ROOSTING AND NESTING OF THE GOLDEN-OLIVE WOODPECKER

BY ALEXANDER F. SKUTCH

THE Golden-olive Woodpecker (*Piculus rubiginosus*) is to my eye one of the most beautiful members of its family. Its back and wings are a most attractive shade of olive-green with a golden cast. The under parts are yellowish-olive with transverse yellowish bars; and the tail is brownish-olive, its central feathers becoming black at the tip. As with most woodpeckers, male and female are alike in appearance except for the markings of their heads. The male wears a large, bright crimson patch on his nape. This color extends forward along the sides of the crown to the base of the bill and encloses the slate gray of the forehead and center of the crown. His grayish cheeks are bordered below by broad, crimson malar stripes. The female has a large patch of crimson on her nape but lacks the conspicuous malar stripes of the male. About eight inches in length, these are woodpeckers of medium size.

The species has a vast range from México to northern Argentina and is highly variable, with many named races. I found the race *differens* fairly abundant in the coffee plantations on the Pacific slope of Guatemala, where the trees of the original forest had been left to shade the coffee which was set out after the undergrowth was cleared away and the canopy thinned. In October these woodpeckers were usually in pairs and rather difficult to approach. The Costa Rican form (*uropygialis*) is most abundant in the highlands. Carriker (1910. *Ann. Carnegie Mus.*, 6:584) found it ranging from 1500 to 6000 feet above sea level, but in greatest numbers between 2000 and 4000 feet, in the Reventazón Valley on the Caribbean side of the country. But in the region of El General on the Pacific slope I have never met it as low as 3500 feet. In the vicinity of Vara Blanca on the northern or Caribbean side of the Central Cordillera, the Golden-olive Woodpecker was rather rare at 5500 feet. Here I met it in the heavy, epiphyte-laden forest and in adjacent clearings with scattered trees.

Sleeping Habits

The first Golden-olive Woodpecker that I found at Vara Blanca was discovered one evening in August, as I made the rounds of the dead trunks standing in a pasture amid the forest, trying to learn what birds slept in the numerous cavities they contained. When I tapped on a low trunk with a woodpecker's hole in its side, a female of this species stuck her head through the doorway to see what was causing the disturbance. I attempted to make her come into the open; for I wished to see enough of her plumage

to identify her with certainty, and also to learn whether perchance a mate was in the hole with her. But although her chamber was only 20 feet high, she was not easily frightened into leaving it. Neither by hammering and tapping on the trunk—all that the tottering stub seemed capable of withstanding—clapping my hands, nor throwing up my cap, could I persuade her to quit her snug retreat.

But the following evening, August 20, 1937, I watched for her to enter her dormitory. The mountain was shrouded in clouds and a fine drizzle fell. At 5:10 p.m., she flew up to the trunk and entered without hesitation, although I stood fairly near and unconcealed. She slept alone in her trunk in the pasture, only a few paces from the forest's edge. This was her nightly lodging for the next two months.

I was absent from Vara Blanca during much of November and December. After my return in January, 1938, I found that the upper half of the low stub in which the woodpecker slept had fallen, and with it her bedroom. She now slept in a hole only head-high above the ground, in a low, slender stub in the midst of the pasture, up the slope from her former dormitory. This cavity had been the lodging of a female Hairy Woodpecker (*Dendrocopos villosus*), which had abandoned it before the Golden-olive Woodpecker's first hole fell (see Skutch, 1955. *Wilson Bull.*, 67:25–32). Early in March, I discovered that a male Hairy Woodpecker slept in a freshly carved hole in the top of the same low stub, about six feet above the old cavity in which the Golden-olive Woodpecker still roosted, and on the same side of the trunk. But before the end of the month, the female Golden-olive Woodpecker was lodging in the newer and higher hole, the Hairy Woodpecker having gone elsewhere. I do not know whether his desertion was voluntary, or whether his bigger neighbor had somehow evicted him, possibly merely by ensconcing herself within before his arrival in the evening. The lower hole in this trunk was now without a tenant.

Voice

About the middle of February, I began to hear, especially in the early morning, the far-carrying challenge of the male Golden-olive Woodpecker. This was a high-pitched, clear, powerful note, repeated very rapidly to form a long-continued roll or trill, all in approximately the same key. It was quite distinct from the shorter, weaker, slower roll of the Hairy Woodpecker, and from the queer, little, wooden rattle of the Smoky-brown Woodpecker (*Veniliornis fumigatus*), which were the chief picarian neighbors of our species at Vara Blanca. Clinging in some high tree-top, the Golden-olive Woodpecker repeated his loud trill over and over.

The call-note of both sexes is a high, loud, sharp *beee*; and they utter also a dry *churr*.

Incubation

On April 5, 1938, I learned that the Golden-olive Woodpeckers were incubating in the hole where the female had of late been sleeping, and where the male Hairy Woodpecker had formerly passed his nights. Since this cavity was 13 feet above the ground in a slender and exceedingly rotten stub standing amid tall, rank grasses in a steep hillside pasture, I could not reach it to look in without assistants to hold a ladder; and two days passed before these could be enlisted. When the interior had been illuminated by introducing a small bulb attached to an electric torch by means of a flexible cord, the mirror stuck through the doorway revealed four beautiful, glossy, pure white eggs, resting upon clean chips on the bottom of the cavity. I did not jeopardize the nest by attempting to remove them for closer examination.

Now that the female woodpecker's former dormitory had been converted into a nest, the male occupied it by night and kept the eggs warm, as is the custom of all the woodpeckers which sleep singly, so far as I know. The female returned to sleep in her earlier lodging six feet lower in the same stub, but only for a few nights, after which she moved to a more distant abode which I failed to find. In using the female's rather than the male's dormitory as a nest, the Golden-olive Woodpeckers did just the reverse of a pair of Red-crowned Woodpeckers (*Centurus rubricapillus*) whose habits I studied during two years in southern Costa Rica. With this pair, the male was the more industrious hole-carver and usually provided himself with a lodging far more substantial than that of his mate, who was often content to sleep in cavities which he had deserted as no longer fit to occupy. Hence it was natural that at the outset of the breeding season the male Red-crowned Woodpecker's dormitory should be chosen to hold the eggs and young; and of course he continued to sleep in it, incubating or brooding through the night. I was not certain which bird made the hole in which the Golden-olive Woodpeckers nested. Did they themselves carve it out and the Hairy Woodpecker take possession of it for a while, to be evicted later by the rightful owners? The size of the doorway suggested that it was the work of the bigger Golden-olive Woodpeckers.

By day, male and female Golden-olive Woodpeckers sat alternately upon the eggs. Despite the lowness of the nest-cavity, both were extremely confiding, and did not fly out when I stood directly below their doorway, even after I had made a noise which caused them to look forth. When I came with a man and a boy to hold the ladder while I climbed up to look in, we found the male woodpecker in charge of the nest. After I drew his attention by tapping on the trunk, he gazed calmly down upon the three

of us. It was necessary to clear a space at the foot of the stub in order to set up the ladder, and for a while the bird watched me chop down the grass and weeds so close below him. But before I had finished the work of clearing, he lost courage and flew away.

The female, after she had retired at nightfall to rest in her still lower hole, was also reluctant to quit it. If I stood in front and made a noise, she would look out; but when I approached closer she shrank back into the interior. While in charge of the eggs, her conduct was most variable. Sometimes she watched me set up the ladder beneath the nest and climb up to the first step before she winged away. At other times, a slight tap on the trunk would cause her to forsake the nest. Her steadfastness seemed to depend upon how she felt at the moment. In these sparsely-peopled mountain forests, most of the birds were more confiding in my presence than I have ever found them elsewhere; and I rarely had to conceal myself in a blind while studying a nest.

After incubation had been in progress about ten days, I devoted a day to learning how the woodpecker pair divided the duty of keeping the eggs warm. Seated on a distant stump on the hillside without concealment, I began my vigil as it grew light at 5:30 on April 15. There was no sign of activity about the nest until 7:15, when the female woodpecker suddenly flew up to the top of the stub, uttering a single, low, wiry note. The male, who had not previously showed himself in the doorway, now looked forth for the first time, then silently flew off. The female at once entered the nest. Four hours slipped slowly by without my having a glimpse of the female in the nest or of her mate on the outside. Beginning at last to suspect that the male might have replaced her on the eggs, during a moment when my attention wandered, I clapped my hands and called to bring to the doorway whichever woodpecker was in the nest. When these sounds failed to obtain a response, I advanced and tapped lightly on the trunk. Instead of merely looking out, as she usually did in similar circumstances, the female came forth and flew away. But after only six minutes she returned to the nest, and sat for another hour. Through much of her long morning session of nearly five hours' duration, she amused herself by hammering lightly on the inner wall of the chamber.

At 12:12 p.m. the male returned and clung beside the doorway. The female flew out and he entered at once. At 1:34 she returned, alighting beside the entrance with the low, wiry note I had heard early in the morning. The male silently departed and she entered. I was now obliged to be absent for a little over an hour while I visited some other nests. The female was still within when I returned at 2:42 and she sat until her mate replaced her at 3:05. I believe that she had been in charge of the nest continuously

since 1:34; for had the male taken a turn on the eggs in the interval, the period between 1:34 and 3:05 must have been occupied by three shifts—two by the female and one by the male—which would make these sessions far shorter than any taken while I was present. At 4:50 the female again returned to the stub and voiced the same low, wiry notes as before. She waited two or three minutes before the doorway for her mate to come out, but he did not even show his head. Then she went in, but emerged again at once and flew away. After her departure the male looked out, then promptly settled back upon the eggs. At 5:03 the female returned, sounded the wiry note, then entered while her mate was still inside. He at once made his exit and flew off. At 5:54 he returned, clung beside the doorway and uttered a low note; whereupon the female came forth and departed. Then he entered to pass the night on the eggs.

The female woodpecker's long morning session of nearly five hours surprised me greatly. Her two afternoon sessions lasted 91 and 51 minutes, respectively; while the two afternoon sessions of the male were 82 and 118 minutes, respectively. Considering the woodpeckers' day to extend from 5:45 in the morning to 6:15 in the evening, a period of 12.5 hours, the female occupied the nest for a total of 439 minutes, the male for 311 minutes of the day. Had her mate yielded up the nest to her when she arrived at 4:50 p.m. to relieve him, she might have had a still larger share of the day to her credit. At no other woodpeckers' nest which I have watched continuously has the female been in charge for such a large part of the day.

When one of the pair of woodpeckers came to relieve the mate in the nest, it usually waited beside the entrance for the other to leave, before it went in. This appears to be the rule with woodpeckers that sleep singly. Only at the end of the day, when the male was slow in leaving, did the female, on two occasions, enter the nest while he was still within. The first time, she came out again immediately; the second time, her mate left as soon as she went in. They did not linger together in the nest when one relieved the other, as woodpeckers which sleep together often do.

The Nestlings

Three of the eggs hatched on April 16, the fourth on the following day. The newly-hatched nestlings were pink-skinned, completely glabrous—as the botanists would say—and blind, as is usual with woodpecker nestlings. Their parents were negligent about removing the empty shells, allowing parts of them to remain in the nest for at least five days after the nestlings had emerged. Two of the young woodpeckers vanished a few days after hatching, evidently having lost out in the competition with their nest-mates for food. This is a common occurrence among woodpeckers, and appears

to result from the parents' inability to see their little ones well at the bottom of the deep cavity and to distribute the food equably among them. Eight days after they hatched, the two survivors, which had grown with wonderful rapidity, were sprouting their pin-feathers.

After the nestlings hatched, the parent woodpeckers became more wary than they had been during the course of incubation, and they would fly from the hole with far slighter provocation. I tried to watch the nest from a blind set close in front of the doorway; but the female delayed so long in approaching that I finally decided that it would be better to remove the offending brown tent and look on without concealment from a more distant point, as I had done while studying the mode of incubation. On April 27, after the cessation of the rain which at dawn a cold wind was driving over the mountain, I took my station on the hillside and watched the parent woodpeckers attend their two eleven-day-old nestlings. In the four hours and 40 minutes from 6:50 to 11:30 a.m. the male visited the nest only thrice, the female twice. Presumably they fed the nestlings on each visit, which would make the rate of feeding little better than once per hour for the two of them combined. Once I could discern a small particle of food projecting from one side of the female's bill as she entered the nest, but otherwise the parents came with no visible food. The feeding of the nestlings was evidently by regurgitation; but since this was done within the cavity, I could not watch the process. The female still made her first morning appearance at the nest at about a quarter past seven, as she had done during the course of incubation; and the nestlings received their breakfast late. They were now brooded very little during the day; for their mother remained in the nest for periods of 10 and 9 minutes only, while the father stayed for 7, 7 and then 8 minutes. And the parents did not warm the nestlings even for the whole of these brief periods in the cavity, but spent part of the time looking through the doorway. They attended to the sanitation of the nest, from time to time carrying away droppings.

Another nestling died after its feathers had begun to sprout, leaving only one alive out of the four that had hatched. At the age of 21 days the lone survivor began to appear in the doorway to receive food. She was well feathered, quite resembled her mother, and was without much doubt a young female, since juvenile woodpeckers, if they do not bear the markings of the parent of the same sex, are more likely to wear the colors of the adult male than of the adult female. On May 10, when the young woodpecker was 24 days of age, I devoted five hours of the morning to watching the parents attend her. I began my vigil at dawn, and as the light increased I could distinguish the father's head in the top of the cavity. He still passed

the night with the nestling, but perhaps clinging to the side of the chamber above her rather than actually brooding. At 5:58, immediately after he flew out, the nestling's head appeared in the doorway. She continued to watch and wait for her breakfast for nearly two hours more, for it was 7:45 before the male returned with her first meal of the day. He brought nothing that I could see in his bill; but upon arriving he clung to the outside of the trunk beside the doorway, placed his bill in his daughter's mouth, and proceeded to regurgitate food to her. The feeding was completed in two installments, each lasting a few seconds; then he flew away. Three-quarters of an hour later he came again with a second and apparently more copious meal. The youngster, still looking through the doorway, leaned far out to receive it. Clinging to the trunk beside the entrance, the father placed his bill in her mouth, but only momentarily, and apparently passed no food. Then, after a pause of a few seconds, he again inserted his bill into her mouth, and this time seemed to give her nourishment. He removed his bill, but after a pause inserted it again and delivered more food. Then twice he placed his bill momentarily into the nestling's mouth, but apparently without giving her anything. Next followed two more-liberal feedings, after which he flew away. As he went off, the youngster looked through the doorway and uttered a low trill.

The female first appeared that morning at 8:55. Clinging in a neighboring tree, she uttered the sharp, staccato *beee,* then the rapid trilled call. Thence she proceeded to the entrance, with nothing visible in her bill, and fed the nestling by regurgitation in a number of brief installments. After this she flew off and did not return during the next hour and a half. At 9:05 the male appeared for the third time. From a neighboring tree he called and trilled, and was answered by the nestling with a much weaker trill. She stuck out her long, slender, white tongue, as though in anticipation of the good things she was about to receive. But this time the feeding was short. After her father had gone, the young bird amused herself by scratching and pecking the inner wall of the nest-cavity. Through the doorway, I could see that she hung backward in the top of the nest to preen her breast feathers. In 20 minutes the male was back again and fed her more liberally, in four courses.

Thus during the first four and a half hours of the woodpeckers' active day the single nestling was fed only five times, four times by the male and once by the female. When woodpeckers nourish their nestlings by regurgitation, they bring food at a very slow rate. Two feathered nestlings of the Lineated Woodpecker (*Dryocopos lineatus*) were fed upon regurgitated food only nine times in as many hours. The rate of food-bringing for the brood as a whole was about the same as at the nest of the Golden-olive Woodpecker

on the morning I watched; but since the Lineated Woodpeckers had two young instead of one, the rate per nestling was only half as great, or 0.5 times per hour. On the other hand, woodpeckers which bring particles held visibly in their bills make far more frequent visits to the nest. The Golden-naped Woodpecker (*Tripsurus chrysauchen*) and the Red-crowned Woodpecker feed their young without regurgitation; and I have known the former to bring food at the rate of 6.7 times per nestling per hour, the latter at the rate of 9 times per nestling per hour, over brief periods. But these woodpeckers seem to give their brood much less at each meal than those that feed by regurgitation. And since they take a morsel to the nest as soon as they find it, without waiting to fill their crops, they do not make their family wait so long for breakfast as was the custom of the Golden-olive Woodpeckers.

Now that they could feed their nestling through the doorway, the parent Golden-olive Woodpeckers no longer took the trouble to go inside and remove the droppings. As a result of this neglect, the bottom of the chamber was soon covered with an accumulation of filth. This was probably no serious inconvenience to the young woodpecker, which now no doubt passed day and night clinging to the inner wall of the deep cavity, rather than resting on the bottom, as when she was younger. Other hole-nesting birds which are careful of the sanitation of the nest while the nestlings are callow and helpless cease to remove the droppings after they are no longer obliged to enter in order to deliver food; this is true, for example, of woodpeckers of the genera *Centurus* and *Dendrocopos*, of Allied Woodhewers (*Lepidocolaptes affinis*), and of the Quetzal (*Pharomachrus mocino*). None of these birds leads the young back to sleep in the nest after they have taken wing. But the Golden-naped Woodpecker and the Olivaceous Piculet (*Picumnus olivaceus*), which use the nest-cavity as a family dormitory long after the fledglings have begun to fly about, never relax their attention to its cleanliness.

In the afternoon of May 10, I looked into the nest to check upon the number of young it now contained. As we set up the ladder below her, the young woodpecker looked down at us through the doorway, then watched me climb up to her, and even permitted me to touch her bill, before she retreated into the bottom of the cavity. I had thoughtlessly placed the mirror for looking into the hole in one of the pockets of my shirt, instead of in a trousers pocket, where it should have been. As I was ascending to the topmost step of the ladder, balancing myself in a difficult position, this mirror rubbed against the stub and produced a grating noise, which frightened the woodpecker more than my approach. Suddenly darting from the nest, she turned down the slope toward the woods in the ravine. Her

flight was slow and labored; but without a rest she covered about 25 yards, in a course which at first was inclined downward, but toward the end veered slightly upward; and she came to rest in a tangle of vines that covered over a small tree within the edge of the woodland. Since other woodpeckers of about the same size (such as Golden-naped Woodpeckers and species of *Centurus*) linger in the nest a full month, I was surprised that this young Golden-olive Woodpecker could fly so well when frightened from the nest at the age of only 24 days. I had felt sure that when I looked in she would crouch in the bottom of the cavity and not attempt to fly out, and doubtless she would have done so but for the unfortunate scratching of my mirror against the trunk.

The young woodpecker was completely feathered and very pretty in her fresh, new plumage, colored like that of her mother. Soon after her premature departure from the nest, I began to keep watch to learn whether her parents would try to bring her back to its shelter; for the sun was already sinking low. The mother did not again appear in the vicinity, but at about 6:30 the father returned to the nest. Clinging before the doorway, he peered inside and all around him, as was his custom before entering, but he showed little concern over the absence of the nestling. He uttered not a syllable to call her back, as Golden-naped Woodpecker parents would have done, but silently retired into the shelter of the nest, while his daughter of tender age remained in the open, exposed to the rain.

Four days later, I found a young female Golden-olive Woodpecker, attended by her parents, high up in a moss-burdened tree at the forest's edge. Although she was about 1000 feet from the nest that I had watched, I believe that she was the fledgling who had been raised in it; for Golden-olive Woodpeckers were not abundant in the region, and each pair wandered over a wide area. I was happy to see that she was alive and well, and had suffered no ill consequences from her premature departure from the nest in the rainy weather then prevailing. Probably the great amount of rain and mist during the nesting season at Vara Blanca in 1938 contributed to the deaths of the other three nestlings from inadequate nourishment; and, since on these storm-swept mountain slopes such weather was not unusual, this might explain why the Golden-olive Woodpecker was not more abundant in the region.

For a number of nights after the departure of the nestling, her father continued to use the nest-cavity as a dormitory; but I never again saw the young woodpecker in its vicinity. In the use of the old nest for sleeping by the male parent, while the young remain in the open, the Golden-olive Woodpecker agrees with the Red-crowned Woodpecker, the Lineated Woodpecker, and the Hairy Woodpecker (see Skutch, 1955. *Wilson Bull.* 67:30).

Doubtless, as with these other species of which adults always sleep singly, the young Golden-olive Woodpecker roosted clinging to a trunk in the open, until she succeeded by her own unaided efforts in finding an unoccupied cavity suitable for a lodging.

An Ecuadorian Nest

The only other nest of the Golden-olive Woodpecker which I have seen was situated in a dead, branchless trunk, standing in the midst of a swampy area covered with bushes and low trees, in the well-wooded valley of the Río Pastaza below Baños, Ecuador, at an altitude of 4200 feet above sea level. On October 18, 1939, this inaccessible hole contained, as far as I could discover, a single well-feathered male nestling, which spent most of the time looking through his doorway. During an hour and a half each of the parents fed him twice, by regurgitation; and it is perhaps significant that the male returned in slightly less time than the female. Although they delivered food while clinging below the doorway, at the conclusion of a feeding they pushed past the nestling to enter the cavity and clean it. The fact that the head markings of this nestling resembled those of the adult male, while those of my Costa Rican nestling were like those of the adult female, shows that in this species young in their first plumage wear the colors of adults of the same sex.

Summary

In Guatemala, Golden-olive Woodpeckers were found in pairs in October, among the shade trees of the coffee plantations.

At an altitude of 5500 feet in the Costa Rican highlands, the roosting and breeding behavior of one pair were followed through most of a year. From August until the following April, a female lodged alone in various low cavities in stubs in a pasture surrounded by heavy forest. She occupied one dormitory for at least two months. After sleeping for some weeks in an old hole in a stub, she moved to a freshly carved hole higher in the same trunk, which had been used as a lodging by a Hairy Woodpecker.

The high-pitched, clear, powerful, long-continued roll or trill of the male was heard from mid-February onward.

At the beginning of April, four eggs were found in the cavity where the Hairy Woodpecker and then the female Golden-olive Woodpecker had slept. Now the male Golden-olive Woodpecker occupied this hole by night, while by day he took turns with his mate in warming the eggs. In the course of a day, the female incubated for three sessions lasting 297, 91, and 51 minutes, the male for two exclusively diurnal sessions of 82 and 118 minutes. Allowing 12.5 hours for the woodpeckers' active day, the female was in

charge of the nest a total of 439 minutes, the male for 311 minutes (which includes extensions within the active period of his long nocturnal sessions).

Although four nestlings hatched, only one was raised, the others apparently succumbing from malnutrition in inclement weather. Both parents fed by regurgitation at a very slow rate. With two 11-day-old nestlings, they brought food only 5 times in 4 hours 40 minutes. With a single 24-day-old nestling, they brought food 5 times in 4.5 hours. The male was the more active provider.

The parents at first kept the nest clean, but neglected sanitation after the young took food through the doorway and they were no longer obliged to enter for feeding.

The young woodpecker, completely naked at hatching, was well feathered at the age of 21 days and resembled her mother. Frightened from the nest when 24 days old, she flew with slow but sustained flight.

After her departure, the fledgling did not return to sleep in the nest, which the male parent continued to use as a lodging.

An Ecuadorian nest contained, in October, a feathered nestling which resembled the adult male, showing that in this species young in their first plumage resemble adults of the same sex.

EL QUIZARRÁ, SAN ISIDRO DEL GENERAL, COSTA RICA, AUGUST 7, 1955