average height of about 125 feet, with many trees towering still higher. As in heavy forest almost everywhere, trees that in their blossom-time made a colorful display were a disappointingly small minority; and in the understory there was even less color

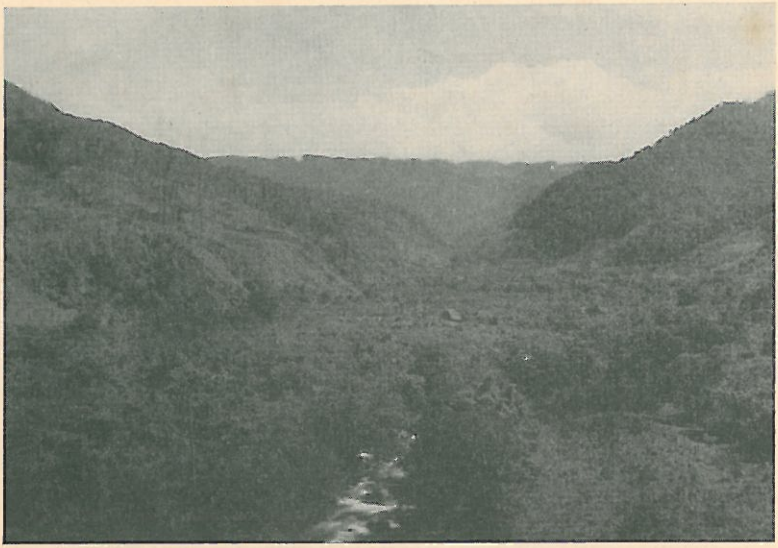
than at the roof. In general there were few species of terrestrial ferns, although some of these were monotonously abundant, such as the *Adiantum*-like Lindsaeas (*L. horizontalis, L. lancea,* and *L. quadrangularis*). Juvenile plants of *Salpichlaena* were a principal constituent of the ground cover.

Patient examination of a mossy tree trunk yielded the delightful little fern *Hecistopteris pumila,* whose dichotomous fronds were scarcely over half an inch in length when full grown. Even more interesting was a dwarf "Hart's-tongue" whose pilose fronds, rooting at the tip in the fashion of the Walking-fern of our northern cliffs, gave rise to new plants, and so formed extensive mats over the tree trunks. This proved to be a new species, which was aptly named *Elaphoglossum proliferans* Maxon & Morton. Another interesting "Walking-fern" of the region was *Leptochilus cladorrhizans,* a terrestrial species whose tall, elegantly divided fronds have long, tail-like tips that strike root where they touch the ground and produce new individuals. Much rarer was *Leptochilus Bradeorum,* with trifoliolate fronds, which seems restricted to the deepest and most humid ravines.

Although the forested slopes were rather unproductive collecting ground for ferns, these grew in the greatest profusion in glens and deep ravines. Here were such tall, wide-spreading, terrestrial species as *Dryopteris Linkiana, D. exculta* var. *guatemalensis, D. subincisa, Diplazium obscurum, D. grandifolium, Asplenium abscissum,* and *Tectaria Sodiroi.*

One of the most interesting excursions I made from Rivas was to the first high summit on the eastern side of the valley, on the divide between the Buena Vista and Chirripó Rivers. The forest trail was so wretchedly muddy, now in early December at the end of the long wet season, that I forsook it to continue upward through

the trackless forest. Progress was at first difficult through the undergrowth and over fallen logs; but soon we came to a ridge that was narrow and steeply ascending and covered with tall slender *Euterpe* palms almost to the exclusion of other arborescent vegetation. This broad avenue of palms led us directly to the summit, where



VALLEY OF THE RÍO BUENA VISTA

the aneroid barometer registered 5,000 feet. On this flat mountain top many trees of *Clusia flava,* about 25 feet high, grew among the palms. They were just coming into blossom, and their broad white flowers—the staminate ones nearly two inches wide—shed a delightful fragrance over the whole mountain top. Beneath the palms and Clusias the ground was thickly carpeted with sphagnum, in which grew the curious fern *Oleandra costaricensis.* This is found, at least at lower elevations, chiefly as an epiphyte on the trunks of trees, but here the slender, rod-

like stems, covered with brown scales, rose obliquely out of the moss. Some were eight feet long, and supported themselves on the bifid leaves of *Carludovica* and other vegetation. Other ferns abundant near the summit were *Polypodium fraxinifolium* and *Cyathea divergens*, a tree-fern with a caudex 18 feet high and drooping fronds 10 feet long.

Although my original intention had been to spend only five or six months amid these forests, I stayed in my cabin at Rivas for a year and a half, and later worked for ten months in two other portions of the basin of El General. But my collections do not contain a complete representation of the ferns, nor of any other section of the flora. Many years of steady collecting would be necessary to complete our knowledge of the plants of this rich and varied region. When finally opened to traffic, the Inter-American Highway will enable botanists to collect with ease and comfort in this and other parts of tropical America hitherto difficult of access. Rich rewards in new species await those who first take advantage of the unique opportunities for collecting the highway will afford; but to be most effective the work should be done promptly, for despite a good deal of conservation talk, the original vegetation along the route of the road will doubtless rapidly vanish.

SAN ISIDRO DEL GENERAL, COSTA RICA