

ON A steep slope above the Río Buena Vista, in southern Costa Rica, was a recent clearing in which a number of tall, charred trees stood gaunt and desolate above the low, tangled growth that had sprung up after the harvest of the maize, for which the clearing had been made. To the south and east of the opening the heavy rain-forest stood up like a wall more than a hundred feet high. To the north rose the long, tree-clad ridge of the continental divide, part of the Cordillera de Talamanca; while on the west, far below, one caught glimpses of the river flowing impetuously along its rocky, tree-shaded channel through the cultivated and resting lands of the valley.

On many a morning in the dry month of February I climbed up to this old cornfield from my thatched cabin in the valley, arriving while the light was still dim to watch the exit of the woodpeckers, toucans, and other birds that roosted and nested in cavities in the fire-killed trees. One day, at the end of the month, before the sun

perches, these graceful birds began to fly against a large wasps' nest, suspended from the end of one of the lower branches of the great guanacaste tree, about a hundred feet above the ground. About a foot in length, this nest, covered with silver-gray carton, was shaped like a boy's spinning-top. The doorway was in the spout-like lower end.

Two weeks earlier I had watched a pair of these trogons, I believe the same that I now had before me, digging into a somewhat dilapidated and seemingly old nest of the same sort, apparently to hollow out a cavity for their eggs and young. This was a surprising discovery; for although I already knew that some trogons excavate their brood chambers in the hard, black substance of a termitary, I was not aware that any bird used a wasps' nest for rearing its family. But now these violaceous trogons were turning their attention not to an abandoned nest but to one occupied by a swarm of stinging insects. I had thought of trogons as the perfect

gentlemen among the tropical American birds, all of whose ways were in keeping with the quiet dignity of their upright posture and their soothing, mellow notes. I had never seen trogons of any species attack a bird of another kind, and their disputes among themselves were always settled by much calling, with now and then a harmless dart toward the adversary; never a grappling encounter. Were these trogons, so gentle and mild, capable of capturing an occupied wasps' nest?

The spout-like lower extremity of the nest had been partly broken away, possibly by the trogons on an

earlier visit, but a transverse partition closed off the bottom. Low in the side that faced out from the supporting tree a narrow opening had been made, and the birds were trying to enlarge it. Of a sudden one of them would leave its lofty perch, dart to the nest and, poised on beating wings, take a bite at the gray carton at the hole's edge, then fly back to some convenient twig. Sometimes they would bite twice or thrice at the wall while continuing to hover. But at best their attack upon the nest was a momentary performance, evidently because they could not longer sustain themselves on the wing. Their spectacular mode of working—wings rapidly beating, yellow belly conspicuous from below—reminded me of the way they plucked a berry from a tree, or tore away a piece of the green fruiting spike of a cecropia, while poised on wing before it.

Between darts to the nest, the trogons rested quietly in the crown of the guanacaste tree, now, at the end of the dry season, clad in fresh new foliage. Male and female flew alternately at the nest, as earlier they had taken turns at digging into the abandoned structure; for with trogons of many kinds the sexes share the labor of carving out the nest cavity, and the male often takes the initia-

Trogons and Wasps' Nests

By ALEXANDER F. SKUTCH

Illustrations by Don R. Eckelberry

had risen above the crest of the ridge, I heard full, mellow notes, *cow cow cow cow*, floating out of the adjoining forest. It was a typical trogon's call; and from the even flow of the notes—many in a series, all on the same key, with scarcely any acceleration or rise in pitch toward the end—I recognized its author, the violaceous trogon, *Trogon violaceus*.

Presently a pair of these birds flew out of the forest, passed in strongly undulatory flight across a corner of the clearing, and came to rest in the spreading crown of a magnificent guanacaste tree at its edge. Here, high above the ground, they perched with their usual upright posture, their long tails hanging straight down. The male was a splendid bird, with metallic golden-green upper plumage. His head was black, his chest violet-blue, his lower breast and abdomen orange-yellow. The under side of his tail was evenly barred with black and white. His short, thick bill was pale bluish-gray, while each dark eye was surrounded by a ring of naked, orange-yellow skin, conspicuous from afar. His mate was far less brilliantly attired, with dark slaty plumage on her head, neck, back and breast, yellow on her abdomen.

After resting for a while on their high, exposed

chamber, there were several other gaps in its silver-gray envelope; and it appeared old and worn.

The nestlings that it held were fed and brooded by both parents, of which the female attended them through the night. To pass food to the youngsters the birds clung in the entranceway with only rump and tail showing, and after delivering the meal they climbed in to brood. The tail feathers of both parents were crumpled and bent from long sitting in the confined space. Standing below and a little to the front of the nest and peering through binoculars into the dark cavity, I could clearly distinguish the yellow orbital ring and light-colored bill of the male; while when the female was brooding I could discern her bill, the whitish crescent behind each eye, and the whitish spot in front of it. Otherwise the dark heads of both were vague and shadowy in the dimly lighted cavity. The female must have felt quite safe in her high chamber, and neither walking heavily over the crashing fallen canes and crackling dead leaves, shaking the supporting tree, nor hammering on its trunk made her fly forth. The male sat through everything—

including the throwing of my cap up toward him—except shaking the tree, which brought him out. When disturbed, both parents complained with a low rattle, which they uttered while slowly elevating their tails, and soon they returned to their nestlings. Trogons with low, accessible nests lean out to investigate if they hear a noise, and with little provocation they fly away.

Peering up into the cavity a fortnight later, I noticed three indistinct light points in the dark circle of the orifice. These proved to be the bills of the three nestlings, whose heads I could vaguely distinguish. While waiting for their meals, the youngsters uttered almost continuously a low, sweet-voiced *cow cow cow*, like the call of the parents but more subdued. As each nestling delivered this note, its throat became faintly visible as a light point amid the darkness, an effect caused by the exposure of its pale skin as the sparse plumage was spread apart by the throat's expansion. Once one of the youngsters leaned so far over the entrance shaft that I could see part of its whitish abdomen, but otherwise its plumage was too dark to be distinguished in the dimly lighted chamber. From time to time the little trogons regurgitated seeds, which fell through the opening to the ground. Twice their mother passed food to them while I stood almost directly below her. Brooding had now ceased, and after each visit the parent flew away.

Sixteen days after I discovered this nest, already with nestlings, the youngsters abandoned it. I found one stubby-tailed fledgling resting on a low twig amidst the cane brake, repeating incessantly its low *cow cow cow*. Almost fearless, it took wing only when I was a few inches away; but its flight was still so weak that I easily overtook and captured it. After a little ineffectual

struggling in my hand, it submitted meekly to its fate—the careful examination of its dark plumage, which resembled that of its mother. When I set it on a perch below the nest, she arrived with food and allowed me to approach within a few feet while she rested near her fledgling.

At the end of May, three years later, I found a pair of violaceous trogons attacking a wasps' nest of the same shape as that in the guanacaste tree, but inhabited by another kind of wasp, yellowish instead of blackish. Instead of catching the insects in the middle of the morning, like the first pair, these trogons would begin in the dim light of dawn and continue for about an hour,

until the sun stood low above the crests of the distant mountains. From perches of about the same height in the neighboring shade trees of the little coffee plantation where this nest was situated, the birds shot swiftly past the wasps' citadel, sometimes skimming the outer surface, sometimes merely darting past the doorway, about which the insects were swarming. Without much doubt they were eating the wasps, probably making their break-

fast of them; but their movements were so swift, and the insect vanished so rapidly, that it was difficult to see just what happened.

Usually, after dashing past the wasps' nest, the trogons came to rest at a respectful distance; but occasionally they did not go far enough, and pursuing wasps would cause them to retreat. Or else the birds would try to beat off the assailants with their wings. This wasp-catching in the early morning continued for at least fourteen days before I found the trogons so engaged later in the day. In the warmer air of the early afternoon the wasps were much more active than at daybreak, sallied forth with greater zeal in pursuit of the birds, and often sent them into hasty and undignified flight. These trogons caught the wasps earlier in the day than the first pair because here, at an altitude of 2000 feet above sea level in June, nights were far warmer than they had been a thousand feet higher in February and March; and consequently the insects were more active before sunrise. After a clear, cool night in early February, even at 2000 feet, wasps of some kinds would be so torpid at daybreak that if they fell to the ground they could not rise.

After more than a fortnight of persecution, the inhabitants of the nest had been noticeably diminished in number; and now at last the trogons began to dig their chamber. The papery envelope of the nest had been frayed and broken, especially at the nether end, by the trogons' impacts against it while they caught the wasps; and the brood cells were exposed at several points. The male and female of this pair could not agree as to where to start the excavation. The female chose the customary position, on the side of the nest facing out from the tree, where (Continued on page 500)

THE SNOW JEWEL

*Celebrate the snow tonight,
It is speaking soft and bright
To beauty's believers now. . .
It is strange how diamonds grow
In the trees, on poor men's coats. . .
Even some on sparrow throats.*

Marion Schoeberlein

Trogons

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her round hole began in a mass of brood cells screened in front by the loosely hanging, papery tissue of the torn outer envelope. The male elected to begin on a lateral face of the wasps' nest, at a somewhat higher point. Curiously enough, although the two were making separate holes, they worked alternately, as when trogons carve at the same hole. It apparently never occurred to them that they were spoiling the nest that it cost them over two weeks to capture. The male took the longer spells of work, up to twenty-one minutes continuously, and accordingly his hole deepened far more rapidly than that of his mate, whose turn at the nest was taken up with a number of short spells of activity, lasting from a few seconds to three minutes, with intervening periods of rest on neighboring perches. In their intervals of repose, both birds constantly uttered low, soft, melodious sounds.

The few remaining wasps did not display much spirit and rarely attacked the trogons. But sometimes they hovered about the head and shoulders of the female, whose shallower hole left her more exposed, and she turned back her head to snap at them. At times one would cling to her plumage, causing her to dart rapidly away, trying to shake or pluck off the insect, an endeavor in which she usually succeeded promptly. I could not tell whether the birds were ever stung; they gave no evidence of pain, and I noticed on their heads no swellings such as might have resulted from a sting. When I left this locality at the end of June, a full month after the birds began to catch the wasps, they still had not started to incubate; and I do not know whether the male's excavation or the female's was finally chosen for the eggs.

From Barro Colorado Island in the Panamá Canal Zone, violaceous trogons have been reported as excavating chambers in termite nests and incubating in a cavity in a low stump, both of which are sites frequently chosen for their nests by other species of trogons. Once, in southern Costa Rica, I watched some male violaceous trogons, who had been calling much in a tall tree at the forest's edge, drop down and cling for a few seconds at a time to a decayed portion of the trunk, as

though interested in it as a nest site. But the four occupied nests that I have found in El General and lower parts of the Térraba Valley in Costa Rica, as also the four other nests at which I have watched sustained work, were all in silver-gray wasps' nests. These were situated far out on exposed branches of trees standing in pastures or plantations or at the forest's edge, never within the heavy rain-forest, at heights ranging from fifteen to about one hundred feet above the ground. In this region I have seen the trogons preparing nest cavities from mid-February to mid-June, while nestlings were present from late April to early June. In El General, the pleasant calls of the males are heard more or less throughout the year, but chiefly from late January to June.

Not long ago I met, for the first time in years, an owl in the forest near my house in El General. It was a spectacled owl, the largest of the local species, resting immobile high up in a tree. With its great head and massive form made still more impressive by puffed-out feathers, it seemed nearly as thick as long, and appeared huge by contrast with the smaller birds that had gathered around, protesting the strange presence. Chief among these were trogons and hummingbirds. Some of the latter hovered very close to the giant owl, seeming almost to touch it. The trogons preserved a more respectful distance but were loud in their complaints. A violaceous trogon made a sharp, rattling note while slowly raising his tail well above his back. A pair of white-tailed trogons scolded in lower tones, the male fanning out his tail feathers laterally with a quick motion instead of elevating them like the violaceous trogon. A male green honeycreeper flitted about quite close to the monster, who remained sleepily indifferent to the hubbub it was causing.



Calendula

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All these lovers and eulogists of the charms of the marigold were inspired by the simple blossoms of their times. One wonders to what heights of eloquence they might have soared at sight of the present-day descendants of those primitive forms? There are varieties, too numerous to mention here, that are listed and described in the nursery-



Using her tail as a brace, the female violaceous trogon above is converting an occupied wasps' nest into a birds' nest.