

ON THE HABITS AND NEST OF THE ANT-THRUSH
FORMICARIUS ANALIS

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IN THE lofty forests of the lowlands of Costa Rica and Panama, one of the most distinctive bird notes is the mellow, resonant whistle, usually twice repeated, of the ant-thrush (*Formicarius analis*). The bird-watcher may hear the triple whistle a score of times before he catches a glimpse of the dark-colored, long-legged bird of about the same size and much the same aspect as a small rail. Alert and wary, one of these birds will usually detect the approach of an intruder while still some distance away, and will quietly disappear through the undergrowth—using its legs rather than its wings for locomotion. With dainty, deliberate steps, it walks over the litter of the forest floor, the short, abruptly erect tail tilting forward with each step. The dark brown, black, olive, and gray of the plumage blend so well with the fallen dead leaves of the background that whenever the bird pauses for a moment its form can be distinguished only with difficulty in the dim light that has been filtered through more than a hundred vertical feet of heavy foliage. (The Panama Ant-thrush, *Formicarius analis panamensis*, and Hoffmann's Ant-thrush, *F. a. hoffmanni*, are rather similar in appearance, and I have detected no difference in their voice or behavior.)

This ant-thrush has a fairly varied vocabulary. The call it most often uses is the triple whistle with the first note of the series longest and loudest, the whole sounding a trifle wistful or melancholy to human ears. But at times the bird voices a longer sequence of these whistles—rarely as many as ten. It will hesitantly approach the man who cleverly imitates this call—in fact, the first ant-thrush I ever saw was called out of the undergrowth of the forest on Barro Colorado Island by Dr. Frank M. Chapman. When alarmed, this ant-thrush utters a sharp, clear, somewhat explosive *tleet*, sometimes repeated in a continuous sequence. The note is quite as characteristic of the bird as its whistle; it cannot easily be confused with the call of any other bird of the forests where this ant-thrush dwells.

Formicarius analis is as strongly attached to the ground as any rail. I have never seen birds of this species perch on a bough; and they are quite as reluctant to fly as the forest quails (*Odontophorus*) among which they live. It is unfortunate that the most terrestrial of all ant-birds should be the type genus of the family, for the majority of the Formicariidae are arboreal and are only rarely seen on the ground; they live in the lower half of the forest, or else in thickets and bushy growth. Even the species that forage with the army ants hop down briefly to snatch an insect from the forest floor, then promptly rise again to some low perch where they watch and wait for another victim. Yet the strong-legged ground-foraging antpittas of the genus *Grallaria* hop

rather than walk and thus clearly link the numerous arboreal members of the family with the terrestrial *Formicarius*.

On January 23, 1931, on Barro Colorado Island, Canal Zone, I was walking along the Armour Trail through heavy forest when I observed a Panama Ant-thrush foraging not far ahead of me. I stopped short, and the bird, apparently undisturbed, continued to hunt for food in the middle of the pathway, then moved off to one side where the ground vegetation was so sparse that I could easily observe all its movements. Still assiduously hunting, it worked around in a circle that led it back to within three yards of where I quietly stood; it picked up a few morsels there, then deliberately walked away and was lost to view amid the undergrowth. While foraging, it picked from the ground and swallowed small objects that I could not identify; and often with its rather short, black bill it flicked aside fallen leaves in search of its food¹—a habit also of the antpittas (*Grallaria*) and the Bicolored Antcatchers (*Gymnophithys bicolor*)—but it never scratched with its feet.

I have more extensive notes on Hoffmann's Ant-thrush, which inhabits the Pacific side of southern Costa Rica, ranging from sea level up into the mountains to at least 3,000 feet. On April 30, 1942, I spent many hours in a blind on the forested ridge that rises steeply behind my home in the Térraba Valley in southern Costa Rica. I was watching the nest of a pair of Ruddy Quail Doves (*Oreopeleia montana*), built amid the rather dense undergrowth. About the middle of the morning, I heard the mellow triple whistle, then the sharp *tleet tleet*, of an ant-thrush. Soon through the little rectangular window at my right, I glimpsed the shy bird—the first of the kind I had seen in the six months I had spent in these forests. It had caught a small snake, brownish above and bright coral-red below, a little less than a foot in length, and was pecking it and knocking it about on the ground with its bill. It continued this for a good while, until presently another ant-thrush—probably the mate of the first—hurriedly approached as though to take the snake. To my great disappointment, the intervening undergrowth prevented a full view of what ensued; but I could see that the snake, still squirming, was pecked and shaken a good while longer, until at last both ant-thrushes and victim were lost to view amid the undergrowth. Since other antbirds give food to their mates—I have seen the Spotted Antbird (*Hylophylax naevioides*), the Antwren (*Microrhopias quixensis*), and others do this—I should not be surprised if the snake passed from one bill to the other before it was devoured.

On May 21, 1942, as I searched for nests through the undergrowth of another part of the forest in which I had seen the birds with the snake, a Hoffmann's Ant-thrush flew in front of me, startling me with

¹ Van Tyne (1935:28) found the food of *Formicarius analis pallidus* in Petén to consist of "snails and a few beetles."

its clear, sharp, metallic *tleet*, several times repeated, and in a trice vanished amid the bushes, saplings, and low palms of the underwood. I did not see the bird at the moment it took wing; but its line of flight had led from a low, moss-covered trunk, scarcely more than a hollow shell. On one side of the trunk the bark had broken away and hung loosely from above, leaving a wide gap that ended at about the level of the top of my head. I pushed into this gap the little mirror I always carry in my pocket for such contingencies, and it showed a cavity extending far down into the stump. I could see no sign of nest or eggs, but I clung to my impression that the bird had flown from the trunk.

Returning two hours later, I approached the stump slowly, keeping my eyes upon it, but making no effort to move silently. When I was still five or six yards distant, the head and foreparts of an ant-thrush were suddenly thrust out through a small gap in the hollow shell, beside the larger and more obvious one already mentioned. Claspings with its feet the opposite edges of the long, narrow aperture, the bird regarded me deliberately with large brown eyes, and rested there motionless, giving me an excellent opportunity to examine it through the field-glasses. Its crown was a dark, nondescript shade of brown; but its nape was bright rufous, and this color extended far down on the sides of the neck, forming a collar interrupted in front by the black throat. The brown eyes were surrounded by bare bluish skin. I moved a step forward, and the bird darted out and down, voicing its sharp *tleet tleet* call of alarm. I was elated by my discovery, the most exciting of the year.

The slightly leaning, hollow trunk was about 12 feet high and 7 inches thick. It was covered with green moss; a few aroids and small ferns were growing on it here and there. A stout woody vine which twined round it led up to the lower boughs of a neighboring tree. The central hollow was entered from above by the larger gap, facing south, which I had first noticed, whose lowest point was six feet two inches above the ground. Beside this and facing east was the smaller gap, which extended two inches lower.

I piled some logs at the base of the trunk and stood upon them for a more careful examination of the central hollow. The light beneath the trees was somewhat stronger now that the sun was higher; and in the mirror I could discern, or thought I could discern, two eggs lying very far below. To see them plainly, artificial illumination would be necessary. The same afternoon I brought an electric torch with a long cord and a bulb attached, which I hung in the hollow. Now I could clearly see the nest and eggs.

The two eggs rested approximately two feet below the entrance, or about four feet above the ground. They lay, as at the bottom of a well, upon a mat of dark brown material that filled the lower part of the deep, narrow cavity. They appeared to be white, very finely and

faintly stippled over the whole surface with brown, but it was impossible to make certain of these details from the reflected images of the distant, artificially illuminated eggs. The bottom of the cavity was so dark even at midday that they could be seen only very dimly in the mirror when the light was extinguished.

When I had completed my examination of the nest, I set up my brown wigwam before it in order to begin the study of the habits of the ant-thrushes the following morning (May 22). This is the record I made:

- 5:15 A.M. While the light is still dim in the forest, I enter the blind before the nest. As I go in I hear the sharp *tleet* alarm-call of an ant-thrush. Evidently it took fright and flew from the nest.
- 5:33. An ant-thrush silently flies up and enters the trunk through the small gap facing the east. It enters in one continuous motion, without the careful inspection of cavity and surroundings practiced by woodpeckers, trogons, and most other hole-nesting birds.
- 7:22. The mate, arriving silently from the north through the undergrowth, suddenly flies up and enters the trunk by the smaller gap. It is silent save for the whirring of its wings. Almost at once an ant-thrush (doubtless the one which has been incubating) appears in the small gap and stands facing outward in the opening, where a sunbeam, filtering through the forest canopy, falls full upon it. The bird calls, delivering an emphasized first whistle and about 10 following whistles; then it flies off to the south.
- 8:15. An ant-thrush suddenly enters exactly as at 7:22. Two minutes later a bird appears in the cavity behind the entrance and rests there, looking out. After a while, it descends below the doorway. Twice again an ant-thrush appears in the doorway, then descends—pausing for a time before the last descent. Finally an ant-thrush appears and stands in the large gap facing south.
- 8:28. It flies silently away.
- 11:27. This bird silently approaches, flies up and enters. An ant-thrush (the mate?) almost at once appears in the doorway, stands there a few moments looking around, then flies silently away. I now leave the blind and approach the nest; the other ant-thrush darts out and away, calling sharply: *tleet tleet tleet*.

Since the sexes of the ant-thrush are indistinguishable in appearance, it was not possible to determine exactly the part taken in incubation by male and female. But I think it a fair conclusion that at 7:22 and again at 11:27 nest-relief took place—that the bird that entered was not the one that immediately afterward emerged. It is not easy to

decide whether the ant-thrush that flew away at 8:28 was the same one that arrived at 8:15, or the mate. Since the bird that occupied the nest when the other came at 8:15 had been incubating for less than an hour, it is possible that it refused to make way for its mate, which then lingered in the top of the hollow awaiting the other's departure but finally grew tired and flew away. It is not unlikely, however, that the one that had been incubating did relinquish the eggs to the other but delayed its own departure, not yet feeling hungry.

The ant-thrushes' periods of sitting ranged from an hour and 49 minutes to 3 hours, or a little less. If there was no change-over at 8:15, then one bird sat continuously for 4 hours and 5 minutes; but we cannot be certain of this. Antbirds as a rule take long sessions on the eggs, male and female replacing each other infrequently. Even the smaller species often sit for two or three hours without interruption; and once I watched an Antpitta (*Grallaria perspicillata*) incubate for five hours without a break. At least in those species in which the sexes can be distinguished, the male usually takes somewhat longer sessions on the eggs by day than the female; but the female sits through the night. The ant-thrush coming to take its turn on the eggs always arrived silently, without signaling to its sitting mate. The outgoing partner usually flew off in silence, but once one of the birds called long and loudly from the doorway before flying out. When frightened from the nest by my approach, however, they almost invariably voiced sharp notes of alarm as they flew away. Their flight upon leaving the nest was strong, swift, and direct, gradually descending, reaching the ground a good distance from the hollow trunk.

I never attempted to remove the eggs for closer examination and measurement, for this would have been impossible without enlarging the gap in the side of the hollow trunk and placing the nest in jeopardy. From long experience in the tropical rain forest, I knew that this nest, cunningly concealed though it was, stood only a slight chance of escaping predators until the young were fledged; and I refrained from making any alteration that would decrease the probability of its success. But I came each day with light and mirror to see whether the eggs had hatched.

On May 27 the mirror revealed that the two eggs had hatched since the preceding day. The empty shells had already been removed. These were most surprising nestlings to find in an antbird's nest. All the other newly hatched antbirds I have seen—11 species in 7 genera—were as completely naked as newly hatched vireos, but these baby ant-thrushes were covered, on the upper parts at least, with long, dense down that seemed far more compact than that on most passerine nestlings, and by artificial light was dark gray. I inserted my arm into the cavity up to the shoulder, but the nestlings lay beyond my finger-tips.

Without enlarging the entrance, I would not be able to reach them; so I contented myself with examining them in the mirror. Viewed from above, they appeared as completely and as warmly clad with down as newly hatched rails; but when from time to time they squirmed about, they revealed glimpses of pink, naked skin on the neck and underparts. Most of the time they lay motionless, huddled into a single, dark gray, downy mass. But at intervals one would move, and the other make a swift answering movement to bring it once more into close contact with its nest mate.

I had hoped to watch the care and development of the young ant-thrushes; but their concealment, which to me seemed so excellent, was yet not sufficient to shield them from discovery by one of the many enemies of nesting birds that lurk in the tropical forest. Or perhaps on my visits I had left scents which led the sharp-nosed coatimundi or some other mammal to investigate the hollow stump. At all events, upon visiting the nest on May 30 I found the trunk torn open and the nestlings gone.

I tore out the side of the hollow shell to expose the ant-thrushes' nest. The bottom of the cavity was filled to a depth of about 14 inches with a loose mass of dead leaves of many kinds, chiefly dicotyledonous, but including some strips of palm fronds. The largest leaf measured 5 inches long by $3\frac{1}{4}$ inches broad. At the top, the leaves were mixed with slender dead petioles and flower stalks. Upon this filling rested the nest proper, a thick mat consisting largely of petioles and flower stalks, mixed with a number of long, slender, yellowish flowers, too far decayed for identification, and a few ventral scutes of a big snake.

Antbirds' nests are typically open, hemispherical structures, often suspended between the arms of a forked horizontal twig, vireo-wise. In none of the numerous open antbirds' nests that I have examined has there been any snakeskin. So too with wrens: house wrens (*Troglodytes* spp.) and Bewick's Wrens (*Thryomanes bewickii*), which breed in cavities, frequently place a bit of cast snakeskin in their nests; but the many wrens that build roofed nests in trees or bushes rarely if ever use this material. The Crested Flycatcher and other species of *Myiarchus* often take pieces of cast reptile skin into the cavities where they lay their eggs; but among the flycatchers that build nests in the open, the Arkansas Kingbird (*Tyrannus verticalis*) is exceptional in employing exuviae. The castle-builders (*Synallaxis* spp.) collect for their nests a great deal of the cast skins of both snakes and lizards; but although these birds do not nest in cavities, they construct relatively huge edifices of sticks in which they build the nest proper—much as a wren builds in a box provided for it. Thus reptile skins are quite commonly used by passerine birds that lay their eggs in cavities, very rarely by those that nest in the open. The theory has been advanced that birds place exuviae in their nests as scarecrows to ward off the attacks of predatory creatures, but I find it difficult to believe that a few ven-

tral scutes of a snake lying at the bottom of a dark cavity could be of service in frightening away any animal, however small. Yet the snake scales were not an integral part of the nest, and in view of their common use by hole-nesting species I believe that reptile skins, as such, must have some significance for the birds which is obscure to us.

I have published an account (Skutch, 1934) of the nesting of the Slaty Antshrike (*Thamnophilus punctatus*); subsequent studies, still in manuscript, of a number of other species and genera show that the open nest and naked young of this bird are fairly typical of the antbird family. Van Tyne (1944) found the hole-nesting habit described in only two genera of antbirds, *Gymnopathys* and *Formicarius*. Cherrie (1916) described a nest of *Formicarius colma* found on the Orinoco in March, 1899, which was in a natural cavity in a tree trunk and contained two pure white eggs. He also reported that *Formicarius analis saturatus* nests in holes in trees (Cherrie, 1908:366). Cleaves (1944) figures the nest, also a tree cavity, of *F. a. panamensis*.²

Thus *Formicarius analis* differs from the majority of other antbirds in its manner of reproduction as well as in its terrestrial habits. It nests in a cavity instead of in the open; and the young upon hatching are covered with down instead of being quite naked. It agrees with the more typical antbirds in laying two eggs (a number that appears to be as constant in this as in the hummingbird and manakin families) and in the participation of both sexes in incubation.

² Carriker (1910) ascribed to *F. [analis] umbrosus* a frail open nest, containing a single egg that was dark greenish-olive, heavily blotched with different shades of burnt amber; but it would be most surprising if there really exists among closely related species such wide variation in nest and eggs.

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