THE NESTING OF SOME VENEZUELAN BIRDS

ALEXANDER F. SKUTCH
San Isidro del General
Costa Rica

I passed the interval from 15 March to 24 July 1966 at "La Araguata," a large cattle farm situated among the hills near Pirapira, some 20 miles south of Valencia in the state of Carabobo, Venezuela. Although most of my time was devoted to the study of the Rufous-fronted Thornbird (*Phacellodomus rufifrons*) and the birds of other kinds that occupy its great, many-chambered nests, I found a number of nests of other species and learned what I could about them. In view of the dearth of information on the habits of Venezuelan birds, it seems useful to publish these observations, fragmentary though some of them be. My study of the thornbird and its nesting associates will be published separately.

My visit to Venezuela was supported by a grant from the Frank M. Chapman Memorial Fund of the American Museum of Natural History of New York. The farm on which my wife and I lived and worked was the property of the Venezuelan bird artist Walter Arp, who with his wife Elena gave us unforgettable hospitality. Paul Schwartz arranged for our sojourn here, helped us to get established in Venezuela, and showed us various parts of the country. To all these people and institutions, I am profoundly grateful.

PALE-HEADED JACAMAR

On the morning of 3 May, as I walked along a rough road that skirted the edge of a lightly wooded ravine, a bird new to me flew into a treetop with a butterfly in its bill. After knocking the insect against its perch until the wings floated down, it swallowed the body. This bird's slender form and long, thin bill assured me that it was a jacamar, although it was smaller and far duller than any other member of this charming family that I knew.

Its head, hindneck, and sides of the neck were pale grayish brown. The remaining upper parts, including the wings and tail, were dull blackish with a faint bluish and purplish gloss. The chin and throat were buffy; the foreneck and sides dark brown, enclosing a whitish triangular area on the center of the breast. The base of this triangle rested upon a broad band of chestnut across the upper abdomen. The lower abdomen and under tail coverts were dull white. The bill was black, the eyes dark, and the legs and toes blackish. Through my binoculars I could detect only one hind toe, instead of the two that I expected in a jacamar. Later I learned that in the genus *Brachygalba* the inner hind toe is greatly reduced in size. From the description I then wrote, I identified this delicate little bird as the Pale-headed Jacamar (*Brachygalba goeringi*), a species confined to northwestern Venezuela and eastern Colombia, where it inhabits light woods and adjoining clearings, at low altitudes.

DISCOVERY OF THE NEST

While I continued to watch, a second jacamar, quite similar to the first in appearance, flew up from the precipitous slope below the roadway with earth on its long bill, an almost certain indication that it was nesting. I promptly located the nest of the only pair of Pale-headed Jacamars that I have ever seen. The burrow had been dug into a bare, vertical wall of clay, at a point three feet above its base. At its mouth, the narrow tunnel was only 1¼ inches high and 1⅝ inches wide. Probing it carefully with a slender vine, I found its length to be 31 inches. I wondered why the burrow of this small jacamar was so much longer than any of the numerous tunnels of species of the larger *Galbula* that I had examined.

THE NESTLINGS AND THEIR CARE

Illuminating the burrow with an electric bulb attached by a long cord to a flashlight, I succeeded in distinguishing the heads of four nearly feathered nestlings, deep in the earth. I then sat some distance away to watch the parents attend their young. Soon one came with a fairly large butterfly of the skipper family (Hesperiidae) with wings still attached, and a little later the other parent arrived with what appeared to be a much smaller butterfly of the same group. After much delay, one went to the mouth of the burrow but lacked courage to enter. The other parent swallowed its butterfly and flew away.

There was no place to set a blind on the steep side of the ravine. After I had watched unconcealed for a while, the parents proceeded to feed their nestlings, although to the last they remained somewhat distrustful of my presence. During about five hours on three mornings, I saw the parents bring only insects. These were always held conspicuously, one at a time, in the end of the delicately slender

bill, where I could examine them through my binoculars while the parents perched well up in the small trees, hesitating to approach the burrow. About half of the insects brought to the nest were large dragonflies, about as long as the bill in which they were grasped. Usually the wings had been knocked off before the parent came in sight; more rarely the dragonflies were delivered to the nestlings with wings attached. Next in order of abundance came butterflies of small or medium size, which were always delivered intact. Nearly all of the lepidopterans were dull in color; the brighest had orange-and-black wings. Many of the butterflies had the stout bodies, relatively short wings, and strongly hooked antennae characteristic of Hesperiidae. It seemed significant that the jacamars brought none of the slender-bodied, long-winged heliconian butterflies, which at this season were present in the undergrowth of the woods, especially in moist ravines, in amazing abundance. Nor did they bring one of the wide-winged azure morphos, which during the preceding week or two had become prominent in the woodland. Rarely the parents came with an insect of some other kind, such as a dipterous fly and what appeared to be a small cicada. From 09:55 to 11:25 on 5 May, when the jacamars had lost much of their shyness in my presence, the two parents fed the nestlings 13 times.

These jacamars foraged chiefly, if not wholly, in the treetops. I watched one of them resting among the topmost twigs of a tall tree with expanding foliage and white, acacialike flowers. From its lofty lookout the bird darted out, flycatcherlike, to capture volitant insects. Despite the great difference in its bodily proportions, it reminded me of the Swallow-wing (*Chelidoptera tenebrosa*), a dusky puffbird that has a similar method of foraging. Nearly always, the parent jacamars flew down to the burrow from high in the trees, and after delivering their food they promptly rose to the treetops again. They lived at a higher level than the larger and far more brilliant Rufous-tailed Jacamars (*Galbula ruficauda*) that were much more abundant in this region.

The parent Pale-headed Jacamars announced their arrival in the treetops near the burrow by calling *weet* several times in a high, thin voice, not unlike that of some small flycatcher, such as the Tufted Flycatcher (*Mitrephanes phaeocercus*) or the Wood Pewee (*Contopus virens*). At times the jacamars delivered a series of these thin notes, becoming faster and higher in pitch, until the sequence ended in a little sharp trill. Sometimes they twittered in a low, confidential voice. Or they might combine the two sorts of utterances, calling *weet weet weet t'weet t'weet t'weet,* perhaps terminating with a little trill. The nestlings were mostly silent. Rarely they voiced a slight *weet.* Only once, when a parent rested in front of the burrow, hesitating to take in their meal, did I hear the nestlings call more loudly. Their habitual silence contrasted with the irrepressible loquacity of Rufous-tailed Jacamars of the same age.

One morning, while I sat on the ground watching the nest, a big black Tayra (*Tayra* sp.) ran down the slope above me, almost colliding with me before it turned left and ran toward the burrow, frightening away a parent who rested on an exposed root in front of it, waiting to take in the dragonfly that it held. The overgrown weasel passed above the nest, apparently without noticing it, and vanished into the woods.

DEPARTURE AND APPEARANCE OF THE FLEDGLINGS

At about 09:30 on 12 May, while I stood in the roadway above the burrow, watching the parent jacamars bring food, a fledgling emerged from its nest and flew up into a tree in front of me. Both parents came immediately to perch close beside it and sing, as though congratulating it, or themselves, on the successful conclusion of its nestlinghood. Their singing consisted of a crescendo of sharp *weet*'s and twitters, running off into high, thin trills. They repeated the song again and again, with variations, while they turned their bodies from side to side and twitched their tails rapidly up and down, as though beating time to their notes. At intervals the fledgling joined in with its weaker voice, flagging its tail as its parents did. This long-continued performance reminded me strongly of the most animated vocal outbursts of the Rufous-tailed Jacamar; but the voice of these little birds was thinner, as befitted their smaller size.

Presently the young jacamar flew off through the treetops and was lost to view. Later in the morning I noticed that another fledgling was in the entrance, with its head and chest projecting outward. While I stood only a few yards away, it launched forth, flying strongly upward to alight in a bamboo, well above my head. A single parent promptly alighted beside it and sang, but considerably less than when the first fledgling flew out. Evidently the emotional outburst that had greeted the emergence of the first left little enthusiasm for the departure of the next one.

The second flight of this young jacamar carried it well up into the treetops. On their very first flights, both fledglings showed power and control and alighted without difficulty.

Although Rufous-tailed Jacamars in juvenal plumage closely resemble their parents, these young Pale-headed Jacamars differed conspicuously from the adults. The top of the head was gray instead of brown. The hindneck was grayish brown. The dark back, rump, wing coverts, and tail were strongly tinged with metallic green as I viewed them in the sunshine, a little above me. The parents perching close beside a young bird, and viewed in the same optical conditions, showed no green in their dusky dorsal plumage, but only dull glints of deep blue and violet. But when a fledgling was well above me and I saw its back from behind, it showed no more green than the adults. There was a dusky patch on the fledgling's cheeks and ear coverts. Its throat was white, instead of buffy as in the adults; but its more posterior under parts resembled those of the parents. The fledgling's bill and tail, although already long, had not yet attained full length. Some tufts of natal down still adhered to its head and neck. I wondered whether, when newly hatched, it had been as downy as hatchling Rufous-tailed Jacamars.

The brighter coloration of the young Pale-headed Jacamars, especially of their upper parts, suggested that the ancestors of this species had been more brilliant, more like other jacamars, and that its present dull plumage had been secondarily acquired. Perhaps this was an adaptation to life in the treetops, where too glittering an attire would be too revealing to birds of prey passing overhead. Although birds that forage within the foliage high in the treetops are among the most brilliant creatures of the tropics, those that dart out into the open spaces at the top of the forest tend to be less colorful. I was reminded again of the Swallow-wing, and of some of the larger flycatchers.

THE RETURN TO THE BURROW FOR SLEEPING

Still puzzled why this burrow should be about twice as long as the average burrow of the larger *Galbula* spp., I returned in the afternoon, a few days after the fourth nestling left, to examine it more carefully than I had cared to do while the young were present. To check on the length, I pushed in a slender vine and manipulated it until it would go no farther. It went in for 31 inches, the same as the first time. While I moved the vine around to make sure it had reached the tunnel's end, two frightened jacamars flew out. Perplexed by this unexpected occurrence, I peered into the burrow with a light. Two more white-throated juveniles were looking down the tunnel at me! Here, gratifyingly soon, I had one possible answer to my question. The Pale-headed Jacamars may dig a longer burrow because they use it for a dormitory, as, so far as I know, the Rufous-tailed Jacamar never does. It remains to be seen, however, whether the burrows of the Pale-headed Jacamar are commonly as long as the only one for which information is available.

It was then 17:30 in the afternoon of 16 May, and an hour and a half of daylight remained. I withdrew to a distance and watched. Presently another juvenile, hearing the calls of its parents off in the woods, flew from the burrow. Then, with much calling and trilling, a parent arrived with two young, and all perched on a stout horizontal root that passed in front of the tunnel. After a little while, the parent flew away and the young jacamars entered. Then one flew out. This left two outside; and each was led back by a parent who alighted with it on the horizontal root, then entered with it. By 18:15 the family of six—two parents and four young jacamars —had retired for the night. I watched for another half-hour, and none came out. Then I looked in at them with the flashlight, but they were so far back in the tunnel that I could see only two. Forty minutes after the last jacamar retired, a Southern House Wren (*Troglodytes musculus*) still sang; and nearly an hour after it retired there was still enough light under the open sky to read the pencilled jottings in my notebook.

As the days passed, the jacamars went to rest later. On 21 May, nine days after the young left the nest, the family arrived in the treetops in front of the burrow, calling and trilling, at 17:35. Between 17:39 and 17:41 the four young entered the burrow alone, without being escorted by their parents, while the sunshine still fell upon the bank where the tunnel was situated. The parents did not come near the burrow until 18:27, when one alighted on the root in front and called until its mate joined it there, whereupon both entered.

On the morning of 31 May, I found a parent and at least two young birds in the tops of roadside trees between pastures, not far from their burrow. The juveniles, recognized by their shorter bills and whiter throats, skillfully caught small flying insects. I did not see a parent feed one of the juveniles, who had now been out of the nest for 19 days.

On the evening of 6 June, when the sky was lightly overcast, five jacamars entered the burrow at 17:51, 18:20, 18:25, 18:26, and 18:53. The last might have entered a few minutes earlier, if I had not gone to look into the tunnel when I thought that no more would

come. The next-to-last was an adult; the others flew in too suddenly to be identified.

The last evening that I watched this burrow, too distant from my residence for frequent visits, was 6 July. At 18:27 when the sky suddenly grew dark as a strong wind blew up, bringing rain, five or six jacamars entered the burrow in rapid succession. After they were well settled, I looked in with the light and saw five resting side by side, facing me, with their slender bills tilted upward. Perhaps the sixth was behind.

In earlier years I had studied Rufous-tailed Jacamars in Guatemala and Costa Rica without learning that they use their burrows for anything except breeding. After so long an interval, I could not remember how thoroughly I had investigated the possibility that their short nesting burrows also serve as dormitories; but the fact that only a single parent remains with the eggs or young overnight made me doubt that they do so. On the same farm where the Pale-headed Jacamars nested, two pairs of Rufous-tailed Jacamars had recently reared broods in large, domelike, terrestrial termitaries, instead of the more usual tunnels in the ground. I now tried to learn whether the adults or young continued to sleep in the chambers that the parents had carved in these hard, black structures. A nocturnal visit to one of them revealed that it was empty. The other had been closed up by small ants, which probably would not have occurred if the jacamars had continued to occupy it.

Although, aside from the Pale-headed Jacamar, no member of the family is known to sleep in a dormitory, only two of the 15 species seem to have been studied in a way that would reveal this. When one reflects on the matter, it is not surprising to find a piciform bird using as a dormitory a cavity such as it employs for nesting. This habit appears to be practically universal in the woodpeckers, and has been recorded for certain barbets and toucans (Skutch 1944, 1958, 1961). Among the related puffbirds, no example of this is known, doubtless because so few of the 30 species have been studied as living birds.

RUFOUS-TAILED JACAMAR

Rufous-tailed Jacamars (*Galbula ruficauda*) were moderately abundant at "La Araguata," where I often saw them in, and about the edges of, the light second-growth woods. In voice and general behavior I noticed little difference between these Venezuelan jacamars and those of another race of the same species that I had earlier studied in Guatemala, Honduras, and Costa Rica (Skutch 1937, 1963). But whereas the dozen nests of this jacamar that I have seen in Central America were all in burrows in the ground or else in the mass of clay raised up by an uprooted tree, two of the three nests that I found in Venezuela were in termitaries (see fig. 1).

FIGURE 1. Termitary in which Rufous-tailed Jacamars nested, showing entrance to the nest chamber carved by the birds. Beyond the two strands of wire at the top of the picture is open pasture. Near Pirapira, Carabobo, Venezuela, April 1966.

The first of these Venezuelan nests was in a belt of low, open, second-growth woods between a pasture and a small stream. On a steep slope, the termitary emerged from the ground in the form of a rough, irregular, black dome about 24 inches high and 20 inches in diameter. From an opening on the downhill side of the termitary, the burrow penetrated the hard black material horizontally for a length of 12½ inches. The orifice was 1⅝ inches wide by 1⅜ inches high. The expanded chamber at the inner end was so shallow that, when I inserted a small electric bulb, I could see the upper half of the eggs without using a mirror. Close by this nest was a vertical cut bank such as jacamars use for their burrows in Costa Rica; but the soil had long been so dry and hard that the birds had probably found it easier to dig into the hard termitary.

When found on 5 April, at the height of a severe dry season, this nest contained four

glossy, white eggs. Both parents incubated, sitting so steadfastly that moving noisily around their termitary, or throwing a beam of light into their dark chamber, did not make them fly out. When I wished to see what they covered, it was necessary to invite them to emerge by tapping on the termitary. By 13 April there were four nestlings, some of which had hatched so recently that their rather copious down had not yet spread out. By 30 April their green plumage glittered with golden and bronzy reflections when I cast a beam of light upon them. The next day they had gone, after a nestling period of 18 or 19 days.

On 14 April I found another jacamars' nest, in a termitary quite similar to the first in shape and size, situated on a steep slope covered with light second-growth woods, above a small pond. The entrance to the tunnel faced sideways along the slope rather than downward. This orifice was eight inches above ground level and measured 1⅝ inches in horizontal diameter by 1⅜ inches in vertical diameter. The total length of this burrow was only 11½ inches. The saplings that grew thickly around this termitary made it difficult to place my head close to the entrance and look in; but I managed to glimpse one nestling, already with expanding plumage.

On 29 April, while ascending a dry watercourse in the bottom of a deep, lightly wooded ravine, I heard the clear little trills of a young jacamar. Directed by these notes, I discovered a nestling resting on the ground at the foot of the low bank of the watercourse, almost covered by a large fallen leaf. Its plumage was just breaking out of the sheaths; it had evidently fallen prematurely from its burrow, which I promptly found in the bank above it. This burrow was situated 16 inches above the foot of the bank and about the same distance below the top. It was 13 inches long, and after I replaced the fallen nestling, it held a brood of three.

I did not revisit the burrow in the ravine, but neither of the two in the termitaries was used for a second brood. As far as I could learn, neither the parents nor the young slept in the nest, after the latter flew.

Most of the burrows of jacamars of various species of which we have information had been dug into earth or clay, but breeding in termitaries has been reported for the Rufous-tailed Jacamar in Venezuela by Medina Padilla (1957) and for *Galbula leucogastra* in Surinam by Haverschmidt (1958). Although sets of four eggs laid by the Rufous-tailed Jacamar have been found in Guatemala (Skutch 1937) and in Trinidad (Belcher and Smooker 1936) as well as in Venezuela, strangely enough none of the nine nests that I examined in Costa Rica held more than three (Skutch 1963). Yet Costa Rica is at approximately the same latitude as northern Venezuela and Trinidad. The nestling period of 18 or 19 days recorded in the present study is considerably shorter than the 21 to 26 days that the young remained in several nests in Costa Rica, in the wet season. The more rapid development of the nestlings in the termitary during the dry season is doubtless due to the more favorable conditions in which they grew up.

BUFF-BREASTED WREN

The Buff-breasted Wren (*Thryothorus leucotis*) is a six-inch-long bird with brown upper plumage, prominently barred on wings and tail with dusky. In both sexes a conspicuous white superciliary stripe extends far behind each eye, and below this the sides of the head and neck are whitish flecked with dusky. The color of the ventral plumage deepens from whitish on the chin and throat through pale buff on the chest to cinnamon-buff on the abdomen, flanks, and under tail coverts. The upper mandible is dark and the lower horn-color. The eyes are dark, and the legs are gray.

At "La Araguata" this wren was the most abundant representative of its family. It was especially numerous in low, bushy growth near streams, but it also lived on the hillsides and ridges far above them. From March onward I usually found these wrens, in pairs or trios, foraging industriously through the tangled vegetation, and frequently descending to the ground to hunt among the fallen leaves. When disturbed, they uttered harsh *churrs* and rattles, much like other wrens. They sang generously in a full, clear, ringing voice. Often, mated birds performed antiphonally, one repeating notes that fitted the words *see you,* while the other joined in with *birdie,* the two synchronizing their parts so perfectly that the phrase *see you, birdie; see you, birdie* was repeated over and over as by a single voice. Many wrens of the genus *Thryothorus* sing antiphonally in similar fashion (Skutch 1960). More surprising to me was the way these Buff-breasted Wrens sang at dawn, when the delightful chorus that arose from the bushy growth seemed to be formed by scattered soloists, probably by males each on his own territory, rather than by pairs performing together. In the subdued

light before sunrise, each songster repeated tirelessly, sometimes for about half an hour, a liquid phrase of two notes, the first emphasized, sounding like *sée you, sée you, sée you.* The Buff-breasted Wrens were already singing persistently at dawn when I arrived in mid-March. In late May, when the song of the bird population as a whole was waning, the wrens were the chief songsters at daybreak, especially in the bushy valleys. They continued this dawn-singing into July.

Like many members of their family, Buff-breasted Wrens build special nests for dormitories. I found two such nests in tangled roadside thickets, one at a height of 4½ feet, the other twice as high. The former was a loosely constructed pocket with a sideward-facing doorway. It was composed of grass inflorescences, straws, fine rachises from compound leaves, fibers, a few feathers, and similar materials. It measured 7 inches from front to back, 4 inches from side to side, and 5 inches in height. On 4 May the single occupant of this dormitory had already retired at 18:30, when many birds were still active. It flew out when I disturbed it but soon returned. The higher nest was a bulkier structure, composed largely of grass inflorescences. The wren slept with its breast in the doorway.

Near the first of these dormitories, but farther within the light second-growth woods, I found, on 14 June, the only breeding nest that I saw. Situated 30 inches up on a slender horizontal branch, it was a roughly globular structure with a roof that extended forward and downward to shield the opening in the side of the chamber, much as in nests of the Riverside Wren (*Thryothorus semibadius*). Composed of rootlets, grass inflorescences, and similar fine materials, this nest measured 6½ inches from front to back, 5½ inches from side to side, and 4½ inches in height.

When I examined this nest, a feathered nestling wren jumped out and fluttered away over the ground, while its parents complained with profuse *churrs.* Feeling then inside the closed structure, I found a second nestling with sprouting pinfeathers but still almost naked. Its bill was short and thick, and the interior of its mouth was red, rather than yellow as in wrens. Evidently it was a Shiny Cowbird (*Molothrus bonariensis*), a parasite that was far from abundant in the vicinity. The egg from which the cowbird nestling hatched must have been laid some days after that from which the wren hatched.

DONACOBIUS

An exceptionally elegant member of the mockingbird family, the Donacobius (*Donacobius atricapillus*) is nearly nine inches long. Its thin black bill, long tail, and slender body, which fit it for slipping through the dense marsh vegetation amid which it dwells, give it an aspect of streamlined grace.

The whole head and hindneck are black. The wings and back are deep brown, which brightens to rufous or chestnut on the rump and upper tail coverts. The strongly graduated tail is black, with broad white tips on all but the central pair of feathers. At the base of the primaries is a large patch of white that is hidden when the bird is at rest but revealed in flight. On each side of the neck, below the black, is a patch of deep-yellow bare skin. The under plumage is buff, with narrow, distant, dark bars on the flanks. The bright golden eyes gleam intensely in the glossy black head, giving the impression that nothing escapes their penetrating gaze. The legs and toes are dusky. When flying low, with the large areas of white on wings and tail contrasting with the dark dorsal plumage, the bird is both conspicuous and handsome. The sexes are alike in appearance.

The book name "Black-capped Mockingthrush," widely applied to this species, is unfortunate. It is not a mimic; there is nothing thrushlike in its appearance, voice, or behavior; and the name "mockingthrush" has not achieved currency as the English designation of the family Mimidae. In Venezuela the bird is known as Paraulata de Agua; but the name "paraulata," with suitable modifiers, is applied to such an array of large songbirds, from thrushes and mockingbirds to saltators, that it is hardly distinctive. I suggest that it would be better to anglicize *Donacobius*—the reed-dweller—as the English name of this bird. Many felicitous precedents for this procedure can be found, as, for example, "Phainopepla."

Donacobius atricapillus, the only species in its genus, is widely spread over tropical South America, from Venezuela and eastern Colombia to Paraguay and northern Argentina. It is at home in swamps and marshes overgrown with grasses, reeds, or cattails, and is also found in narrow strips of tall, dense grass along streams and about the margins of ponds in open country. Here it lives in pairs or small family groups, much of the time lurking unseen amid the rank aquatic herbage, but when its suspicion or curiosity is aroused, rising to some outstanding shrub or the nodding tip of a reed to look around with its piercing yellow eyes and proclaim its annoyance in unmistakable tones. It subsists largely, if not wholly, on the insects, spiders, and other small invertebrates that, with its slender bill, it plucks from the marsh vegetation or picks

from the surface of the water between the crowded stems. The poorly drained areas where the Donacobius dwells are, of course, found chiefly at low altitudes; and I have seen no definite record of its occurrence higher than about 1500 feet, at which altitude it was sparingly present in the vicinity of Pirapira.

VOICE AND DISPLAY

The Donacobius has a number of loud, clear, ringing notes, each of which may be repeated rapidly a number of times, forming an utterance more noteworthy for the power and excitement that it suggests than for its beauty. *Cheeo cheeo cheeo cheeo cheeo*; and *chu chu chu chu chu*; and *whoi-it whoi-it whoi-it whoi-it* . . . are versions that I recorded. Once I heard a male deliver a clear, undulatory song with his lower mandible rapidly vibrating. These notes are uttered with the mouth widely open, revealing its black interior. I believe that only the male sings in this fashion. Such loud, vehement song seems too exhausting to be long-continued. The few Donacobiuses that I observed never indulged in prolonged, freely flowing song, such as one hears from other members of the mockingbird family and many kinds of thrushes and finches; they sang chiefly when stirred by some excitement, such as a threat to their territory. Possibly in extensive marshlands where these birds are more abundant, they stimulate each other to greater vocal efforts. I never heard any suggestion of mimicry.

The Donacobius is surprisingly quick to detect the approach of a man to the marsh where it lurks unseen, and often one's first intimation of its presence is an outburst of grating, rasping, or churring notes, alarming in its sudden loudness. Far more than its song, these harsh notes of protest suggest the Donacobius's affinity to mockingbirds (*Mimus* spp.) and Catbirds (*Dumetella carolinensis*).

In early May two pairs of Donacobiuses proclaimed their presence in and around a dense stand of broad-leafed grass, higher than my head, that filled a moist depression between pastures at "La Araguata." The area of marsh grass, about 100 yards long by 12 yards in greatest width, was well shaded by *Erythrina* and other trees. From time to time, especially in the early morning and in the evening, an outburst of loud, clear notes, or else of harsh, rasping sounds, revealed that these two pairs had not yet settled their territorial claims.

The members of a pair followed each other closely and often perched only a few inches apart, at times almost in contact with each other. While resting side by side, or perhaps clinging one above the other on an upright stem, they engaged in a curious mutual display such as I have seen in no other bird. Each partner spread its long tail until the pattern it presented was a wide, dark, central band broadly bordered with white. Simultaneously, the two birds wagged their fanned-out tails rhythmically from side to side through a wide arc, and while so engaged they opened their black bills to emit contrasting notes. The male uttered a loud, liquid, ringing *whoi-it whoi-it whoi-it* . . ., or sometimes a higher note, while his mate accompanied him with a sizzling or grating sound. One morning when the territorial dispute was at its height, this performance was repeated at short intervals by both pairs. When the display was at highest intensity, the bird's back was humped up, its tail depressed, its head lowered, and its throat grotesquely distended, doubtless to provide resonance for the loud notes. At lower intensity the birds wagged their tails and called with their bodies held in a more upright posture. Twice I saw a pair display in this fashion while one member held a loose mass of fibrous material in its bill. Occasionally, after a slight altercation, the four birds perched in pairs a few yards apart and all displayed simultaneously. I saw no fighting.

I searched in vain for a nest in this tract of high, shaded grass for which the two couples had so zealously contended. Not long afterward, however, I found a pair building beside a pond a few hundred yards away and followed the complete cycle of their nesting. Secure in the possession of their territory, these two birds did not so often engage in the mutual display.

NEST-BUILDING

According to Schäfer and Phelps (1954:129), in northern Venezuela the Donacobius nests during nearly the whole year, with the exception of the last three months. At "La Araguata" one pair built in the second half of May and laid in early June. Another pair had a newly finished nest in late July, when I left the country. In Surinam (Dutch Guiana) breeding has been recorded from January to July (Haverschmidt 1955:120).

My first nest, which I watched from an early stage of construction to its successful conclusion, was situated beside a small pond, about 100 feet wide, which had been made by damming a rivulet at the point where it emerged from a narrow ravine. On both sides of the pond rose steep slopes covered with

FIGURE 2. Nesting area of a pair of Donacobiuses. The nest is situated amid the tall grass on the farther side of the pond. Near Pirapira, Carabobo, Venezuela, June 1966.

dense scrubby growth and light secondary woods; below the dam, open pastures and small marshy areas extended to a large stream (see fig. 2). Although at the head of the pond was a fairly extensive stand of densely growing broad-leafed marsh grass, where the Donacobiuses often foraged, they chose to build their nest in a narrow strip of the same kind of grass, only a few yards wide, along the edge of the pond, beside a cowpath. Here, fortunately, it could be reached without wading into the open water, which was inhabited by several small and middle-sized alligators. Although a variety of flycatchers and other small birds frequented the pond and nested around its margins, the only aquatic bird to be found there day after day was a lone Purple Gallinule (*Porphyrula martinica*).

On 21 May, when I discovered this nest by seeing a Donacobius carry something to it, it was a loose, formless mass of fibrous vegetable material and bits of dead grass blades, attached to the broad-leafed grass about two feet above the watery mud. In the following days I spent many hours watching for the birds to build; but observation was difficult because the nest was screened by the surrounding grass and I hesitated to expose it, lest the birds desert at this early stage. Both members of the pair took contributions to the nest; but one, evidently the female, seemed to do much more than the other, although even she hardly exerted herself strenuously. The male preened interminably in a shrub growing on the neighboring shore. Sometimes, seeing his mate approach the nest with material, he hurried toward it with empty bill; but I could not see what he did there.

A few yards from the nest of the Donacobiuses, a Vermilion-crowned Flycatcher (*Myiozetetes similis*) was also starting a nest, six feet up in a shrubby *Jussiaea* with yellow flowers. While she and her mate were absent, a Donacobius went to the loose mass of material, plucked a liberal billful from it, and carried it to its own nest. Apparently stimulated by this action, the other Donacobius did the same. A little later, the pair of flycatchers twittered together close beside their newly begun nest. This stirred a Donacobius

to attempt another depredation; but it and likewise its mate who approached with similar intentions were held aloof by the darts of the flycatchers. After the flycatchers flew away, however, one of the Donacobiuses, who had waited in the lower part of the shrub, ascended to the nest and gathered a liberal billful of white, cottony material mixed with fragments of fine grass inflorescences. But on the way to its own nest the thief opened its bill and dropped all the stolen goods, probably because they were not suitable for its own construction. In all, the Donacobiuses tore four large billfuls from the flycatcher's accumulation while I watched.

The nest amid the marsh grass progressed slowly. I saw no more than seven billfuls of material carried by the Donacobiuses in an hour, and two of these were dropped before they reached the nest, possibly because the birds noticed me spying on them from across the pond. However, I may have missed other trips to the nest because the builders approached through the grass with greater secrecy. The last time that I saw a bird take material to the structure was 30 May, so that building continued for at least 10 days and probably a few more.

The nest had now become a deep, bulky cup, composed chiefly of fibrous materials of vegetable origin and narrow strips of grass blades or the like. This material was looped around three upright, dead grass stalks and, more loosely, around one living grass blade. The lining consisted mainly of narrow strips of grass blades and similar materials. On one side of the strongly incurved rim was a large scrap of lizard skin and on the other a crumpled piece of waxed paper. The asymmetrical nest was 4 inches high and 6½ by 4½ inches in overall diameter. The cavity was 2½ inches deep and 3¼ by 3 inches in diameter at the mouth. The nest was attached to the grass stalks on one side only, and before the nestlings were feathered it tilted so strongly that I propped it up with a forked stick.

On 18 July I found another pair of Donacobiuses building in a quite different situation. Their site was in the midst of an extensive stand of head-high Guinea grass, on a low-lying, level riverside *vega*, over 100 feet from the stream. Although by this date hard rains had been falling for two months, the ground below and around the nest was neither inundated nor muddy. This nest was supported, at a height of 44 inches, between a green shoot of a shrub of the composite family and a stem of the Guinea grass, about both of which its materials were wrapped. By 24 July, when it appeared to be finished, it was 9 inches high by 6 inches in diameter at the middle, where it was thickest. At the top it was 4½ inches in diameter. The cavity was 3½ inches deep by 2½ inches in diameter. This extraordinary structure, over twice as high as the first, was composed of fibrous rootlets, slender dead vines, tendrils, broad strips of monocotyledonous leaves, strips of bark, and the dark fungal rhizomorphs known as "vegetable horsehair." The cup was lined with fairly broad grass blades, with a few fine rootlets and green grass inflorescences on the bottom. There were at least two scraps of reptile skin in the nest. A weft of cocoon silk had been placed on the rim.

No egg had been laid in this nest by the time of my departure on 24 July, and all the following observations were made at the first nest.

THE EGGS

Although the nest beside the pond appeared finished by the end of May, I found no egg in it until 6 June, so that well over two weeks elapsed between the start of building and the beginning of laying. One egg was deposited daily, and the set of three was completed on 8 June. These eggs were unlike any others that I have ever seen. At the first glimpse, they appeared to be uniform, light, reddish brown. Closer scrutiny revealed that they were mottled rather than uniformly colored, but so densely as to cover the whole surface with slightly varying shades of reddish brown. The pigmentation was somewhat heavier at the thicker end of the eggs. If they could be said to have a ground color, it was merely a slightly lighter rufous brown. When the glossy shells were wet from the frequent showers of this period, they were exceptionally beautiful. These eggs measured 25.5 by 16.5, 24.7 by 16.8, and 24.4 by 16.3 mm.

INCUBATION

Observation of incubation, as of building, was carried on under a handicap. I was exceedingly anxious not to lose my single nest of Donacobius that had been so hard to find. So as not to jeopardize it by exposure, I refrained from cutting any of the surrounding grass, merely parting the blades slightly to permit a view of the nest from across the pond; but, moved by the breeze or by growth, the herbage would gradually close together and hide the nest while I watched. When bright sunshine penetrated the grass and the bird sat with her neck stretched up, her golden eye was easy to pick out through my bin-

oculars. At other times, I was often uncertain whether she was present.

After I had watched for a while, I discovered that the right central tail feather of one member of the pair, evidently the female, was only half grown, so that it served as an identification mark. Thereafter, I saw only this bird cover the eggs. Sometimes I failed to notice her secretive approach or departure through the surrounding grass; but I managed, on two mornings, to time nine full sessions of incubation, which ranged from 11 to 43 minutes and averaged 22.4 minutes, and an equal number of recesses, ranging from 7 to 25 minutes and averaging 14.6 minutes.

While the female incubated, her mate spent much time resting in a shrub on the shore, a few yards from the nest, preening interminably. Often the lightly barred buffy feathers of his flanks were prettily spread over his dark folded wings. Sometimes he sun-bathed, leaning away from the rising sun with his plumage puffed out, head depressed, bill gaping, and sunward wing raised almost vertically above his back, displaying the broad white band that was usually concealed except when he flew. Although at long intervals, as when he heard another Donacobius in the distance, he sang loudly, his habitual silence contrasted with the songfulness of the Bare-eyed Thrush (*Turdus nudigenis*), the Streaked Saltator (*Saltator albicollis*), the Buff-throated Saltator (*S. maximus*), and the Rufous-browed Pepper-Shrike (*Cyclarhis gujanensis*), all singing profusely in the sunshine on the surrounding slopes. Once the male Donacobius seemed to feed his incubating partner; but I could not see what, if anything, he held in his bill as he approached the nest through the dense grass.

On the morning of 13 June the male and female often joined in the tail-wagging display already described. In the intervals of displaying and preening her own plumage, the female again and again gently billed the feathers of her mate's neck. After one bout of tail-wagging while the two faced each other, the female crouched with quivering wings; but her mate did not respond to her solicitation. Often, as she returned to her eggs, he escorted her to the vicinity of the nest. One of the parents took a limp fragment of waxed paper (in which my breakfast sandwiches had been wrapped) to the nest, only three days before the eggs hatched.

One egg had hatched by the evening of 24 June, and by the following noon all three had hatched, after an incubation period of 17 days. The empty shells were soon removed by the parents.

THE NESTLINGS

The newly hatched Donacobiuses were devoid of down. Their naked skin was at first pink with a dusky tinge, which deepened during the following days. Their legs, toes, and toenails were yellow. The interior of the nestlings' mouths was dark flesh-color, and after a few days I noticed that the tongue was marked with three conspicuous black spots, one anterior and two posterior. The elaborate patterns on the interior of the mouth of estrildines and of the weaverbirds that parasitize them are well known, but these nestling Donacobiuses were the only ones I have seen in tropical America with dark marks on a light ground.

When the nestlings were five days old, their eyes were opening. At six days, the sheaths of the contour feathers were pushing through the skin, and those of the remiges were already becoming long. No down feathers had developed; but feather rudiments were sparsely scattered over the interpterylae, especially on the back and flanks. When eight days old, the nestlings were in long pinfeathers. The interior of their mouths had become purplish flesh-color, still with the three black spots on the tongue. At 10 days the body plumage started slowly to expand, covering their heads and backs by the time they were two weeks old.

Both parents fed the nestlings, bringing them a variety of small insects and spiders, held conspicuously in the tips of their slender black bills, one at a time. The droppings were either swallowed or carried away in the parents' bills. As far as I could tell, only the female brooded. Whenever I approached the nest, before and after the eggs hatched, the parents protested loudly with harsh rasping and churring notes, often advancing close to me. After I left, they would promptly go to the nest.

At 17:30 on 11 July, a nestling was sitting on the edge of the nest. While I watched a short distance away, it hopped off through the crowded upright blades of the marsh grass and vanished, leaving its two siblings resting in the nest. At 09:20 next morning, another nestling was perching beside the nest and fled as I approached. Two hours later, the last nestling was perching very upright on the nest rim, facing inward. It remained here while I regarded it a yard away, but as I turned to go it flew off, leaving the nest empty. Soon afterward, I found one of the

fledglings in the shrubbery beside the pond. It hopped and flitted with agility from branch to branch, well able to elude me. While perching, it wagged its tail up and down to balance itself. The parents accompanied it, scolding me with harsh, grating *churrs* and screams suggestive of agony. The older nestling had remained in the nest for 18 days, the other two for 17 days.

These fledglings resembled their parents, with some noteworthy differences. The forehead and forepart of the crown were buffy, indistinctly barred with dusky; hind part of crown and hindhead dull blackish; a narrow buffy streak passing from side of forehead above lores and eye to join a broader and more conspicuous white streak above the auricular region; lower eyelid white; lores, cheeks, and auricular region dusky brown; back brown, becoming lighter, more rufous on rump and upper tail coverts, much as in the adults; wing coverts dusky with broad brown edgings; narrower brown margins on dusky remiges; central tail feathers dusky, lateral ones white as far as exposed; chin and throat white; no yellow patches on sides of neck; more posterior under parts buffy; bill blackish with light tip; eye dark instead of yellow; legs and toes gray.

For the next 10 days I failed to see the young Donacobiuses when I visited the pond, although the parents complained loudly as I came in sight. Finally, when the juveniles were 26 and 27 days old, I found two of them resting in the bushes above the water's edge in the bright sunshine, while the parents brought them food. One of the young birds busily preened and scratched. To scratch its head, it sometimes raised its foot outside the wing and sometimes inside and over the relaxed wing, as I saw repeatedly. It seemed to have difficulty preserving its balance on one leg when it practiced the "indirect" or over-the-wing method of head-scratching typical of adult passerine birds. Aside from their smaller size, the most conspicuous difference between the young Donacobiuses and their parents was now the light postocular stripe of the former. They already had prominent white patches on their wings, and the ends of all but their central tail feathers were extensively white.

The long incubation period (17 days) and nestling period (17–18 days) of the Donacobius are noteworthy. From my own observations and from published records (especially, Bent 1948), it appears that in the species of the Mimidae inhabiting the United States the incubation period is typically 12 to 14 days, rarely shorter or longer. Nestling periods fall mostly within the range 11 to 14 days, although Palmer's Thrasher (*Toxostoma curvirostre palmeri*) has been reported to remain in the nest for 18 days (Bent 1948: 393). In the color of the interior of the nestling's mouth, the Donacobius also differs from other Mimidae for which information is available, in which the mouth lining is yellow or orange-yellow, without dark spots. The Donacobius's lack of natal down also appears to be rather exceptional in the family, although the newly hatched Crissal Thrasher (*T. dorsale*) is said to bear only "the faintest suggestion of down on head and back" (Bent 1948: 422). Apparently *Donacobius*, despite its thrasher- or mockingbirdlike form, is not closely related to the northern Mimidae.

TROPICAL MOCKINGBIRD

The Tropical Mockingbird (*Mimus gilvus*), widespread in the more arid parts of tropical America from southern México to southern Brazil, was not abundant at "La Araguata." I found only one breeding pair, which in mid-March had a nest in a small orange tree growing in a close-cropped pasture. The open cup of coarse sticks, situated 15 feet up in the midst of the densely branched crown where it was difficult to reach, contained three nestlings. Whenever I approached the nest tree, three or four grown mockingbirds flew around close to me, protesting with harsh, grating notes. When a Yellow-headed Caracara (*Milvago chimachima*) alighted nearby, the mockingbirds darted menacingly at it until it took wing, then dashed very close to it and seemed at times to strike its back, making it waver in its course. Sometimes one of the mockingbirds chased another, mildly. At night, all four of them roosted in the small orange tree, a yard or so from each other and from the nest, where the feathered nestlings were no longer brooded. It is rare to find land birds sleeping so close to an occupied breeding nest in this fashion; a wider dispersion at night seems more compatible with the safety of the brood.

The four mockingbirds were evidently a mated pair with full-grown young of an earlier brood. I wondered whether the young birds would help the parents to feed the nestlings, but in several hours of watching I never saw more than two carrying food. They brought both insects and berries to the nestlings. Sometimes a grown bird with empty bill flew toward a parent bearing food, as though to take it; but I saw no begging. At times a parent carrying food briefly chased a foodless bird. On 23 March the fledglings left the nest. On the succeeding nights I found only three grown birds roosting in the nest tree; but additional members of the family may have been hidden by the dense foliage. A few days

later this tree was largely defoliated by leaf-cutting ants, and the mockingbirds abandoned it.

On 21 April the excited behavior of these mockingbirds drew my attention to a smaller orange tree, 40 feet from the first. Here they had three featherless nestlings, in a bowl of coarse sticks so dilapidated that one of the occupants was slipping through the bottom. As it dropped, I caught it and returned it to the nest. Later in the day, this or another nestling fell from the disintegrating structure to the ground, where I retrieved it, evidently uninjured. Taking a recently abandoned nest of the Bare-eyed Thrush (*Turdus nudigenis*), I set it in the site of the mockingbirds' nest and placed the three nestlings in it, while five grown birds flew around, scolding me. The parents fed and brooded their young in the substituted nest.

Although I often passed through the orchard where these mockingbirds lived, I seldom had time to examine all the young orange and other citrus trees it contained, and in the earlier stages of a nesting the parents were so secretive that I failed to notice that they were so engaged. Accordingly, the third nest, like its two predecessors, escaped my attention until after the eggs hatched. This latest nest, only five feet up in an orange tree, was an exceedingly slight fabric of coarse twigs, many of which were thorny, and it was lined with finer materials. This nest also held three nestlings, which at the end of May had expanding plumage. They were heavily infested with *tórsalos,* larvae of a dipterous insect that formed great swellings beneath their skin. Five grown birds frequented the vicinity of this low nest and protested when I visited it, but I am not sure that they were all the same as those that had remained close to the earlier nests. Probably the full-grown nonbreeding birds present in March had departed, to be replaced by the young more recently fledged.

Thus, between March and June, this pair of mockingbirds nested three times, each time hatching out a brood of three. The first and third broods were successfully reared, but I am uncertain about the second brood. During this entire interval, I heard no song from the mockingbirds, who were evidently too heavily engaged with family duties to sing. I first became aware of mockingbirds' song in the second week of July, when the wet season was well established and many kinds of birds had finished nesting. Mockingbirds, possibly offspring of the pair whose nests I had found, now appeared and sang in parts of the farm where earlier I had noticed none. Their song was disappointing, as it had little force or variety, and I wondered whether it would improve with time. Appraisals of the song of this mockingbird in various parts of its far-flung range differ, some writers applauding it as sweet and pleasing, others disparaging it. Apparently the Tropical Mockingbird imitates other birds far less than does its northern relative *Mimus polyglottos.*

According to Schäfer and Phelps (1954: 129), in northern Venezuela the Tropical Mockingbird nests during almost the whole year, with the exception of November and December. Snow and Snow (1964:13) state that in Trinidad the main breeding period extends from January to July, and there is a minor period from September to November. The nests of this mockingbird have been described by Cherrie (1916:141), Belcher and Smooker (1937:509–510), Friedmann and Smith (1950:516–518), and others. In northern South America and adjacent islands, it usually lays three eggs, but sets of two and, rarely, four have been recorded. Although many notes on this bird are scattered through the ornithological literature, a thorough study of its habits seems never to have been made. The fragmentary observations here recorded suggest that it has interesting social habits, approaching, if not matching, those recently described for the Galápagos Islands mockingbird *Nesomimus macdonaldi* by Hatch (1966), who found it living in collective territories held by bands consisting of from four to 10 individuals.

LONG-BILLED GNATWREN

A diminutive bird with a disproportionately long bill and a long, narrow tail that seems too loosely attached, the Long-billed Gnatwren (*Ramphocaenus melanurus*) is easy to recognize despite its plain attire. In both sexes the upper plumage is brownish gray, diversified by a broad band of rufous-tawny on the back and sides of the neck. The under parts are dull white or palest gray. The graduated tail is black, with a little white on the tips of the outer feathers. The upper mandible of the straight, slender bill is blackish, the lower horn-color. The legs and toes are dark. This bird, formerly classified as an antbird (Formicariidae), is now usually placed, along with the gnatcatchers, in the Sylviidae.

The Long-billed Gnatwren is widely distributed over the lowlands of tropical South America, and in Venezuela it extends upward to about 4300 feet (Phelps and Phelps 1963: 291). In the Pirapira district it was abundant

in light second-growth woods, where, from my arrival in March until July, I found it in pairs. As the tiny, slender birds hunted tirelessly for insects in the lower and middle layers of the woodland, they constantly wagged their narrow black tails loosely from side to side. From mid-March onward, the males increasingly repeated a soft, slow trill, all on nearly the same key. Another utterance was similar in form but less liquid—a sort of dry, rattling trill. Both the liquid and the dry versions closely resembled songs of the Straight-billed Gnatwren (*R. rufiventris*) of Central America. Although they differ markedly in appearance, *melanurus* and *rufiventris* are sometimes considered to be conspecific.

NEST-BUILDING

I saw no evidence of breeding until the wet season was well established in June. On 11 June I discovered a pair of gnatwrens completing a nest. Their deep cup was situated nine inches above the ground in a nearly leafless undershrub amid a rather open tangle of vines, beside a little-used path through low second-growth woods on a slope above a stream. When I found the nest toward the middle of the morning, the birds were actively building, and I watched them for the next hour. Both sexes worked, but the songless female more actively. At first, her mate hesitated to approach the nest in my presence when she was not there. Most of their material was gathered on or near the ground. When bringing a billful, the builders never approached their nest from the more exposed side, which would have been easiest, but they came hopping and flitting through the tangled vegetation on the opposite side, usually on a downward course from a higher level. Each sat in the nest to arrange what it had brought, but once the male passed his contribution to his mate, whom he found sitting there. They uttered a low ticking or rattle when they met at the nest. For a while the male disappeared and the female carried on alone, silently. While these birds built, their long black tails wagged tirelessly from side to side.

Two days later this nest seemed to be finished. The compact, cupped structure was composed of grass blades, fragments of decaying dicotyledonous leaves, strips of fibrous bark, and the like. The lining was of fine, hairlike black fibers and some brown vegetable fibers. I detected no cobweb in the structure. It measured 3 inches in diameter by 2 inches in height. The cavity was 2 inches in diameter by 1½ inches deep.

On 14 June I found another nest, already completed, seven inches above the ground on the slender bent stem of a shrub, in low but dense second-growth woods with little ground cover beneath the crowded saplings. In structure it resembled the first nest.

THE EGGS

In the first nest one egg was laid on 17 June, but the following day it had vanished, and the nest was thereafter deserted. In the second nest I found one egg on 16 June and two, the full set, on the following day. These eggs were white, lightly spotted with reddish brown, chiefly on the thicker end. They measured 17.8 by 12.9 and 17.9 by 12.9 mm. The few available records of the nesting of *Ramphocaenus* spp. indicate that they regularly lay two white, spotted eggs (Skutch 1960:54–61).

INCUBATION

I watched the gnatwrens incubate at the second nest from 13:10 to 19:00 on 23 June and from 06:20 to 13:10 on the following day. The two parents alternated on the nest, rarely leaving the eggs uncovered except for a minute or two as they changed places. Although I could not distinguish them by appearance, I heard only one of them sing, and doubtless this was the male. Considering the morning and afternoon together, he took six sessions of incubation ranging from 11 to 73 minutes and averaging 57.5 minutes. The female took five diurnal sessions ranging from 22 to 64 minutes and averaging 52.4 minutes. Shortest of all was the first morning session of the male, which lasted only 11 minutes; the next shortest was the 22-minute session of the female, which followed immediately after this. All the other sessions of both sexes continued for 57 minutes or more. Including one session of each parent that I did not time in full, in an active day of 713 minutes the male incubated for a total of 380 minutes and the female for 279 minutes. She also took the long nocturnal session, from 18:13 in the evening until about 06:20 the next morning.

As I approached the blind at dawn, the male was singing among the trees. When I came in view of the nest at 06:20, it seemed to be unattended; but the light in the undergrowth was so dim that I may have been mistaken. As daylight increased, it became clear that the eggs were uncovered, and so they remained until the male came to warm them at 06:44. This interval of neglect of about 24 minutes was by far the longest of the whole day. The next longest, 11 minutes, occurred between the male's departure at

18:02 and the female's return for the night at 18:13. Aside from these intervals of neglect, the eggs were never left uncovered for more than four consecutive minutes. In all, there were 11 periods of neglect totalling 54 minutes. The eggs were incubated for 92.4 per cent of the daytime.

The gnatwren coming to take its turn on the low nest never approached at its level but always at a much higher level, where the foliage of the crowded saplings was denser. I usually became aware of its presence when it was 12 or 15 feet above the ground. From this point it descended slowly by sidling along slender saplings or sometimes hopping head-first down upright stems, always with wagging tail. Or it would hop downward along a small, inclined dead trunk that passed above the nest. The bird was always most reluctant to use its wings on this last stage of its journey to its eggs. If the sapling down which it sidled took it to a point on a level with the nest and a foot or so away, it would not fly across a clear space to reach the nest, but to avoid spreading its wings it would make a detour, hopping upward from twig to twig and then down again. On reaching the nest, which meanwhile its mate had vacated, it would snuggle down in the cup, to sit with its long bill pointed upward over the rim at an angle of about 45 degrees with the horizontal or even more nearly vertical, its narrow black tail tilted up over the opposite rim. For long intervals, it would remain immobile in this posture.

When approaching the nest, the male would often sing, but the female at most voiced slight *ticks*. The incubating partner usually left when it heard the voice of the other coming to take its turn on the eggs. Sometimes it rose from the eggs a little while before I became aware of its mate's approach, its keener ears probably having heard notes that escaped mine. The bird's departure was a reversal of its arrival. Although once, early in the morning, the male flew directly from the nest when his mate suddenly appeared only a yard above him, on all other occasions the departing gnatwren deliberately climbed and flitted upward through the saplings and vines to a height of four or five yards before it flew off, or else it would hop upward along the inclined dead trunk to an equal height. As it ascended, it might pause here and there to pick from the vegetation many objects too small for me to see. Even when the incubating gnatwren saw me approaching, it left the nest by flitting deliberately upward rather than by precipitous flight. Sometimes the male sang as he rose to the tops of the saplings, or after he had passed from my view; but from the female I heard only low *ticks*.

Early in the sunny afternoon, when the brown litter that carpeted the woodland was dappled with bright spots of sunshine, a spotted lizard about a foot long hunted over the ground near the nest, burrowing under fallen leaves and digging into the earth with its forefeet in search of food. Then a much bigger lizard of the same kind, at least two feet long, walked by, catching insects with its darting tongue. The incubating female gnatwren sat motionless. A little later a dull green snake, three or four feet long, glided slowly past the nest at a distance of about four feet, while the gnatwren remained immobile. The serpent finally vanished, apparently not having noticed the nest.

These gnatwrens were not easily frightened from their eggs. One of them had resumed incubation before I had finished setting my blind 20 feet away; and, at the end of my watch, the female remained sitting while I took down the blind and folded it up. One egg fell from the nest during the course of incubation. The remaining egg had not hatched by 2 July, 15 days after the set was completed. The following morning I found the nest torn apart, the egg gone.

At a nest of the Straight-billed Gnatwren (*R. rufiventris*) in Costa Rica, the incubation period was 17 days. I was impressed by the similarities of behavior of the Long-billed Gnatwrens in Venezuela and the Straight-billed Gnatwrens that I had watched in Central America 27 years earlier. The sexes of the latter also alternated on the nest, but they incubated somewhat more constantly, seldom sitting for less than an hour and sometimes as long as an hour and a half, and leaving their eggs exposed for only a few seconds as they changed over. At this nest, too, the shortest sessions were the first of the morning, but they were considerably longer than the corresponding sessions of the Long-billed Gnatwren. The Straight-billed Gnatwrens also approached their nest by hopping and flitting downward through the vegetation from a point well above it, and their departure was a reversal of this procedure. One of them likewise remained calmly incubating while a large lizard foraged over the ground beneath and close by their low nest.

While studying the Straight-billed Antwren, too, I often heard one partner sing but never, to my knowledge, the other. According to Belcher and Smooker (1936:807–808), in *Ramphocaenus melanurus trinitatis* the "call

is a long series of even high notes, just not sufficiently run together to be called a trill. . . Both sexes call." My observations on this same race of *Ramphocaenus*, while building and incubating in Venezuela, and on a related form while nesting in Costa Rica, make me doubt that they are correct in ascribing to the female the utterance which they term the call, and I take to be the song, of the gnatwren.

SILVER-BEAKED TANAGER

The male Silver-beak (*Ramphocelus carbo*) is one of the most strikingly colored members of a brilliant family. His velvety plumage, in some aspects appearing almost uniformly black, suddenly reveals the deepest, richest crimson as he moves into a more favorable light. The swollen lower mandible of his thick bill is conspicuously whitish, but the upper mandible is dark. The female (especially of the race *venezuelensis*) is dull red of a less changeable shade, so that she often appears brighter than the male. These attractive tanagers are widespread in the more humid parts of northern South America, from the Caribbean coast to Perú and Brazil. Like other members of their genus, they roam through lush thickets, plantations, bushy pastures, and open woods in loose, straggling flocks, in which adult males are outnumbered by birds in female plumage. They occur from sea level up to about 6000 feet.

At "La Araguata" Silver-beaks were abundant in the lower areas, especially in the neighborhood of streams; but I found none on the stony ridges where low, gnarled trees grew scattered amid tussocks of grass. By late March the males were singing generously, often from perches high in the trees. More tuneful than many members of the tanager family, they sang with a fluency that rivalled that of the Song Tanager (*Ramphocelus passerinii costaricensis*), the Pacific race of the Scarlet-rumped Black Tanager, but their voices tended to be weaker and more squeaky, lacking the sweetness and brightness that Song Tanagers often achieve. The Silver-beaks continued to sing rather freely until mid-July.

One morning at the end of April, while walking through a deep ravine with lightly wooded sides, I heard a finchlike song that puzzled me. The long-continued flow of slight, varied, musical notes led me to expect a seedeater, a goldfinch, or some other small member of the family. To my great surprise, I traced this pleasing medley to a splendid male Silver-beaked Tanager perching at the edge of a tangle of bamboo. For several minutes he continued to pour forth his animated song, the most musical that I heard from his kind. A month passed before I again heard such a song from a Silver-beak, as he was going to roost in the evening. Probably this performance should be classed as a subsong or whisper song.

The call note of the Silver-beak, a sharp, warblerlike monosyllable, lacks the nasal quality of the corresponding utterance of the Song Tanager. More than once, hearing it beside a stream, I looked for one of the Northern Waterthrushes (*Seiurus noveboracensis*) that wintered abundantly here, only to find a male or a female Silver-beak.

In April and May I found five nests of the Silver-beak. Two were built in a *Nothopanax* shrub growing beside the front porch of the farmhouse, at heights of 52 inches and seven feet. One was five feet up, amid dense shrubbery on low ground beside a rivulet. Another, 26 inches up in a weedy opening amid second-growth thickets, tilted sideways and was abandoned when nearly finished. The remaining nest, the earliest of all that I saw, was in a quite different situation, supported in a tangle of green vines that tapestried the vertical bank of a small stream. It was placed about four feet above the water and one foot below the top of the bank. The nest was a compact open cup composed of rootlets, slender vines, strips of monocotyledonous leaves, and the like. The lining consisted of the thin rachises of compound leaves and other fine materials. The nest measured 4 inches in diameter by 3½ inches in height. The cavity was 2½ inches in diameter by 1¾ inches deep. The other nests were of similar construction. One contained in the outer layer a number of pieces of the frond of a climbing fern (*Lygodium* sp.), which had been gathered while green. The Scarlet-rumped Black Tanager also frequently incorporates pieces of living ferns in its nests. In both of these species I have seen only females build.

Each of four nests of the Silver-beak contained two eggs. In Trinidad, Belcher and Smooker (1937:536) never saw a larger set. In at least two of my nests, the eggs were laid on consecutive days. These eggs were bright blue, marked with black and shades of brown and lilac. The black markings, usually in the form of fine spots or larger roundish blotches but sometimes scrawls, were typically concentrated on the thicker end of the egg, often in a wreath. The brown and pale lilac were usually present as finer flecks. Three sets of eggs measured 22.3 by 15.8 and 21.2 by 16.2 mm; 22.9 by 16.9 and 22.0 by 17.0 mm; and

21.1 by 16.4 and 22.2 by 16.2 mm. As in other tanagers, only the females incubate. At one nest, the incubation period was 12 days, which is also the usual period in the Song Tanager.

The two nests in the *Nothopanax* beside the porch, only three feet apart, were occupied simultaneously by different females, suggesting the same lack of well-defined territoriality that one finds in the Song Tanager (Skutch 1954). Although in the latter species most females are faithfully accompanied by males who help feed the young, some of the more numerous females seem unable to find mates and attend their nests unaided. Such was the case of the female Silver-beak who laid first in the shrub beside the porch. Although while she built a male sometimes sang nearby, afterward he seemed to desert her. On 16 May I spent four hours watching her attend her one surviving nestling, then six days old. Between 06:12 and 10:12 she fed it 21 times, and brooded it for nine intervals ranging from 3 to 16 minutes. Once a male accompanied her as far as a rose-apple tree 50 feet from the nest; but, aside from this, I neither saw a male, nor heard one sing, during the four hours. Briefer observations on other days likewise failed to reveal that a male was helping with this brood.

While this female cared for her nestling, her neighbor, incubating in the same shrub, likewise came and went without an attendant male. The two females ignored each other. Although nesting so close to an occupied house, both were most distrustful of man, as I have nearly always found Song Tanagers to be.

The single nestling raised in the *Nothopanax* was brooded by night as long as it remained in the nest. It left spontaneously at the age of 11 days, when it was well clothed with plumage resembling that of its mother, with dull-red under parts, rump, and upper tail coverts, and a darker back. The corners of its mouth were whitish. Another nestling, also reared alone, stayed in the nest for at least 12 days.

SUMMARY

This paper presents observations on the nesting and other habits of seven species of birds of north-central Venezuela:

1. Pale-headed Jacamar. In May a pair had four feathered nestlings in a long burrow in a vertical bank. The young were fed almost wholly with large dragonflies and small or medium-sized butterflies (chiefly Hesperiidae) that the parents caught on darts from the treetops. The departure of the young was celebrated with long-continued song by both parents, the fledgling joining in. For at least two months after the young flew, the parents and juveniles continued to sleep in the burrow.

2. Rufous-tailed Jacamar. Three nests were found in April, one in a burrow in a bank and two in large terrestrial termitaries. One nest held four eggs, another three nestlings. The nest cavities were not used for sleeping after the young flew. No second brood was noticed.

3. Buff-breasted Wren. These abundant inhabitants of moist thickets often sang antiphonally, but at dawn males(?) sang alone for long periods. Dormitory nests were occupied by single adults. One breeding nest held a feathered young wren and a still-naked Shiny Cowbird.

4. Donacobius ("Black-capped Mockingthrush"). These birds inhabit dense stands of coarse grass or cattails in marshy areas. Perching close together, male and female engage in a unique mutual display in which both wag their spread tails from side to side, while the male sings loudly and his mate accompanies him with sizzling or grating sounds. The male helps to build the nest, an open cup attached to upright stems, usually of marsh grasses. One set consisted of three eggs, almost uniformly reddish brown in color. Only the female was seen to incubate the eggs, which hatched in 17 days. The interior of the nestlings' mouths was dark flesh-color, with three black spots on the tongue. They were fed insects and spiders, carried singly in the bill, by both parents, and left the nest when 17 and 18 days old.

5. Tropical Mockingbird. Between March and June one pair hatched three broods, each consisting of three young. Closely associated with the parents at each nesting were two or three full-grown mockingbirds, apparently their older offspring, who help to defend the nest but were not seen to attend the nestlings. In March four grown birds roosted close by a nest that held three feathered nestlings.

6. Long-billed Gnatwren. Two nests were built, seven and nine inches above the ground, in light second-growth woods, both sexes working. A set of two eggs was incubated by both parents, sitting alternately, for periods that often exceeded an hour. These gnatwrens never flew to their nest but always approached it by hopping and sidling down upright or inclined stems for a distance of four or five yards. Their departure was usually a reversal of this procedure. Only the male was heard to sing.

7. Silver-beaked Tanager. The males of

this abundant species sang much from mid-March into July. Only females were seen to build the cupped nest, placed in a thicket or ornamental shrub, from two to seven feet up. Two eggs were regularly laid, incubated by the female alone, and hatched in 12 days. The young remained in the nest for 11 or 12 days. Absence of territoriality was indicated by two females nesting only three feet apart and ignoring each other. One fed her nestling, without a male's help, while her neighbor incubated, likewise unattended by a male.

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