

BIRDS OF A HIGHLAND CLEARING IN CUNDINAMARCA, COLOMBIA

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SEVERAL authors (Dugand 1947, Olivares 1969, Lehmann 1970) have noted effects on distribution of Colombian avifauna by land disturbance, particularly the ever-accelerating clearing of forest to make way for pasture and agriculture. This paper attempts to describe this process on a small ranch near the capital city of Bogotá, which has been settled for more than a century and where, consequently, the altered ecology has more or less stabilized.

The Finca Rancho Grande (4° 36' N, 74° 20' W), is situated 15 km west of Bogotá in Santandercito, Cundinamarca, in the valley of the Bogotá River, a tributary of the Magdalena, Colombia's principal river. The finca lies 8 km downriver from the famous Tequendama Falls, which mark one of the bounds of the altiplano. The finca's altitude, 1700 m, is thus considerably lower than that of the Sabana of Bogotá (2600 m). Meyer de Schauensee (1964) defines the tropical zone as extending from 0 to 1385–1700 m, and the subtropical zone as going from the 1385–1700 m line to 2300–2600 m. This finca is at the altitude of overlap between the two zones. The avifauna consists mainly of tropical and subtropical species of the west slope of the Eastern Andes-Magdalena Valley. So far 82 species of birds have been seen at the finca, 10 North American migrants and 72 residents in Colombia.

The finca, roughly 500 m by 500 m (25 ha or 61.8 acres) in extent, lies on the north-facing slope of the east-west running valley. It is a step-sided valley, with approximately flat shelves alternating with grades as steep as 40°, descending northward to the river, some 1.5 km away at a level of 1500 m. Almost the entire valley on both sides of the river, originally forested, has been converted into fincas for animal husbandry (cattle and horses) and orchards for coffee culture, with numerous small towns and weekend cottages built to take advantage of the pleasant climate (temperature 16.5°–24° C; 62°–75° F). Behind the finca, to the south, climbs the Cordillera Subía with peaks as high as 2800 m, and separating the valley of the Bogotá River from that of the Subía River. Much of this cordillera, parts of which were explored by the Chapman party in 1910–15 (Chapman 1917), has, like the region around Santandercito, been cultivated for at least 100 years, but considerable stands of thick secondary humid forest (*Cecropia*, tree fern, tree-sized Melastomataceae *Miconia*) still remain around swamps. On hillsides too steep for human use (grades of at least 70°)

are heavy stands of what appear to be remnants of the humid forest that formerly extended all the way down to the river.

Relatively few trees remain on the finca; 80% of the land has been cleared for pasture. The most numerous trees found scattered through the grazing area are the fruit-bearing guayaba (*Psidium guajava*). Second most numerous are various introduced citrus trees and native legumes (*Erythrina* spp.), which, independently of each other and at various times of year, blaze with brilliant red flowers that turn into pendulous pods. Epiphytes are common, and many trees, particularly citrus and myrtles, are infested with berry-bearing vines of the mistletoe family (Loranthaceae).

The finca is bordered by stone fences assembled from pieces of granite that are strewn everywhere through the valley, and many of these fences are bordered by 20–50 foot tall native trees. About 15% of the finca is planted with coffee. This area, fenced off from the pasture by barbed wire, is thick with undergrowth and shaded by trees similar to those along the fences. The trees found on the finca are listed in Table 1.

There are two rainy seasons, late February–June and late August–early December, and two dry seasons, mid-December to late February and June–late August. The annual average precipitation is about 61 inches. The monthly norms recorded at La Mesa (altitude 1300 m), 8 miles northwest of Santandercito on the other side of the Bogotá River, over an 11-year period (Wernstedt 1972) were: January 2.56, February 4.02, March 6.46, April 5.67, May 7.62, June 4.53, July 1.42, August 1.77, September 3.23, October 9.76, November 8.66, and December 5.35.

The land is not well-drained despite the many ditches and streams that traverse it, and several bogs about a quarter acre in extent and a small marsh remain wet even through the dry seasons. Cactus grows in the more exposed places along the ridges. The trees, with the exception of avocado and citrus, lose their leaves in periods of dryness and bloom in their own seasons throughout the remaining 7 months. The finca looks driest in early August, when the pasture becomes yellow and few herbs are in flower. It is at its lushest from March through May, when fragrant blossoms appear on verbena and mimosa trees and fruit on the poma-rosa and orange. From May through July the meadows are dappled with composites and other flowers.

METHODS

During 1972–73 the author lived in a small isolated house on the finca. About 75% of daylight time, 0630–1830, was spent watching birds, for a total of 123 days, between 22 April 1972 and 21 January 1973, most intensively until the end

TABLE 1
TREES FOUND ON THE FINCA IN ORDER OF ABUNDANCE

| Species | Family | Common name | Na-tive | Intro-duced | Pas-ture | Path | Fence | Cof-fee grove |
|-----------------------------|----------------|-------------------------------|---------|----------------|----------|------|-------|---------------|
| <i>Coffea arabica</i> | Rubiaceae | Coffee | - | X | - | - | - | X |
| <i>Psidium guajava</i> | Myrtaceae | Guayaba | X | - | X | - | - | - |
| <i>Citrus</i> spp. | Rutaceae | Orange, grapefruit, tangerine | - | X | X | - | - | - |
| <i>Musa sapientum</i> | Musaceae | Banana | - | X | - | - | - | X |
| <i>Erythrina edulis</i> | Fabaceae | Balu | X | - | X | - | X | X |
| <i>Erythrina rubinervia</i> | Fabaceae | Chochos de arbol | X | - | X | - | X | X |
| <i>Sapium</i> spp. | Euphorbiaceae | Spurge, gaucho | X | - | X | - | X | - |
| <i>Eugenia</i> spp. | Myrtaceae | Arean | X | - | X | - | - | - |
| <i>Tricanthera</i> spp. | Acanthaceae | Nacedero | X | - | X | - | X | - |
| <i>Inga</i> spp. | Mimosaceae | Guamo or guavo | X | - | X | - | X | X |
| <i>Ficus</i> spp. | Moraceae | Fig | X | - | - | - | X | X |
| <i>Citharexylum</i> spp. | Vernenaceae | Masato | X | - | X | - | X | - |
| <i>Eugenia jambos</i> | Myrtaceae | Poma rosa | - | X | X | - | X | - |
| <i>Rapanea</i> spp. | Myrsinaceae | Espadero | X | - | - | X | X | - |
| <i>Cupania</i> spp. | Sapindaceae | Guacharaca | X | - | X | - | - | X |
| <i>Persea americana</i> | Lauraceae | Avocado | X | - | X | - | X | - |
| <i>Eucalyptus</i> spp. | Myrtaceae | Eucalyptus | - | X | - | - | X | - |
| <i>Mangifera indica</i> | Anacardiaceae | Mango | - | X | X | - | - | - |
| <i>Salix</i> spp. | Salicaceae | Willow | X | - | - | - | X | - |
| <i>Cyphomandra betaceae</i> | Solanaceae | Tomate de arbol | X | - | X | - | - | - |
| <i>Pinus</i> spp. | Pinaceae | Pine | - | X ¹ | - | - | - | - |
| <i>Xylosma velutinum</i> | Flacourtiaceae | | X | - | X | - | - | - |
| <i>Cedrela</i> spp. | Meliaceae | Cedar | X | - | - | - | X | - |

¹ Near main house.

of September (3 or 4 days a week), and thereafter for an average of 5 days a month. With mist nets 210 birds of 53 species were caught, and most were color-banded before being liberated. Visits were made to neighboring regions above and below the finca for the purpose of understanding the nature of the original avifauna before clearing. Bird nomenclature is that of Meyer de Schauensee (1970).

STUDY AREA AND POPULATION

Eight different habitats occur on the finca:

(1) Pasture: closely matted grasses, clover, and Cyperaceae (daily cropped by a small herd of about 16 cattle and 3 horses), interspersed with lichen-covered granite boulders from 6 inches to 3 feet in diameter, and with about 5% tree cover (see Table 1).

(2) High herbs: up to 3 feet or more in height and thus flowering, usually growing next to or in spaces between boulders, or on steep slopes: Compositae, including ragweed, several of the genus *Bidens*, and at least four other genera including *Eupatorium*, borages (Boraginaceae), spiderworts (Commelinaceae), figworts (Scrofulariaceae), mints (Labiatae), loosestrifes (Lythraceae), mallows (Malvaceae), primroses (Oenotheraceae), buckwheats (Polygonaceae), crowfoots (Ranunculaceae), Rosaceae (most commonly blackberry), madder (Rubiaceae), Solanaceae, vervain (Verbenaceae), and grasses (Graminae).

TABLE 2
ABUNDANCE OF BIRDS AND USE OF FINCA HABITATS¹

| Species | Abundance ² No. | Pasture | High herbs | Bog | Marsh | Stream | Coffee | Path | Clump of trees |
|---|----------------------------|---------|------------|-----|-------|--------|--------|------|----------------|
| Rufous-sided Crane, <i>Lateralus melanophaius</i> | R | - | - | - | f | - | - | - | - |
| Ruddy Ground-Dove, <i>Columbina talpacoti</i> | C | f | - | - | - | - | f | p | p |
| White-tipped Dove, <i>Leptotila verreauxi</i> | S | - | f | - | - | - | f | - | - |
| Rock Dove, <i>Columba livia</i> | C | f | - | - | - | - | - | - | p |
| Spectacled Parrotlet, <i>Forpus conspicillatus</i> | A | f | f | - | - | - | p | - | p |
| Smooth-billed Ani, <i>Crotophaga ani</i> | C | f | - | f | f | - | f | p | p |
| Green Hermit, <i>Phaethornis guy</i> | S | - | - | - | - | - | f | - | - |
| White-tipped Sicklebill, <i>Eutoxeres aquila</i> | S | - | - | - | - | - | f | - | - |
| Sparkling Violetear, <i>Colibri coruscans</i> | S | - | - | - | - | - | f | - | f |
| Black-throated Mango, <i>Anthracothorax nigricollis</i> | C | - | f | - | - | - | f | - | f |
| Fork-tailed Woodnymph, <i>Thalassidroma furcata</i> | C | - | n | - | - | - | - | - | f |
| Violet-bellied Hummingbird, <i>Damophila julie</i> | R | - | - | - | - | - | - | - | f |
| Indigo-capped Hummingbird, <i>Amazilia cyanifrons</i> | S | - | - | - | - | - | f | f | f |
| Rufous-tailed Hummingbird, <i>A. tzacali</i> | C | - | - | - | - | - | f | - | f |
| White-bellied Woodstar, <i>Acestrura mulsant</i> | C | - | - | - | - | - | f | - | f |
| Olivaceous Piculet, <i>Picumnus olivaceus</i> | R | - | - | - | - | - | f | f | f |
| Spot-breasted Woodpecker, <i>Chrysopilus punctigula</i> | C | - | p | - | - | - | f | - | f n |
| Red-crowned Woodpecker, <i>Melanerpes rubricapillus</i> | C | 8 | - | - | - | - | f | - | f n |
| Red-rumped Woodpecker, <i>Veniliornis kirikii</i> | R | 8 | - | - | - | - | f | - | f |
| Pale-breasted Spinetail, <i>Synalaxis albescens</i> | C | 14 | - | - | - | - | f | f | f n |
| Ash-browed Spinetail, <i>Cranioleuca curtata</i> | S | - | - | - | - | - | f | - | f |
| Bar-breasted Antshrike, <i>Thamnophilus multistriatus</i> | C | - | f | - | - | - | f | p | p |
| Vermilion Flycatcher, <i>Pyrocephalus rubinus</i> | C | 5 | p | - | p | - | - | p | p n |

¹ f = feeding, p = perching only, n = nesting.

² A = abundant, seen every day in numbers; C = common, seen every day; S = scarce, not seen every day and rarely more than three at once; R = rare, seen only a few times.

TABLE 2—Continued

| Species | Abundance ² No. | Pasture | High herbs | Bog | Marsh | Stream | Coffee | Path | Clump of trees |
|---|----------------------------|---------|------------|-----|-------|--------|--------|------|----------------|
| Tropical Kingbird, <i>Tyrannus melancholicus</i> | C 20 | - | f | - | p | - | p | p | p |
| Rusty-margined Flycatcher, <i>Myiozetetes cayanensis</i> | S | - | p | - | - | - | - | - | p |
| Great Kiskadee, <i>Pitangus sulphuratus</i> | C | - | - | - | - | - | p | - | p |
| Wood Pewee, ³ <i>Contopus virens</i> | C | - | - | - | - | - | p | - | p |
| Common Tody-Flycatcher, <i>Todirostrum cinereum</i> | C 20 | - | - | - | - | - | f | - | f |
| Torrent Tyrannulet, <i>Serpophaga cinerea</i> | C 6 | - | - | - | - | p | - | - | - |
| Yellow-bellied Elaenia, <i>Elaenia flavogaster</i> | C 30 | - | - | - | - | - | - | f | f |
| Lesser Elaenia, <i>E. chiriquensis</i> | S | - | - | - | - | - | - | - | f n |
| Sooty-headed Tyrannulet, <i>Phyllosmyias griseiceps</i> | C 8 | - | - | - | - | - | f | - | f |
| Blue-and-white Swallow, <i>Notiochelidon cyanoleuca</i> | A 50 | - | - | - | - | - | - | - | p |
| Rough-winged Swallow, <i>Stelgidopteryx ruficollis</i> | S | - | - | - | - | - | - | - | p |
| Band-backed Wren, <i>Campylorhynchus zonatus</i> | S | - | - | - | - | - | - | - | f n |
| House Wren, <i>Troglodytes aedon</i> | C 40 | f | f | - | - | - | f | f | f |
| Tropical Mockingbird, <i>Mimus gilvus</i> | C 10 | f | - | - | - | - | - | p | f n |
| Swainson's Thrush, ³ <i>Catharus ustulatus</i> | S | - | - | - | - | - | f | - | - |
| Black-billed Thrush, <i>Turdus ignobilis</i> | A 150 | f | - | - | f | - | p | p | p n |
| Rufous-browed Peppershrike, <i>Cyclarhis gujanensis</i> | S | - | - | - | - | - | - | - | f |
| Warbling Vireo, <i>Vireo gilvus</i> | C 12 | - | - | - | - | - | f | - | f |
| Scrub Greenlet, <i>Hylophilus flavipes</i> | S | - | - | - | - | - | f | - | - |
| Tennessee Warbler, ³ <i>Vermivora peregrina</i> | C | - | - | - | - | - | f | - | f |
| Yellow Warbler, ³ <i>Dendroica petechia</i> | S | - | - | - | - | - | f | - | f |
| Canada Warbler, ³ <i>Wilsonia canadensis</i> | S | - | - | - | - | - | - | - | f |
| Blackburnian Warbler, ³ <i>Dendroica fusca</i> | C | - | - | - | - | - | - | - | f |
| Mourning Warbler, ³ <i>Geothlypis philadelphia</i> | S | - | - | - | - | - | f | - | - |
| Rufous-capped Warbler, <i>Basilentanus rufifrons</i> | S | - | - | - | - | - | f | - | - |
| River Warbler, <i>B. rivularis</i> | S 4 | - | - | - | - | - | f | - | - |

³ Migrant.

TABLE 2—Continued

| Species | Abundance ² No. | High | | | | | Clump of trees |
|--|----------------------------|---------|-------|--------|-------|--------|----------------|
| | | Pasture | herbs | Bog | Marsh | Stream | |
| | | | | Coffee | Path | | |
| Bananaquit, <i>Coereba flaveola</i> | C 10 | - | - | - | - | f | f |
| Slaty Flower-Piercer, <i>Diglossa baritula</i> | R | - | - | - | - | - | f |
| Thick-billed Euphonia, <i>Euphonia lamirostris</i> | S | - | - | - | - | f | - |
| Fawn-breasted Tanager, <i>Pipraeidea melanonota</i> | S | - | f | - | - | - | f |
| Turquoise Dacnis-Tanager, <i>Pseudodacnis harilaubi</i> | S | - | - | p | - | - | f |
| Blue-necked Tanager, <i>Pseudodacnis cyanicollis</i> | C | - | - | - | - | f | f |
| Bay-headed Tanager, <i>T. gyrola</i> | C | - | - | - | - | f | f |
| Scrub Tanager, <i>T. vitirolina</i> | C 20 | - | - | - | - | f | f |
| Black-capped Tanager, <i>T. heinei</i> | S | - | - | - | - | - | f |
| Blue-gray Tanager, <i>Thraupis episcopus</i> | C | - | - | - | - | f | f |
| Palm Tanager, <i>T. palmarum</i> | S | - | - | - | - | f | f |
| Summer Tanager, ³ <i>Piranga rubra</i> | S | - | - | - | - | - | f |
| Crimson-backed Tanager, <i>Ramphocelus dimidiatus</i> | C 12 | - | - | - | - | - | f |
| White-lined Tanager, <i>Tachyphonus rufus</i> | S 2 | - | - | - | - | p | p |
| Gray-headed Tanager, <i>Eucometis penicillata</i> | R | f | - | - | - | - | - |
| Shiny Cowbird, <i>Molothrus bonariensis</i> | C 20 | f | - | - | - | p | p |
| Yellow-backed Oriole, <i>Icterus chrysater</i> | S | - | - | - | - | f | f |
| Eastern Meadowlark, <i>Sturnella magna</i> | C 6 | f | f | f | - | - | p |
| Streaked Saltator, <i>Saltator albicollis</i> | C 16 | - | - | - | - | f | f |
| Rose-breasted Grosbeak, ³ <i>Phenicticus ludovicianus</i> | S | - | f | - | - | - | f |
| Yellow-faced Grassquit, <i>Tiaris olivacea</i> | S | - | - | - | - | f | - |
| Black-faced Grassquit, <i>T. bicolor</i> | S | f | p | - | - | - | - |
| Gray Seedeater, <i>Sporophila intermedia</i> | S | - | - | - | - | f | - |
| Yellow-bellied Seedeater, <i>S. nigricollis</i> | C 30 | - | f | f | f | f | p |
| Ruddy-breasted Seedeater, <i>S. minuta</i> | C 30 | f | f | f | - | - | p |
| Andean Siskin, <i>Spinus spinescens</i> | S | f | f | - | - | p | p |
| Dark-backed Goldfinch, <i>S. psaltria</i> | A 80 | f | f | f | f | f | p |
| Rufous-collared Sparrow, <i>Zonotrichia capensis</i> | A 250 | f | fn | f | f | f | f |

(3) Bog: vegetation as in (2), heavily mixed with Acanthaceae.

(4) Marsh: mostly water hyacinth (*Eichornia azurea*) and Acanthaceae, with clumps of sedge and blackberry and with vegetation as in (2) along borders.

(5) Streams: running water bordered by vegetation as in (2).

(6) Coffee plantation: coffee plants in rows, about 3 or 4 feet apart and forming an almost continuous low (6 feet) leafy canopy, shaded by numerous banana plants (*Musa* sp.) and woody trees up to 50 feet high (see Table 1). The ground cover retains shrubs and ground plants of the original forest (Archer 1958).

(7) Paths: bordered and in places overgrown with blackberry, Melastomataceae, fique (*Forcrea* sp.), mint, Loganiaceae, loosestrife, mallow, madders, castor bean (*Ricinus communis*), legumes, *Rapanea*, and unidentified saplings.

(8) Groves: small clumps of trees (Table 1) found in the pasture on steep slopes, in very rocky places, and along stone fences. A few trees in thickets remain unidentified.

The relative abundances of different birds on the finca and their use of the habitats is shown in Table 2.

In addition to the birds listed in Table 2, three species were seen just once: Black-and-white Seed-eater (*Sporophila luctuosa*), Dark-billed Cuckoo (*Coccyzus melacoryphus*), and the migrant Northern Waterthrush (*Seiurus noveboracensis*). In the air above the finca one commonly sees Black Vultures (*Coragyps atratus*), occasionally Turkey Vultures (*Cathartes aura*) and, at dusk, White-collared Swifts (*Streptoprocne zonaris*). An owl, assumed to be *Otus* sp. because its call resembles *Otus asio*, is heard at night (*Otus choliba* has been collected in Santandercito by Olivares), and a migrant Broad-winged Hawk (*Buteo platypterus*) was seen several times, perched on telephone poles along the road above the finca.

DISCUSSION

Clearly the greatest factor affecting abundance of the birds on the finca is the use to which the land has been put. All the abundant species either feed directly in the open pasture (Rufous-collared Sparrow, Black-billed Thrush, Spectacled Parrotlet, Dark-backed Goldfinch), or in the air just above it (Blue-and-white Swallow).

On the other hand, the few trees left on the finca contribute to the variety of species in a significant manner. Together with the coffee-growing area with its trees, they make it possible for at least 50 species to exist at, or at least visit, the finca. This includes even so successful a ground-feeder as the Black-billed Thrush, which nests in trees and spends at least 10% of its waking time perching in them. In another part of Colombia, Puerto López, Meta, I have observed this species to be as boreal as its close relative, the Glossy-black Thrush (*Turdus serranus*), which suggests that its exploitation of open country is a recent adaptation. Even in Santandercito, the Black-billed Thrushes spend more time peering intently from elevations than on the ground. The scattered trees are important to all these ground-feeding birds. The two flocking species, Spectacled Parrotlets and Smooth-billed Ani, pro-

gress from tree to tree in approaching a feeding site. All, of course, use trees as refuges—I have even seen an Eastern Meadowlark take a perch in the top of a spurge to utter one of its melodious songs.

Despite the open character of the finca, exclusively arboreal species outnumber the ground-feeders. There are 19 ground-feeding species (including three flycatchers that are far from being exclusive ground-feeders); but 28 of the finca's species were never seen on the ground: Olivaceous Piculet, Red-crowned Woodpecker, Red-rumped Woodpecker, two Elaenia flycatchers, Wood Pewee, Sooty-headed Tyrannulet, Common Tody-Flycatcher, Band-backed Wren, Swainson's Thrush, Warbling Vireo, Scrub Greenlet, Tennessee Warbler, Blackburnian Warbler, Mourning Warbler, Bananaquit, Thick-billed Euphonia, Turquoise Dacnis-Tanager, Blue-necked Tanager, Bay-headed Tanager, Scrub Tanager, Black-capped Tanager, Blue-gray Tanager, Palm Tanager, Summer Tanager, White-lined Tanager, Yellow-backed Oriole, and Streaked Saltator.

A group of three 50-foot trees—a verbena and two spurges, together with two small guayabas (20 feet) and a mango, on a steep rocky slope in the midst of the pasture, with guayaba saplings below, and tangles of blackberry, Melastomataceae and mistletoe, on a favorable misty morning will harbor as many as 20 species of birds: Yellow-bellied Eleanias screeching and hopping along the lichen-covered branches in the top half of a 50-foot spurge; the short, sharp whistle of the Lesser Eleania; a Common Tody-Flycatcher ticking and trilling in the top of a guayaba, walking sideways on a slender branch; Blue-gray Tanagers picking insects from the undersides of 2-inch thick branches at the tops of the high trees; Scrub Tanagers searching leaves and epiphytes; a Vermilion Flycatcher sallying from an exposed low branch and a Tropical Kingbird from the top of the verbena; Pale-breasted Spinetails picking at the lichen; a Bar-crested Antshrike gleaning lower leaves; Rufous-collared Sparrows flying up from the grass below; cowbirds, anis, and parrotlets pausing in search of new pasture. The three large woodpeckers may be seen in any tree on the finca, and the little piculet may spend 20 min on a bare, horizontal branch, making holes and picking insects from beneath the bark.

During three mornings in late September, thrushes (*Turdus ignobilis*) and anis disputed an area of bog from which they both extracted large numbers of earthworms. (I saw one thrush devour three worms in less than 2 min.) The thrushes greatly outnumber the anis on the finca, but the anis, whose territory includes the finca and comparable areas to the north and west (i.e. about 1 km² or 240 acres), arrive together as a social group, and effortlessly chase away any other birds. (A typical

confrontation was six thrushes vs. nine anis.) Communicating with each other by means of whistled signals, which include warnings of intruding animals and humans from lookout posts, the anis are aggressive against other birds. The only other species observed feeding with them was the Shiny Cowbird.

Mistletoe (*Loranthaceae* sp.) that fruited in a sapium tree at the end of October (drupes 0.4 inches in diameter, green-skinned, with red arils and yellowish flesh) attracted 21 species of birds. The great number of tanagers, with as many as eight rarely seen Palm Tanagers in the tree at one time, and several Turquoise Dacnis-Tanagers never before observed at the finca, inspired an investigation of the surrounding territory. Four forays were made into the Cordillera Subía to an altitude of 2200 m, 3 km (1.8 miles) south of the finca. An extensive (15- to 20-acre) swamp in this region, heavily overgrown with *Cecropia*, tree ferns, and *Miconia*, and bordering a steep, forested slope, shelters a large population of tanagers. Except for the Blue-gray, Crimson-backed, and Scrub Tanagers, all those tanagers known at the finca were found in far greater numbers (population density). In addition, others were common that had never been seen at the finca: Beryl-spangled Tanager (*Tangara nigroviridis*), Metallic-green Tanager (*T. labradorides*), Golden-naped Tanager (*T. ruficervix*), Blue-and-black Tanager (*T. vasorii*), Golden Tanager (*T. arthus*), Blue-capped Tanager (*Thraupis cyanocephala*), and Oleaginous Hemispingus (*Hemispingus frontalis*).

This region was also rich in a number of other birds unknown at the finca: Lesser Swallow-tailed Swift (*Panyptila cayannensis*), Collared Inca (*Coeligena torquata*), Bronzy Inca (*C. coeligena*), Green Violetear (*Colibri thalassinus*), Cinnamon Flycatcher (*Pyrrhomysias cinnamomea*), Gray-breasted Wood-Wren (*Henicorhina leucophrys*), Glossy-black Thrush, Slate-throated Redstart (*Myioborus miniatus*), Golden-winged Warbler (*Vermivora chrysoptera*), Tropical Parula (*Parula pitiayumi*), Russet-crowned Warbler (*Basileuterus coronatus*), Three-striped Warbler (*B. tristriatus*), Black-and-white Warbler (*Mniotilta varia*), White-sided Flower-Piercer (*Diglossa albilatera*), Slaty Brush-Finch (*Atlapetes schistaceus*), and Moustached Brush-Finch (*A. albofrenatus*).

Visits to the river at the bottom of the valley (1500 m) revealed only two birds unknown at the finca: Black Phoebe (*Sayornis nigricans*), and the parasitic Striped Cuckoo (*Tapera naevia*). However, a number of other species have been collected around the bottom of the valley by the National University in Bogotá since 1950. Table 3 indicates the birds found at the finca and contiguous regions by the author and others.

TABLE 3
BIRDS OF THE FINCA AND SURROUNDING AREAS¹

| Species | Collected Below in Subía finca | | | | Below finca pre-1971 |
|---|-----------------------------------|-------------------------|--------------------------------------|---------------------------------------|----------------------------|
| | Finca 1700 m 1973 | Subía 2200 m 1973 | 1910-15 to river by Chapman | 1910-15 to river 1500 m 1973 | |
| Black Vulture, <i>Coragyps atratus</i> | A | A | - | A | - |
| Turkey Vulture, <i>Cathartes aura</i> | R | - | - | - | - |
| Broad-winged Hawk, ² <i>Buteo platypterus</i> | - | X | - | - | - |
| Andean Guan, <i>Penelope montagnii</i> | - | - | 4 | - | - |
| Crested Bobwhite, <i>Colinus cristatus</i> | - | - | 1 | - | - |
| Gorgeted Wood-Quail, <i>Odontophorus strophium</i> | - | - | 1 | - | - |
| Rufous-sided Crane, <i>Laterallus melanophaius</i> | R | - | - | - | O |
| Eared Dove, <i>Zenaida auriculata</i> | - | - | - | - | O |
| Common Ground-Dove, <i>Columbina passerina</i> | - | - | - | - | O |
| Ruddy Ground-Dove, <i>C. talpacoti</i> | C | - | - | C | - |
| White-tipped Dove, <i>Leptotila verreauxi</i> | S | - | - | S | O |
| Flame-winged Parakeet, <i>Pyrrhura calliptera</i> | - | - | 7 | - | - |
| Spectacled Parrotlet, <i>Forpus conspicillatus</i> | A | A | - | A | O |
| Squirrel Cuckoo, <i>Piaya cayana</i> | - | - | 2 | - | - |
| Smooth-billed Ani, <i>Crotophaga ani</i> | C | C | - | C | O |
| Striped Cuckoo, <i>Tapera naevia</i> | - | - | - | h | - |
| Semicollared Nighthawk, <i>Lurocalis semitorquatus</i> | - | - | 3 | - | - |
| White-collared Swift, <i>Streptoprocne zonaris</i> | C | - | - | - | - |
| Lesser Swallow-tailed Swift, <i>Panyptila cayennensis</i> | - | C | - | - | - |
| Green Hermit, <i>Phaethornis guy</i> | S | - | - | - | - |
| Pale-bellied Hermit, <i>P. anthophilus</i> | - | - | - | - | O |
| White-tipped Sicklebill, <i>Eutoxeres aquila</i> | S | - | - | - | - |
| Green Violetear, <i>Colibri thalassinus</i> | - | C | - | - | - |
| Sparkling Violetear, <i>C. coruscans</i> | S | C | - | - | - |
| Black-throated Mango, <i>Anthracothorax nigricollis</i> | C | - | - | C | O |
| Red-billed Emerald, <i>Chlorostilbon gibsoni</i> | - | - | - | - | O |
| Fork-tailed Woodnymph, <i>Thalurania furcata</i> | C | C | - | C | - |
| Violet-bellied Hummingbird, <i>Damophila julie</i> | R | - | - | - | - |
| Indigo-capped Hummingbird, <i>Amazilia cyaniifrons</i> | S | - | - | - | O |
| Rufous-tailed Hummingbird, <i>A. tzacatl</i> | C | - | - | C | O |
| White-vented Plumeleteer, <i>Chalybura buffonii</i> | - | - | - | - | O |
| Bronzy Inca, <i>Coeligena coeligena</i> | - | C | - | - | - |
| Collared Inca, <i>C. torquata</i> | - | C | - | - | - |
| White-bellied Woodstar, <i>Acestrura mulsant</i> | C | C | - | - | O |
| Emerald Toucanet, <i>Aulacorhynchus prasinus</i> | - | - | 8 | - | O |
| Black-billed Mountain-Toucan, <i>Andigena nigrirostris</i> | - | - | 4 | - | - |
| Olivaceous Piculet, <i>Picumnus olivaceus</i> | R | - | - | R | O |

¹ X = observed, but insufficiently to judge abundance; h = heard only; A = abundant; C = common; S = scarce; R = rare; O = Collected by Olivares.

² Migrant.

TABLE 3—Continued

| Species | Finca | Subia | Collected Below | | Below finca pre-1971 |
|---|----------------|----------------|--------------------------|----------------------------|----------------------------|
| | 1700 m 1973 | 2200 m 1973 | 1910-15 by Chapman | to river 1500 m 1973 | |
| Spot-breasted Woodpecker, <i>Chrysoptilus punctigula</i> | C | — | — | — | O |
| Crimson-mantled Woodpecker, <i>Piculus rivolii</i> | — | — | 1 | — | — |
| Red-crowned Woodpecker, <i>Melanerpes rubricapillus</i> | C | C | — | C | — |
| Red-rumped Woodpecker, <i>Veniliornis kirkii</i> | R | — | — | — | — |
| Strong-billed Woodcreeper, <i>Xiphocolaptes promeropirhynchus</i> | — | — | 3 | — | — |
| Pale-breasted Spinetail, <i>Synallaxis albescens</i> | C | C | — | — | O |
| Slaty Spinetail, <i>S. brachyura</i> | — | — | — | — | O |
| Ash-browed Spinetail, <i>Cranioleuca curtata</i> | S | X | — | — | O |
| Bar-crested Antshrike, <i>Thamnophilus multistriatus</i> | S | — | — | — | O |
| Uniform Antshrike, <i>T. unicolor</i> | — | — | 2 | — | — |
| Chestnut-crowned Antpitta, <i>Grallaria ruficapilla</i> | — | h | — | — | — |
| Green-and-black Fruiteater, <i>Pipreola riefferii</i> | — | — | 6 | — | — |
| Dusky Piha, <i>Lipaugus fuscocinereus</i> | — | — | 1 | — | — |
| Cinereous Becard, <i>Pachyramphus rufus</i> | — | — | — | — | O |
| Black Phoebe, <i>Sayornis nigricans</i> | — | — | — | C | O |
| Pied Water-Tyrant, <i>Fluvicola pica</i> | — | — | — | — | O |
| Vermilion Flycatcher, <i>Pyrocephalus rubinus</i> | C | C | — | C | O |
| Tropical Kingbird, <i>Tyrannus melancholicus</i> | C | C | 2 | C | — |
| Boat-billed Flycatcher, <i>Megarhynchus pitangua</i> | — | — | — | — | O |
| Rusty-margined Flycatcher, <i>Myiozetetes cayanensis</i> | S | X | — | C | O |
| Great Kiskadee, <i>Pitangus sulphuratus</i> | C | — | — | — | — |
| Wood Pewee, ² <i>Contopus virens</i> | C | — | — | — | — |
| Ornate Flycatcher, <i>Myiobicicus ornatus</i> | — | — | 1 | — | — |
| Cinnamon Flycatcher, <i>Pyrrhomyias cinnamomea</i> | — | X | — | — | — |
| Bran-colored Flycatcher, <i>Myiophobus fasciatus</i> | — | — | — | — | O |
| Yellow-olive Flycatcher, <i>Tolmomyias sulphurescens</i> | — | — | — | — | O |
| Common Tody-Flycatcher, <i>Todirostrum cinereum</i> | C | — | — | C | O |
| Torrent Tyrannulet, <i>Serpophaga cinerea</i> | C | — | — | C | O |
| Yellow-bellied Elaenia, <i>Elaenia flavogaster</i> | C | — | — | C | O |
| Lesser Elaenia, <i>E. chiriquensis</i> | S | — | — | — | — |
| Mountain Elaenia, <i>E. frantzii</i> | — | — | 3 | — | — |
| Mouse-colored Tyrannulet, <i>Phaeomyias murina</i> | — | — | — | — | O |
| Sooty-headed Tyrannulet, <i>Phyllomyias griseiceps</i> | S | X | — | X | O |
| Blue-and-white Swallow, <i>Notiochelidon cyanoleuca</i> | A | X | — | — | O |
| Rough-winged Swallow, <i>Stelgidopteryx ruficollis</i> | S | X | — | X | — |
| Green Jay, <i>Cyanocorax yncas</i> | — | — | 1 | — | — |

TABLE 3—Continued

| Species | Finca 1700 m 1973 | Subía 2200 m 1973 | Collected Below in Subía finca | | Below finca pre-1971 |
|--|-------------------------|-------------------------|-----------------------------------|----------------------------|----------------------------|
| | | | 1910-15 by Chapman | to river 1500 m 1973 | |
| Band-backed Wren, <i>Campylorhynchus zonatus</i> | S | - | - | - | - |
| House Wren, <i>Troglodytes aedon</i> | C | C | - | C | O |
| Gray-breasted Wood-Wren, <i>Hemicorhina leucophrys</i> | - | X | 4 | - | - |
| Tropical Mockingbird, <i>Mimus gilvus</i> | C | X | - | C | O |
| Swainson's Thrush, ² <i>Catharus ustulatus</i> | S | X | - | - | O |
| Glossy-black Thrush, <i>Turdus serranus</i> | - | C | 1 | - | - |
| Black-billed Thrush, <i>T. ignobilis</i> | A | X | - | X | O |
| Paramo Pipit, <i>Anthus bogotensis</i> | - | - | 1 | - | - |
| Rufous-browed Peppershrike, <i>Cyclarhis gujanensis</i> | S | - | - | X | - |
| Warbling Vireo, <i>Vireo gilvus</i> | C | X | - | X | O |
| Scrub Greenlet, <i>Hylophilus flavipes</i> | S | - | - | - | O |
| Black-and-white Warbler, ² <i>Mniotilta varia</i> | - | X | - | - | - |
| Golden-winged Warbler, ² <i>Vermivora chrysoptera</i> | - | X | - | - | - |
| Tennessee Warbler, ² <i>V. peregrina</i> | C | - | - | - | - |
| Tropical Parula, <i>Parula pitiayumi</i> | - | X | - | - | - |
| Yellow Warbler, ² <i>Dendroica petechia</i> | S | - | - | - | - |
| Blackburnian Warbler, ² <i>D. jusca</i> | C | C | - | C | - |
| Northern Waterthrush, ² <i>Seiurus noveboracensis</i> | S | - | - | - | - |
| Mourning Warbler, ² <i>Geothlypis philadelphia</i> | S | - | - | - | - |
| Canada Warbler, ² <i>Wilsonia canadensis</i> | S | X | - | - | - |
| Slate-throated Redstart, <i>Myioborus miniatus</i> | - | X | - | - | - |
| Citrine Warbler, <i>Basileuterus luteoviridis</i> | - | - | 1 | - | - |
| Three-striped Warbler, <i>B. tristriatus</i> | - | X | - | - | - |
| Rufous-capped Warbler, <i>B. rufifrons</i> | S | - | - | C | O |
| Russet-crowned Warbler, <i>B. coronatus</i> | - | C | 3 | - | - |
| River Warbler, <i>B. rivularis</i> | S | - | - | h | O |
| Bananaquit, <i>Coereba flaveola</i> | C | X | - | X | O |
| Rufous-browed Conebill, <i>Conirostrum rufum</i> | - | - | 1 | - | - |
| Capped Conebill, <i>C. albifrons</i> | - | - | 2 | - | - |
| Slaty Flower-Piercer, <i>Diglossa baritula</i> | R | - | - | - | - |
| White-sided Flower-Piercer, <i>D. albilatera</i> | - | X | - | - | - |
| Thick-billed Euphonia, <i>Euphonia lanurostris</i> | S | X | - | X | O |
| Fawn-breasted Tanager, <i>Pipraeidea melanonota</i> | S | X | 1 | X | - |
| Turquoise Dacnis-Tanager, <i>Pseudodacnis hartlaubi</i> | S | X | - | - | - |
| Golden Tanager, <i>Tangara arthus</i> | - | C | 6 | - | - |
| Saffron-crowned Tanager, <i>T. xanthocephala</i> | - | - | 7 | - | - |
| Flame-faced Tanager, <i>T. parzudakii</i> | - | - | 7 | - | - |
| Metallic-green Tanager, <i>T. labradorides</i> | - | C | 6 | - | - |
| Blue-necked Tanager, <i>T. cyanicollis</i> | C | C | - | - | - |
| Golden-naped Tanager, <i>T. ruficervix</i> | - | C | - | - | - |
| Bay-headed Tanager, <i>T. gyrola</i> | C | X | - | X | O |
| Scrub Tanager, <i>T. vitriolina</i> | C | X | 5 | X | O |

TABLE 3—Continued

| Species | Finca 1700 m 1973 | Subía 2200 m 1973 | Collected Below in Subía finca | | Below finca pre-1971 |
|---|-------------------------|-------------------------|-----------------------------------|----------------------------|----------------------------|
| | | | 1910-15 by Chapman | to river 1500 m 1973 | |
| Beryl-spangled Tanager, <i>T. nigroviridis</i> | — | C | 6 | — | — |
| Blue-and-black Tanager, <i>T. vassorii</i> | — | C | — | — | — |
| Black-capped Tanager, <i>T. heinei</i> | S | C | 7 | — | — |
| Blue-winged Mountain-Tanager, <i>Anisognathus flavinucha</i> | — | — | 7 | — | O |
| Buff-breasted Mountain-Tanager, <i>Dubusia taeniata</i> | — | — | 1 | — | — |
| Blue-gray Tanager, <i>Thraupis episcopus</i> | C | X | — | X | O |
| Palm Tanager, <i>T. palmarum</i> | S | C | — | — | — |
| Blue-capped Tanager, <i>T. cyanocephala</i> | — | C | 1 | — | — |
| Crimson-backed Tanager, <i>Ramphocelus dimidiatus</i> | C | X | — | C | O |
| Summer Tanager, ² <i>Piranga rubra</i> | S | — | — | — | O |
| White-lined Tanager, <i>Tachyphonus rufus</i> | S | — | — | — | O |
| Gray-headed Tanager, <i>Eucometis penicillata</i> | R | — | — | — | — |
| Rose-breasted Thrush-Tanager, <i>Rhodinocichla rosea</i> | — | — | — | — | O |
| Oleaginous Hemispingus, <i>Hemispingus frontalis</i> | — | X | 4 | — | — |
| Shiny Cowbird, <i>Molothrus bonariensis</i> | C | X | — | X | — |
| Mountain Cacique, <i>Cacicus leucorhamphus</i> | — | — | 2 | — | — |
| Yellow-backed Oriole, <i>Icterus chrysater</i> | S | X | — | X | O |
| Eastern Meadowlark, <i>Sturnella magna</i> | C | X | — | X | — |
| Streaked Saltator, <i>Saltator albicollis</i> | C | X | — | X | O |
| Black-backed Grosbeak, <i>Pheucticus aureoventris</i> | — | — | 2 | — | — |
| Rose-breasted Grosbeak, ² <i>P. ludovicianus</i> | S | — | — | — | — |
| Yellow-faced Grassquit, <i>Tiaris olivacea</i> | S | C | — | — | O |
| Black-faced Grassquit, <i>T. bicolor</i> | S | — | — | — | O |
| Gray Seedeater, <i>Sporophila intermedia</i> | S | — | — | X | O |
| Dull-colored Seedeater, <i>S. obscura</i> | — | — | — | — | O |
| Black-and-white Seedeater, <i>S. luctuosa</i> | R | — | — | — | — |
| Yellow-bellied Seedeater, <i>S. nigricollis</i> | C | X | — | X | O |
| Ruddy-breasted Seedeater, <i>S. minuta</i> | C | — | — | X | O |
| Andean Siskin, <i>Spinus spinescens</i> | S | X | — | — | O |
| Dark-backed Goldfinch, <i>S. psaltria</i> | A | X | 1 | C | O |
| Yellow-throated Brush-Finch, <i>Atlapetes gutturalis</i> | — | — | 1 | — | — |
| Moustached Brush-Finch, <i>A. albofrenatus</i> | — | X | — | — | — |
| Slaty Brush-Finch, <i>A. schistaceus</i> | — | X | — | — | — |
| Black-striped Sparrow, <i>Arremonops conirostris</i> | — | — | — | — | O |
| Rufous-collared Sparrow, <i>Zonotrichia capensis</i> | A | X | — | A | O |

CONCLUSIONS

Clearing has reduced or extirpated from the finca area populations of species that formerly presumably occurred there. Before the land was disturbed it probably supported a heavy population of tanagers of the genus *Tangara*, along with the Turquoise Dacnis-Tanager, Oleaginous Hemispingus, and Green Violetear Hummingbird at least as low as the altitude of the finca. Some birds exclusively of the Subía—Blue-capped Tanager, Slaty Brush-Finch, Gray-breasted Wood-Wren, and the two Inca hummingbirds—probably did not range as low as the finca because they seem to prefer slightly cooler weather. (Elsewhere, I observed these species only at altitudes higher than the finca. The Inca hummingbirds at La Aquadita, Cundinamarca, 2000 m; the Gray-breasted Wood-Wren and Slaty Brush-Finch at Quebrada del Chicó, Bogotá, 2500 m; and the White-sided Flower-Piercer, Blue-capped Tanager, and Gray-breasted Wood-Wren at San Lorenzo, Sierra Nevada de Santa Marta, 2200 m.)

The limited number of visits to sites above and below the finca prohibit any assumption that birds formerly collected in those areas and not recently seen are no longer there.

The population of ground-feeding birds of open areas has increased. The Rufous-collared Sparrow, for example, is unknown in the forest. On the other hand, forest ground-feeders have disappeared.

Arboreal species of open or semiopen habitats have maintained their numbers: Common Tody-Flycatcher, Russet-crowned Warbler, Blue-gray Tanager, Crimson-backed Tanager, and Scrub Tanager; and one, Black-billed Thrush, has apparently benefited by becoming more of a ground-feeder.

Areas unsuitable for cultivation or pasture (marshes, bogs, boulders, steep slopes) provide circumscribed habitats favorable to some species of birds:

(1) herbs that escape cropping by cattle provide food for seedeaters and other finches. Thus, were the finca entirely flat, rockless pasture uniformly used by cattle and horses, seedeaters would be scarcer;

(2) the marsh shelters the Rufous-sided Crake;

(3) trees have been left, or allowed to grow, on steep slopes and among large boulders;

(4) high herbs, and the marshes and bogs themselves, favor greater variety and number of insects, other invertebrates, small amphibians and reptiles.

The Subía secondary forests and remnants of humid forests act as a preserve for some humid forest species that would otherwise disappear from the region. Of the 13 tanagers seen on the finca, for example, only

five birds of open or semiopen habitats appear to nest there: Blue-gray, Crimson-backed, Scrub, and White-lined Tanagers, and Thick-billed Euphonia.

The Subía forests, coffee groves, and scattered finca trees provide habitats for North American migrants.

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SUMMARY

Birds on a finca in central Colombia, in an area of former humid tropical and subtropical forest in the eastern Andes (altitude 1700 m), were studied for 123 days over a period of 9 months. Comparison with avifauna in nearby existing forest revealed several significant differences. The most plentiful birds on the finca were ground-feeders, and among them were species unknown in the forest. The few remaining trees, patches of terrain unsuitable to cultivation or pasture, and the coffee grove contributed greatly to the variety of species. Of the 82 birds known on the finca, most could not exist without trees and, among them, 28 were exclusively arboreal.

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