

The Ant-thrush Chicks

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a work that will probably encompass six volumes. In 1950, he was awarded the Brewster Medal of the American Ornithologists' Union for his studies of tropical American birds.

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THE greatest forest on earth is the rain forest of tropical America. From southern Mexico it stretches, with minor interruptions, over 40 degrees of latitude to Bolivia and southern Brazil. In Mexico and Central America it occupies a rather narrow strip along the eastern side of the mountains; but in South America it extends from the eastern foothills of the Andes in Colombia, Ecuador, and Peru to the Guianas and the mouths of the Amazon, more than 2,000 miles away—a vast expanse of glorious greenery drained by the greatest of all river systems, the sea-like Amazon and its many broad tributaries.

The aspect of this immense forest varies endlessly with changes in soil, drainage, annual rainfall, and other environmental conditions to which, like any living thing, it is sensitive. Yet throughout its length and breadth it has certain common features and certain widespread inhabitants, which would tell a naturalist who suddenly found himself in its midst that he was in tropical America rather than in a forest of the Old World. The dominant trees tower up to great heights, usually exceeding 100 and sometimes reaching 200 feet. Orchids, aroids, bromeliads, trailing cacti, ferns, and other epiphytes grow profusely on their boughs, drawing their nourishment from the rain, decaying bark, and fallen leaves. Great lianas or "bush ropes," sometimes as thick as a man's

waist, hang in graceful catenaries from the high boughs and often spread a smothering tapestry of leaves over the crowns of tall trees. There is a profusion of palms, some of which, tall and slender, thrust their rosettes of great feathery or fanlike fronds high into the forest canopy; while others, that often bristle with long, forbidding, black thorns, grow in clusters amid the undergrowth.

Seeking fruits and insects high in the trees, where they are difficult to see, roam a host of brilliant birds: green parrots, many-colored tanagers, glittering trogons, exquisite honey creepers, gemlike hummingbirds, toucans with huge and colorful bills, motmots with racket-shaped tails. In the dimly lighted undergrowth live birds of other kinds, whose subdued tints blend with the bark and the brown fallen leaves; even the long-billed hummingbirds which dwell in deep shade wear dull plumage to match their setting. Wherever in this vast sylvan realm man has not spread destruction, slender monkeys leap from bough to bough, and the more sedate howlers roar mightily at dawn. In the wilder parts lurk the tapir, the jaguar, the puma, and the ocelot; bands of peccaries roam in search of fallen fruits, betraying their presence by their heavy scent; small deer leap gracefully through the undergrowth, unimpeded by the vines that trip the human wanderer. Throughout this immense forested region, from Mexico to Paraguay and from Ecuador to the Amazon's mouths, many kinds of plants and animals range with little variation; while on the other hand every region, every mountain chain and major valley, has its own peculiar forms of life, found nowhere else.

In places where many columnar trunks lead the gaze far upward with their unbroken sweep, where shafts of sunlight illuminate the graceful foliage of fern and palm, the tropical forest exalts all but the dullest and least responsive of human spirits. Where fallen trees break its continuity, disorderly vines

limit one's vision and impede his advance, and all seems tangled confusion, the woodland may appear gloomy and forbidding. Unless one has a special interest in it, this forest, of which each acre supports a greater variety of living things than is to be found in any other type of vegetation, and which is the headquarters of terrestrial life on this planet, may soon become monotonous and boring.

The forest resembles life itself in giving to everyone, as a rule, what he seeks and expects to find in it. If he comes prepared to meet violence and terror, he will doubtless encounter it, although neither so soon nor so dramatically as certain unscrupulous writers have led him to anticipate. If, already convinced that the forest is full of discomforts, he permits himself to be irritated by every mosquito bite, every drop of moisture, and every prick of thorn, he will be thoroughly miserable in half an hour. If he seeks beauty, the tropical forest offers it in vast profusion; if he thirsts for peace and tranquillity, it is here; if he craves adventure, he may also find it. If his chief desire is to uncover the secrets of nature, myriads await him, jealously guarded. The tropical forest rarely discloses its mysteries to the hasty or careless observer. The sea of foliage which is its roof is almost as difficult to explore as the ocean's depth, and offers as many baffling problems.

What I have chiefly sought in the tropical forest is its birds. Ever since, fresh from my studies at the university, I became aware of their immense variety, their beauty, and the dearth of information about their habits, the obscurity in which they live has been a challenge to me. Since they have so many enemies among the teeming woodland life, they must live under the cover of secrecy, hiding their nests well and approaching them with great circumspection. Nevertheless, a very large proportion of these nests, often as high as eight out of ten, are prematurely destroyed. After years of searching, one discovers a

nest of one of the more elusive birds, only to have his hope of learning more about it cruelly extinguished when, perhaps only a day or two later, he finds it empty, plundered by a snake, weasel, coati-mundi, tayra, hawk, toucan, or some other of the innumerable enemies of breeding birds. More than once, frustrated and discouraged, I have exclaimed, "I'm finished with the birds of the tropical forest. Let me watch those of high altitudes or high latitudes, where nests are easier to find, where half or more of them escape predators and one can begin a study with some prospect of carrying it to a successful conclusion!" Yet the very elusiveness of some of these tropical birds incites one to persist stubbornly in his attempt to outwit them.

Prominent among these retiring feathered inhabitants of the tropical forests are the ant birds. Indeed, the warm and humid forest of tropical America has produced no family of birds more characteristic of itself, more closely dependent on the peculiar conditions of life which it offers. Of the approximately 250 species in this great family, not one has extended its range much beyond the Tropic of Cancer—not even as far as the valley of the lower Rio Grande in Texas, where so many tropical birds reach their northernmost limit. On the opposite side of the broad tropical belt, few reach beyond Capricorn; W. H. Hudson, the English naturalist, knew only one species in La Plata, and he had little to tell about it. Neither do the ant birds, like some other tropical families, have numerous representatives in high tropical mountains. Their headquarters are the vast forests of the Amazon basin and the Guianas, where they present a bewildering array. About forty species are known in Central America and Mexico, but not one lives in the West Indies. Although most of the ant birds are forest dwellers, some dwell in the densely tangled vegetation that springs up in openings in the humid woodland, in-

cluding clearings that men have made and abandoned after taking off a crop or two. A few ant birds have invaded the thorny scrub of arid regions.

Ant birds are never brilliant; black and white, with many shades of brown, gray, and olive, are their predominant colors. Often rich tones of rufous and chestnut, or bold contrasting patterns, make them most attractive. On the heads of some are featherless areas that are bright blue in color. In size, they range from pygmy ant wrens that are among the smallest of all birds to the big bataras of Paraguay and tropical Argentina, as large as crows. Ornithologists solved the problem of providing English names for this vast assemblage of ant birds by calling them after more familiar birds which they superficially resemble. The smallest and slenderest of the foliage-gleaning species are known as ant wrens; the ant vireos are somewhat stouter, with thicker bills; the ant shrikes are still larger, with stout bills hooked at the tip; the ant thrushes vaguely resemble some of the true thrushes; the long-legged, short-tailed, roly-poly ant pittas reminded some ornithologist of the pittas of the Old World tropics. Thirty years ago, when I first became interested in ant birds, I learned that they had been minutely classified and their ranges had been mapped; but I could not find a moderately complete account of the life of a single one of the 250 species.

Of the ant thrushes, the most common and widespread in the northern parts of tropical America is the black-faced, known to scientists as *Formicarius analis*. Often, while sitting at my writing table, I hear its full, mellow whistles floating out of the forest 100 feet away. *Who who who* it calls, with an emphasized first note. Usually it whistles a triplet, but sometimes it gives as many as ten notes without a pause. Although I so often hear the ant thrush, I have never once, in many years, seen it on the open shady ground which separates my study

from the woodland at the end of the garden. Many of the more tree-dwelling birds of the forest come into the trees around me, and some feast on bananas at my bird feeding shelf; but the birds of the ground and the lowest vegetation seldom venture beyond the closed woodland. Since the ant thrush never comes to me, to cultivate its acquaintance I must seek it in its own ambient.

To watch the shy ant thrush amid the undergrowth, in the dim light that has filtered through tier after tier of heavy foliage, is not easy. But sometimes, while I stand quietly, I have the good fortune to see the elusive creature emerge into a clearer space. With dainty, deliberate steps, the long-legged bird advances over the leaf-strewn ground with which its dark colors blend. Its upper plumage is deep olive-brown, relieved by a half-collar of chestnut on the back and sides of the neck. A black patch covers its face and throat. Behind each large, dark eye is a crescent of bluish white bare skin which imparts an appearance of keen-sighted alertness. The under plumage is dark gray and olive, brightening to tawny on the coverts that show conspicuously beneath the short, upturned tail, which tilts forward with each step as the bird advances. Meeting this unique bird for the first time, one would take it to be a small railbird rather than a passerine, related to the finches, warblers, and swallows. No other ant bird that I know walks as it does, advancing its feet alternately; even the terrestrial ant pittas hop over the ground with their feet together, like a sparrow or a thrush.

A solitary bird, the ant thrush usually forages alone. Walking gracefully over the forest floor, it flicks aside the fallen leaves with its short black bill. The insects, spiders, and other small creatures which it thus exposes are its chief nourishment. Sometimes, when a noisy crowd of small forest birds of many kinds have gathered around the deployed battalions of the

army ants, intent on preying upon the obscure creatures which the hunting ants drive from their hiding places beneath the ground litter, an ant thrush hovers on the outskirts of the throng. No doubt it catches many a fugitive insect or spider that has escaped the ants and the birds that dash into the midst of the swarm. Sometimes it will vary its diet with a lizard or a small snake.

On a morning in May, as I wandered through the forest on the land that I had recently bought in southern Costa Rica, a whirr of wings and a sharp, metallic-clear *tleet tleet tleet* startled me. I looked around in time to see a swiftly flying ant thrush vanish amid the saplings and low palms. Its line of flight led from a slender, mossy, rotting trunk, about 12 feet high. In the side of the stub were two narrow gaps that began slightly above the level of my head. Piling some logs at the base of the decaying trunk, I stood upon them to investigate these holes. They gave access to a central hollow, into which I thrust the little mirror that I carried for such occasions. After my eyes had become adjusted to the obscurity, I vaguely discerned two eggs that seemed to lie far below. Later, when I returned with an electric bulb which I lowered into the cavity on the end of a cord attached to a flashlight, I saw that the eggs were white, finely and faintly stippled over the whole surface with some dark color. They lay, as at the bottom of a well, on a mat of fine, dark brown material, 2 feet below the smaller gap in the side of the stub. My first ant thrush's nest, found a dozen years after I first met the bird and began to seek its eggs!

I lost no time in setting my little wigwam of brown cloth in view of the opening in the trunk's side, for I was eager to discover all that I could about the domestic habits of these little-known birds. Through the following morning, watching from my blind, I learned that both parents took turns in covering

the eggs, as in all the other ant birds that I had studied. They sat in the dark, damp cavity from an hour and a half to three hours at a stretch, each remaining until its mate arrived to relieve it. With a sudden whirr of wings, the incoming partner darted into the hollow before I could see it well. Once the departing ant thrush stood in the opening looking forth, its dark, rich colors beautifully illuminated by a sunbeam that found its way through the forest canopy. Here it sang a long series of full, mellow whistles; then it shot forth with strong, swift flight that carried it between the tree trunks to a point beyond my view.

A few days later, my light and mirror revealed a sight such as I never expected to see in an ant bird's nest. At the bottom of the narrow well lay two nestlings covered with long, dense, dark-gray down. Every other newly hatched ant bird that I had seen had been utterly naked, with no vestige of plumage; these nestlings were more completely clothed than most newborn passerine birds. They brought to mind the downy chicks of railbirds, just as their parents reminded me of adult rails. The two nestlings huddled into a single dark, downy mass; but sometimes, when one moved, I caught a fleeting glimpse of pink skin.

Since I could not reach these nestlings without making a larger opening in the side of the trunk, I restrained my desire to examine them more closely, but my concern for their welfare was in vain. As I approached the trunk three days later, a wide gap in its side made my heart sink. Some mammal had evidently torn it open to devour the tender occupants. Found after so long a search; lost so soon!

Seven more years passed before I discovered my second ant thrush's nest, in the forest near my home. A more unexpected situation could hardly be imagined. On a steep hillside stood a tall, dead chonta palm, propped up by thick, spiny roots that

sprang from the base of the columnar trunk at a point above my head. Its top had broken off, and a 7-foot length of it stood nearly upright on the slope below, precariously upheld by a single loop of a dead frond of twining fern and swaying whenever it was touched. This length of palm trunk had been reduced by the decay of its softer inner tissues to a thin shell, with a hollow interior that occupied nearly all of its diameter of 6 inches. Into the bottom of this long, fragile, brown cylinder a pair of ant thrushes had carried many dead leaves, on which they fashioned a nest of fine leaf petioles. Inserting my light and mirror through a narrow gap near the bottom of the tube, I saw two white, speckled eggs. But the lowest opening through which the parent birds could pass was 5 feet above the ground and nearly as far above their eggs, so that in coming and going they were obliged to climb down and up this long pipe. Its open top afforded no protection from the heavy rains of May and June.

Sixteen days after I found the eggs, they hatched downy nestlings such as I had already seen. Rarely, when I lowered the lighted bulb above them, they held up gaping yellow mouths and made a buzzing sound. Usually they rested quiescent, huddled together in a dark, fluffy mass. Their most conspicuous feature was the enormous white flanges at the corners of their mouths, which doubtless showed the parents where to place the food that they carried into the dimly lighted cavity. The upper and lower flanges on each side did not fit together, and between them was a narrow gap. As I looked down from above, the nestlings seemed to stare up at me with great white eyes, each with a narrow horizontal pupil, the gap between the flanges. I wondered whether these seeming eyes would alarm animals that might come to injure the nestlings, as eyespots on butterflies and other insects sometimes hold hungry birds aloof. I rarely saw the nestlings' true

eyes, dark and inconspicuous behind these bizarre projections.

Twelve days after the nestlings hatched, I found one lying dead beside its nest mate. The survivor remained three or four days longer, then vanished. Apart from its larger size, its aspect had changed surprisingly little since its birth. When I last peeped in at it, it appeared too downy, too undeveloped, to climb up 5 feet of vertical tube and venture into the perilous forest. And if it did leave spontaneously rather than in the mouth of some hungry animal, how did it go? Did it fly off or simply drop to the ground and hop away? As I watched the nestlings' slow development, I became eager for the answer to these questions. But without undertaking long, continuous watches which require a relay of observers, one rarely sees the departure of a young bird unless he already knows its normal period in the nest. Although they hatch without a trace of plumage, ant birds of other kinds are clothed in feathers and hop or flutter from their open nests amid the bushes when from nine to thirteen days old, depending on the species. I doubted that the ant-thrush chicks, which seemed to develop far more slowly, would be ready to venture forth from their dark nursery even at fifteen or sixteen days of age.

Four more years passed before I found my third ant thrush's nest. It was in the forest near the site of the second one; in the top of a standing trunk of a chonta palm that a falling tree had snapped off 12 feet above the ground. The central hollow was a tubular well 14 inches deep and 4 inches wide, just too long and narrow to permit me to touch the two eggs that lay in the bottom, exposed to the sky. By cutting a few inches from the top of the stub, I might have reached them without harming the nest; but I desisted, because such alterations reduce the chances of bringing forth the young alive. In due course the eggs hatched, and one nestling survived to leave the stub when eighteen or nineteen days old. Although I did not watch

its departure, I now knew the age at which this occurred; and this was no small gain.

After another five years, I was walking in the forest near my home when a sudden whirr of wings close to my ears drew my attention to the slender, rotting stub beside which I was passing. There was a long, narrow gap in its side; and by standing on a stool and lowering a light into the hollow center, I could see the ant thrush's usual two white, dark-flecked eggs lying far below, beyond my reach as in the three earlier nests. They were exposed to the rain through another hole in the broken-off top of the stub. Only 100 yards from my house in Costa Rica, this latest nest was the most conveniently situated of all. Nearly thirty years had now sped by since I made the acquaintance of the ant thrush; sixteen had elapsed since I found the first nest. Would I at last succeed in disclosing details in the ant thrush's life that had long escaped me?

Twenty-four days later, I arose while the stars still shone and climbed the steep, grassy slope behind the house. When I paused to catch my breath at the brow of the hill, the sky was brightening above the high, wooded ridges beyond the river in the east. Among the trees below me, Gray's thrushes, scarlet-rumped black tanagers, buff-throated saltators, and other birds were already singing. Pushing through the wall of bushes and vines at the forest's edge, I returned to the darkness of night. As I descended beneath tall trees into a narrow dell, I scanned the ground in front of me in the beam of my flashlight. The bushmaster, the fer-de-lance, and other deadly snakes lurked in this woodland. Soon I picked out the form of the wigwam blind that I had set before the ant thrushes' nest. Carefully I took my seat in it, hung my field glasses around my neck, placed my notebook on my lap, and laid my breakfast within reach. I had come prepared to watch for many hours.

As the dawn light slowly seeped into the depth of the for-

est, the ant thrushes' slender stub, adorned with a variety of creeping air plants, took shape in front of me. In the weeks that had passed since its discovery, I had watched the two parents incubate their eggs and bring to the single nestling that hatched many billfuls of insects or other food, which was usually mangled by the parents beyond recognition. On the preceding day, I had found a number of white, gelatinous pellets stuck to the wall of the cavity near the doorway. These were the excreta of the young ant thrush, evidence that it could now climb up and take its meals through the opening, a yard above its nest. But when I peered in with light and mirror, it still rested on the bottom, a formless mass of dark, fluffy down, which except for greater size looked much the same as when it was a few days old. Beneath the down I could faintly distinguish what seemed to be wing quills. Even now, the chick's one prominent feature was its huge, staring white "eyes."

As I watched in the dim light, I reflected that in an hour or two it would be just eighteen days since I had first seen the nestling, so recently hatched that its down was still plastered against its pink skin.

Who who rang out close by me, while the light was still dim in the underwood. Looking around for a parent ant thrush approaching over the ground with the nestling's breakfast, I almost missed the event that I so greatly desired to behold. At that moment the chick flew out of the hollow trunk. Tracing a long, descending course, it alighted on the ground, where it called loudly *chip chip chip . . .*, as of late it had done whenever a parent fed it in the nest. As well as I could see in the dim light, it was a miniature of its parents, even to the black face and throat. The most conspicuous difference was the prominent white flange at each side of its mouth. Its olive back, and even more its chestnut hindneck,

were shaded by the long, upstanding dark-gray natal down. Whenever I looked into the deep nest chamber from above, this abundant down had completely concealed the juvenal plumage that expanded beneath it, making the young ant thrush appear far more infantile than it actually was.

When I tried to catch the chick for closer examination, it managed to keep ahead of me by a combination of walking and hopping over the rough ground, while a parent followed us, calling sharply *tleet tleet*. When I gained on it, the young bird flew fairly well. Finally, it walked beneath a tangle of bushes, vines, and fallen boughs. I knew that further pursuit was futile. In my eagerness to study its plumage, I had already caused more disturbance than I care to do when a chick first ventures forth from its nest beset by many perils, and perhaps the greater hazards of its life amid the trees and bushes.

Elated by what I had seen, I folded up my blind. When I reached the open pasture at the forest's edge, the sun floated up above the high ridges in the east. My vigil had borne fruit far sooner than I had expected.

In July of the same year, there were again two eggs in the same hollow stub; and in the following year three sets were laid there, in April, June, and August. In all, there were ten eggs, and the parents reared eight chicks. At the age of sixteen days, one of these became alarmed when I looked in, rushed out past my light, mirror, and face, and promptly walked off through the undergrowth. Another chick left when only seventeen days old, and I did not see it go. Five left when eighteen days of age and one at nineteen days; and these six all took their departure in much the same manner, as I first discovered while watching from my blind. Each came forth at the parent's first visit to the nest in the dim light before sunrise. As the parent came walking over the ground and called, the chicks flew out to meet it. If the parent approached

silently and flew up to the doorway before the young birds were aware of its presence, one of the young ones took the food. Then parent and chicks flew down to the ground in swift succession. Without delay, they walked off together, the youngsters traveling quite competently. Soon they were lost to view in the undergrowth; the young birds' loud *chip*'s became fainter, and then inaudible as the family advanced deeper into the forest.

This simple discovery, made after long seeking and waiting, then confirmed by repeated observations, pleased me almost as much as though I had unearthed facts that would shake the scientific world and perhaps change the course of biological thought. Unimportant as it may appear when viewed in isolation, it belongs to a class of discoveries which, taken together, are of the utmost importance. Although sometimes we may, by a stroke of good fortune, learn all the salient facts in an animal's life by means of a single series of consecutive observations, more often it is only by piecing together scraps of information gathered here and there, at long intervals, that we begin to understand how it lives. And from our knowledge of the patterns of life of many different creatures, our understanding of the great realm of living things is built.