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BIRD NOTES FROM BARRO COLORADO ISLAND,  
CANAL ZONE

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THIS report was originally prepared as a chapter in a volume on Barro Colorado, edited by C. P. Haskins, with contributions by Chapman, Barbour, and others. World War II interrupted work on the book, and the project has now been abandoned. The ornithological observations, however, serve to fill some gaps in faunal and life history data and thus seem to justify separate publication.

On June 24, 1925, I first arrived at Barro Colorado where during the succeeding two and a half years I was to spend a total of eleven months in a study of toucans and the life complex in which they exist so successfully. Alfred O. Gross, of Bowdoin College, also a novice in the Tropics, joined me two days later, and we spent the summer learning the fauna and making nesting studies of antbirds, manakins, flycatchers, and other birds. When I left on August 28 I resolved to resume my studies during the next dry season. With assistance and encouragement from the University of Michigan Museum of Zoology, I was able to return to Barro Colorado the last of February, 1926, for nearly three months' work; Frederick M. Gage was my companion during the first six weeks of the

period. In 1927 I reached Barro Colorado on February 24 with Walter E. Hastings, Michigan naturalist and photographer, who assisted me for a month before returning north to his work with the Michigan Conservation Department. My own stay was prolonged until August 21.

Whereas my work during much of the time on Barro Colorado was devoted largely to a study<sup>1</sup> of the toucan *Ramphastos sulfuratus brevicarinatus*, I had many interesting experiences with other bird species. A few of these are recounted in the following pages.

#### TINAMOUS

Two species of tinamou, the little *Crypturellus soui panamensis* and the large *Tinamus major castaneiceps*, live on Barro Colorado, but no worker at the Laboratory has yet been able to gain any such understanding of these extremely shy and elusive birds as Beebe<sup>2</sup> has reported of *C. variegatus* at Kartabo, British Guiana. In 1926 Alfred Gross<sup>3</sup> published two excellent photographs and a short account of a nest of the little dovelike *Crypturellus soui* on Barro Colorado. The nest had been found with eggs on August 4, 1925. I recorded additional nests of the species on March 16, 1926 (deserted March 19, the eggs only slightly incubated), and July 13, 1927 (young hatching and leaving the nest between 8:00 A. M. and noon on July 29). All three nests contained sets of two eggs of a Light Grayish Vinaceous<sup>4</sup> color and were located, two in the brushy Laboratory clearing, one in the very edge of the surrounding forest. The eggs ranged in size from 40.7 by 30.5 mm. to 44 by 32 mm. and weighed 20.4 to 23 grams.

<sup>1</sup> "The Life History of the Toucan *Ramphastos brevicarinatus*," *Univ. Mich. Mus. Zool. Misc. Publ.*, 19(1929).

<sup>2</sup> "The Variegated Tinamou, *Crypturus variegatus variegatus*," *Zoologica*, 6, No. 2(1925): 195-227.

<sup>3</sup> "Barro Colorado Island Biological Station," *Smithsonian Report*, 1927 (for 1926), pp. 337-38, Pl. 5.

<sup>4</sup> Capitalized color names after Robert Ridgway, *Color Standards and Color Nomenclature* (Washington, D. C.: Published by the author, 1912).

	mm.	grams
August 4, 1925 .....	41.2 × 30.5	20.5
	41.9 × 30.8	20.8
March 16, 1926 .....	40.7 × 30.5	20.4
	40.4 × 31	20.8
July 13, 1927 .....	44 × 31.3	22.3
	44 × 32	23

A male specimen in breeding condition, collected on March 20, 1926, weighed 209 grams.

Although these tinamous are very shy and hard to observe in the forest, the incubating birds at both of the nests that I studied, like the one described by Gross, were very reluctant to leave the nest and sometimes even allowed themselves to be touched.

Nothing seems to have been recorded about the nesting of *Tinamus* on Barro Colorado. The bird is apparently confined to the forest, and we found two nests, one in large second growth, one in virgin jungle. Both were located between the buttress roots of large trees and were mere hollows among the dead leaves. The owners of both nests deserted after once being flushed from the nest. The first nest, found April 28, 1926, contained six fresh eggs (Pl. I) and the second, found June 26, 1927, contained four eggs. The eggs were a brilliant glossy Beryl Green and ranged in size from 56 by 45 mm. to 62 by 50 mm. and weighed 56 to 81.4 grams.

	mm.	grams
April 28, 1926 .....	62 × 49	74
	60 × 49	72
	60 × 49	72
	59 × 49	70.5
	61 × 49	73.5
	60 × 49	69
June 26, 1927 .....	62 × 50	74.3
	60 × 50	76.3
	62 × 50	81.4
	56 × 45	56

It will be noted from the nest dates given above that, unlike many species of birds studied on Barro Colorado, these two

species of tinamou nest during both the dry and the wet season. (The rains begin in late May.)

#### HERONS

Hérons are among the most conspicuous birds of the Canal Zone and have been rather ignored by ornithologists as too well known to merit much attention, but the status of some species proves upon examination to be quite obscure.

The Great Blue Heron (*Ardea herodias* subsp.) of the Canal Zone has been termed a resident by some and a winter visitant from the United States by others. The recapture on Gatun Lake in September, 1925, of one banded as a nestling May 23, 1925, at Waseca, southern Minnesota (*A. h. herodias*), shows that at least one Canal Zone Great Blue Heron has been raised in the north. The implications of that record are further borne out by the fact that most of my own sight records from the shores of Barro Colorado Island fall within the northern winter season. Since all but one of my records refer to lone individuals, perhaps the party of four Great Blue Herons I saw on the south shore of Barro Colorado on March 17, 1927, represented a migrating group. On the other hand, individuals seen about Barro Colorado during May and July probably belonged to a resident race. Ludlow Griscom<sup>5</sup> stated that "some form" of Great Blue Heron "has been found breeding in the Canal Zone."

The Little Blue Heron (*Florida caerulea*) is probably the most abundant and certainly the most conspicuous heron of Barro Colorado. There is no evidence yet of its breeding on the island, but both the dark blue adults and the white-plumaged juveniles are often seen along the shores at all seasons.

Perhaps careful study will reveal that these individuals have feeding "territories" as well defined as the nesting territories of most land birds. On February 26, 1927, Walter Hastings and I observed an adult that was chasing an immature bird

<sup>5</sup> "The Ornithology of the Republic of Panama," *Bull. Mus. Comp. Zool.*, 78(1935): 294.

about a little bay in so determined and persistent a manner that we could interpret the incident only as territorial behavior. We took advantage of the young bird's confusion and approached nearer than is usually possible, thus securing several pictures (Pl. II).

The food of a Little Blue Heron taken on the mainland at Frijoles, as well as that of one collected on Barro Colorado, was remarkable for the number of large spiders included. Other food items were insects (especially orthoptera), crustacea, and small fish.

The Little Green Heron (*Butorides*), one of the two most common herons of the Canal Zone, has undoubtedly been the most misunderstood. Contrary to the early assumption, the North American species, *Butorides virescens*, apparently does not breed on Barro Colorado or even occur there in any numbers. The eight specimens collected and the many satisfactory sight records we made proved to belong to the South American species, *Butorides striatus*.<sup>6</sup> Like the North American Green Heron, these birds were much at home in the forest and, when frightened from their hunting along the heavily wooded shores of the island, often escaped from view by walking along large branches back into the forest instead of flying away over the water in orthodox heron fashion. Their breeding season must be of long duration: A male taken March 7, 1926, had apparently finished breeding (gonads retrogressed) and had begun

<sup>6</sup> The subspecies occurring in the Isthmus of Panama was described by Griscom in 1929 ("A Collection of Birds from Cuna, Darien," *Bull. Mus. Comp. Zool.*, 69: 156) as *Butorides striatus patens*. Griscom stated that "the legs and feet are greenish yellow in *virescens*, versus orange red in *striatus*, and the bare loreal space is bright yellow versus indigo blue," but our data from several Barro Colorado specimens do not agree with that statement. The colors of the soft parts of our specimens, adult and immature, much resembled those of *Butorides virescens* from the eastern United States. For example, an adult female collected at Barro Colorado on July 9, 1925, was colored as follows: anterior surface of tarsus—Deep Olive-Buff, posterior surface—Olive Ocher; lores and skin at base of maxilla—Pale Greenish Yellow. Immature specimens were similar, but the colors were lighter and even brighter.

the postnuptial molt; but a male collected April 11, 1927, was in full breeding condition. On July 28, 1925, we found a nest with two pale blue-green eggs (on an isolated stump off the south shore of the island); and on August 11, the Indian boy, Donato—who meant to help us—brought in two half-grown young from another nest.

#### GHIESBRECHT HAWK

At least 15 species of hawks have already been recorded on Barro Colorado. Of these, the splendid, snow-white Ghiesbrecht Hawk (*Leucopternis albicollis costaricensis*) is the most often seen. Each season that I was at the Laboratory there was a pair settled near that section of the forest, and nearly every day we saw the two birds circling about the clearing and over the trees, or sitting quietly on some favorite branch as they watched for the snakes and lizards that seemed to form their principal diet (Pl. III). A number of times we saw one circle across the clearing with a snake or large lizard dangling from its claws. Twice we frightened one into dropping its burden, and both times it proved to be a large basiliscus lizard (in one case more than 38 cm. long). Sometimes I encountered a Ghiesbrecht Hawk as it hunted deep in the forest. Each time the hawk was flying up or down one of the larger stream beds, stopping frequently on some convenient perch to search out the reptile fauna by slow inspection of the ravine bottom. On March 24, 1926, I collected an adult male in a ravine on the north side of the island. In its stomach were a few large orthoptera and a small snake, later identified by A. G. Ruthven as *Stenorrhina degenhardtii*, a species not previously recorded from Barro Colorado.

The voice of the Ghiesbrecht Hawk is a shrill plaintive "ker-wee," typically buteonine, but ending in a queer buzzing note.

#### TOVI PAROQUET

During at least the summer months of the rainy season on Barro Colorado, Tovi Paroquets (*Brotogeris jugularis*) are

very conspicuous as they fly swiftly in large compact flocks over the treetops or circle the Laboratory clearing. As a flock alights, it suddenly becomes an aggregation of many pairs, each two birds sitting close to each other and somewhat apart from other pairs. These little parrots—somewhat smaller than a Martin—make a memorable picture thus scattered in pairs among the branches, their plumage of brilliant green marked by iridescent gleams of bronze and blue on back and wings and a small spot of orange on the throat below the pale heavy bill. When they are perching, especially if they have just alighted or are just about to take flight again, they are usually silent, but once in the air their loud shrill chattering is almost incessant. In late winter these flocks break up into rather widely scattered pairs. For instance, by February in 1926 there were but three pairs in the Laboratory clearing instead of the large flock that had lived there the summer before.

The paroquets nested in old woodpecker holes and similar cavities in the clearing and even in dead trees that stood near the shore in the waters of Gatun Lake. Nesting was completed by late spring, and on May 12, 1926, I saw the first small post-nesting flock. Within four days we again had a large flock in the clearing.

#### TOUCANS

The relations of toucans to other bird species, although often referred to, remain regrettably obscure. Every popular natural history tells us in general terms of toucans mobbing hawks and robbing birds' nests, but most of these accounts clearly have their origin in Azara and Prince Maximilian of Wied, and when we look in their books, published more than a century ago, we find that those wise naturalists guarded their statements with such phrases as "I am told" or "it is credibly reported."

Only twice did I see toucans show any interest in hawks. On May 18, 1926, an adult male Snail Kite (*Chondrohierax uncinatus*) appeared on the south edge of the Laboratory clear-

ing, closely followed by five toucans (*Ramphastos sulfuratus*). The kite flew slowly from tree to tree, the toucans watching him intently. There was no hostility apparent on the part of either kite or toucans. When I collected the kite a little later I found that, as is usual with this species, it had eaten nothing but large land snails, each neatly extracted from its shell. It seemed likely that the toucans were parasitic on the hawk, taking advantage of its phenomenal ability to find snails and quickly snapping up some before the rather sluggish kite could secure them.

The second occasion was on April 25, 1927, when a small hawk (unidentified) alighted in a large tree in the upper part of which some toucans (*Ramphastos sulfuratus*) were feeding on fruit. Immediately four toucans swooped down from as many sides and perched close to the hawk, which unfortunately flew away into the forest before I could learn the meaning of the episode.

Several times I saw small birds, especially flycatchers, drive toucans away from the vicinity of their nests. For example, on April 12, 1926, we noted a big Swainson's Toucan (*Ramphastos swainsoni*) persistently uttering its strange gull-like shrieks from a bare treetop near the Laboratory. Two Boat-billed Flycatchers (*Megarhynchus pitangua*) were chattering and fluttering about him, and at length they became so aggressive that the toucan began to move away by short flights from branch to branch. The toucan eyed the flycatchers watchfully, and they did not attack him except when he moved, but then they were instantly after him. Finally, the toucan dived to the forest below. The flycatchers pursued him hotly, but gave up the chase when he reached the shelter of the forest. Then they returned to their treetop, chattering excitedly.

#### VERMILION-CROWNED FLYCATCHER

The Vermilion-crowned Flycatcher (*Myiozetetes similis columbianus*) is the most common flycatcher along the shores of Barro Colorado. In July and August, 1925, we saw many



groups of two to six which chattered and fluttered from bush to bush, in manner very like the Eastern Kingbird (*Tyrannus tyrannus*) of our northern roadsides. At that season the flycatchers frequently gathered in certain fruiting trees, and the stomachs of several birds we collected contained more seeds and berries than beetles and other insects. The flycatchers' many conspicuous nests were no longer in use, and we guessed that the little groups of flycatchers we saw were post-nesting family parties.

The next spring, and again in 1927, we found a number of new nests under construction and learned something of this flycatcher's habits. There was considerable variation in its time of nesting. Some nests were completed in February, others not until early April. The nests were of grass with an entrance in the side and were usually placed three or four feet above the water in bushes or on tree stumps. The nest figured here (Pl. IV, Fig. 1) was one of the stump type, which by an odd chance had been placed directly over one of the Barro Colorado Reservation signs that warned all comers very emphatically in English, Spanish, and French that no hunting or trespassing would be tolerated. I have published elsewhere<sup>7</sup> a figure of one of these nests built in a bush. While jack-lighting from a canoe on March 9, 1926, Frederick M. Gaige and I had the interesting experience of finding two of these flycatchers roosting beside their half-finished nest. The birds were perched in plain sight on the outer portion of a slender, leafy twig about three feet above the water. Their nest was in a bush on the edge of a little floating island moored by two tree stumps. I did not learn how long this species takes to construct a nest, but in several cases pairs required three days to complete a nest that had appeared to be half-done when I discovered it. In the two instances in which the time could be ascertained, there was an interval of five days between the completion of the nest and the laying of the first egg. Eggs

<sup>7</sup> "The Barro Colorado Laboratory as a Station for Ornithological Research," *Wilson Bull.*, 42(1930): 229.

were noted from March 7, when one set was already three-quarters incubated, to April 28. At two nests I found the period of incubation to be 15 days. Three eggs usually constituted a set, but in one case there were four and in another only two. A set collected March 7, 1927, are creamy white, spotted with Vandyke Brown. The spots range from a pin point in size to a couple of millimeters in diameter and are largely concentrated about the blunt end of the egg. Some of the spots are veiled as though they had been deposited before the last layer of shell was laid down. Three of these eggs measured: 20.5 by 15.2 mm.; 19.6 by 15.5 mm.; and 19.9 by 15.4 mm. The fourth egg was 20.3 mm. long; damage prevented exact determination of the short diameter.

#### PANAMA HOUSE WREN

The Panama House Wren (*Troglodytes musculus inquietus*) appears to be another member of that interesting group of Barro Colorado bird species that breed throughout the year, or at least during both the dry and wet seasons. Frank Chapman<sup>8</sup> recorded nests on Barro Colorado with sets of four eggs completed "early in January," on February 8, and (a double nest) at the end of March. Thomas Hallinan<sup>9</sup> listed one with three eggs at Las Cascadas on the Canal, May 22, 1908. Witmer Stone<sup>10</sup> reported three eggs collected by L. L. Jewel, presumably at Gatun, on June 5, 1911.

On August 16, 1925, we observed a pair in the Laboratory clearing engaged in building a nest 25 feet above the ground in an isolated tree bole near the water's edge. The inaccessibility of the nest and our early departure for the north pre-

<sup>8</sup> *My Tropical Air Castle* (New York: D. Appleton and Co., 1929), pp. 68-70.

<sup>9</sup> "Notes on Some Panama Canal Zone Birds with Special Reference to Their Food," *Auk*, 41(1924): 325.

<sup>10</sup> "Birds of the Panama Canal Zone, with Special Reference to a Collection Made by Mr. Lindsey L. Jewel," *Proc. Acad. Nat. Sci. Phila.*, 70(1918): 271.

vented further observations, but the next spring we observed wrens in the clearing again and soon found their nest of sticks on top of a beam which braced the elevated floor of the cook's house. The set of four eggs was completed during the morning of March 4 and hatched just 12 days later (on March 16). The young remained in the nest 18 days (until April 3), and even that long nestling period may have been somewhat shorter than the normal, owing to our frequent inspection visits. We banded the four young—perhaps the first application of the bird-banding method to Central American ornithology—and collected one of them at the age of 62 days for a permanent museum specimen. Its plumage agrees completely with Ridgway's<sup>11</sup> description of the juvenal plumage in this wren.

In 1927 we discovered a wren incubating four eggs on June 27. The nest was placed in the rolled side-curtains of the launch moored to the Laboratory dock. Since the curtains had been rolled up only seven days previously, nest construction presumably occupied no more than three days. We collected the nest and eggs, knowing that in any case the next rain storm would force us to remove them, but the tireless wrens seemed undaunted and on July 6 we had to collect a second nest and four eggs from the same location. The first nest was a bulky structure of coarse grass and sticks, lined with fine grasses, two white feathers, and a bright green parrot feather. The eggs were light pink, finely and quite evenly speckled with Russet-Vinaceous and Light Russet-Vinaceous. They show a slight tendency toward concentration of the spots over the large end of the egg or in a wreath about that end. The eggs in the first nest ranged in size from 17.4 by 13.2 mm. to 18.1 by 13.7 mm. and weighed 1.7 to 1.9 grams. Thus, they are considerably larger than eggs of the Eastern House Wren (*Troglodytes aëdon*) of the United States. (Also the eggs of both sets are more coarsely marked than are those of the United States bird.) Interestingly enough, the eggs of the second set

<sup>11</sup> "The Birds of North and Middle America," *U.S. Nat. Mus. Bull.*, 50, Pt. 3 (1904): 576.

averaged even larger, measuring 17.6 by 13.2 mm. to 18.3 by 13.9 mm. and each weighing 1.9 grams.

	mm.	grams
June 27, 1927 .....	17.8 × 13.7	1.9
	18.1 × 13.7	1.9
	17.4 × 13.2	1.7
	17.4 × 13.5	1.8
July 6, 1927 .....	18.3 × 13.9	1.9
	18.2 × 13.9	1.9
	17.6 × 13.2	1.9
	17.6 × 13.4	1.9

Cole<sup>12</sup> has reported increased size in successive sets of eggs laid by an Eastern House Wren.

Another strange wren nest location was revealed on July 3, 1927, when our cook changed from the oil stove to the wood stove. Smoke led us to discover a nest with three half-grown young in the bend of the stovepipe.

Only once did we find evidence of insect parasites which might be serious enemies of this remarkably successful species. Two large fly larvae emerged from the belly skin of an adult female House Wren collected August 15, 1925. The larvae were identified by C. T. Greene, of the United States National Museum, as *Philornis pici* Macq., a species we also found parasitizing the nestlings of the common toucan of Barro Colorado, *Ramphastos sulfuratus brevicarinatus*.

As one of the most successful birds in the New World, the House Wren deserves special attention. Chapman<sup>13</sup> has remarked that the House Wren (of the *Troglodytes musculus-aëdon* group) has "a wider range than any other land bird of the Western Hemisphere," extending from Cape Horn to Canada.

<sup>12</sup> "The Laying Cycle in the House Wren" (Abstract), *Wilson Bull.*, 42(1930): 78.

<sup>13</sup> *Op. cit.*, p. 66.

PLATE I



Nest of *Tinamus major castaneiceps*, on Barro Colorado, April 28, 1926. Photograph by J. Van Tyne.

PLATE II

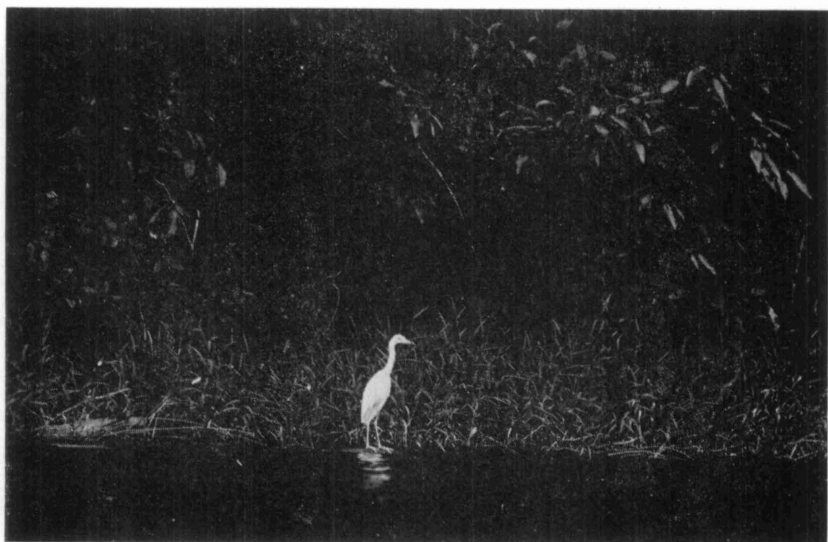


FIG. 1.



FIG. 2.

FIGS. 1 and 2. Immature Little Blue Heron (*Florida caerulea*), on Barro Colorado, February 26, 1927. Photographs by Walter Hastings.

PLATE III



FIG. 1.



FIG. 2.

FIGS. 1 and 2. Ghiesbrecht Hawk (*Leucopternis albicollis costaricensis*), on Barro Colorado, March, 1927. Photographs by Walter Hastings.

PLATE IV



FIG. 1. Nest of the Vermilion-crowned Flycatcher, on Barro Colorado, May 13, 1926. Photograph by J. Van Tyne.



FIG. 2. Vermilion-crowned Flycatcher (*Myiozetetes similis columbianus*), on Barro Colorado, March, 1927. Photograph by Walter Hastings.