A Revised List of Birds of Barro Colorado Island, Panama

EDWIN O. WILLIS

and

EUGENE EISENMANN

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A Revised List of Birds
of Barro Colorado Island, Panama

Edwin O. Willis
and Eugene Eisenmann

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ABSTRACT

Willis, Edwin O., and Eugene Eisenmann. A Revised List of Birds of Barro Colorado Island, Panama. *Smithsonian Contributions to Zoology*, number 291, 31 pages, 1 figure, 1979.—Three hundred and sixty-six species of birds have been recorded on or near Barro Colorado Island, a 14.8 km² forested area in Gatun Lake in the Panama Canal Zone. Of these 366 species, 217 breed or formerly bred on the island; 11 of the 217 are birds of the edge of Gatun Lake rather than land birds. Migrants breeding in North or South America number 83 species, including 25 from the lake.

Nine of the 217 resident species immigrated to the island from nearby lowland areas since the early 1950s, but four of the nine have already disappeared. In addition to the four lost immigrants, 51 formerly resident species have disappeared from the island, leaving 162 species resident in 1977. Most of the extirpated former residents have been lost because of growth of forest and consequent loss of second-growth habitats. Some 16 of the 51 extirpated species seem to be birds of forest; their loss may be due to the small size of the island and to tendencies for small remnants of forest to retain few species.

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## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>1</td>
</tr>
<tr>
<td>Recent Geographical and Ecological History</td>
<td>1</td>
</tr>
<tr>
<td>Lake and Lake Shore</td>
<td>2</td>
</tr>
<tr>
<td>Clearings and Forest Borders</td>
<td>2</td>
</tr>
<tr>
<td>Forests</td>
<td>2</td>
</tr>
<tr>
<td>Climate, Plants, and Animals</td>
<td>4</td>
</tr>
<tr>
<td>Ornithological Studies</td>
<td>4</td>
</tr>
<tr>
<td>Comments on the Annotated List</td>
<td>5</td>
</tr>
<tr>
<td>Loss of Species</td>
<td>6</td>
</tr>
<tr>
<td>Annotated List</td>
<td>8</td>
</tr>
<tr>
<td>Literature Cited</td>
<td>30</td>
</tr>
</tbody>
</table>
A Revised List of Birds of Barro Colorado Island, Panama

Edwin O. Willis
and Eugene Eisenmann

Introduction

The birds of Barro Colorado Island, a reserve of about 1480 ha (3650 acres) of tropical forest in Gatun Lake in the Panama Canal Zone, have been studied at various times over the past fifty years (Chapman, 1929, 1938; Eisenmann, 1952). Recently, Willis (1974) found that some species of birds were disappearing from the island. Here we document this process of change, and bring a list of the birds for the island up to date as of April 1978, using published and unpublished records of many observers. We briefly outline the recent history of the island, lake, and vegetation, and we summarize ornithological studies. In the annotated list of species, we give present and former status of birds, breeding records, and comments on habitats as indicating possible reasons for status or changes in status. Comparisons are chiefly with the status and habitats reported by Eisenmann (1952) and Chapman (1938).

Acknowledgments.—Barro Colorado Island has become internationally famous as a biological reserve and attracts visitors from throughout the world—often for their first experience with the American tropics. For records of birds, we are indebted to many such visitors, too numerous to list here by name. When we use a record for the annotated list, the name of the observer is given.

For sponsoring studies on Barro Colorado Island,

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Recent Geographical and Ecological History

Barro Colorado Island is a forested hilltop that reaches 164 m (540 ft) elevation. It is centered just southwest of 9°10'N and 79°50'W, at about 25 km south of the Caribbean Sea and 32 km northwest of the Pacific Ocean, on the Atlantic slope of central Panama. It is irregular in shape, and ranges from about three to six km in diameter. Originally a part of the lowland forest, between 1912 and 1914 it was isolated when the large artificial Gatun Lake rose to about 26 m (85 ft) behind Gatun Dam on the central Chagres River to form the central part of the Panama Canal. At several places, mainland forest is less than one kilometer from the island.

The island became a biological reserve on 17 April 1923, and a few farmers who had cleared small areas were paid for their claims (Chapman, 1938). Presently it is managed by the Smithsonian Tropical Research Institute. Except for small clearings for a laboratory and for navigation lights and markers along shore, and for some 40 km of named trails marked (for the most part) every 100 m by signposts, the forest has been allowed to grow. This does not mean that the habitats and birdlife have
remained the same, as the following paragraphs show for the main habitats and the annotated list shows for the birds.

Lake and Lake Shore.—Gatun Lake and its borders have changed for two reasons: growth of extensive mats of introduced water weeds (Hydrilla species) since 1965; and spread of a cichlid fish known as “peacock bass” (Cichla ocellaris), efficient fish-eaters introduced about 1971 that have eliminated the prey of certain fish-eating birds (Zaret and Paine, 1973). As is detailed in the annotated list, the growth of Hydrilla added Common Gallinules and increased populations of some other birds, but the spread of peacock bass eliminated many herons, kingfishers, terns, and gulls.

Prior to declines in bird numbers due to competition with the peacock bass, the lake attracted many offshore birds in the rainy season (May–December). Flocks of Black Terns and Laughing Gulls joined tarpon (Tarpon atlanticus) in chasing small fish (Melaniris chagresi), and at times Parasitic Jaegers pursued the gulls. There may have been greater nutrient supplies and hence greater plankton and fish productivity in the rainy season. The absence of dry season choppiness (a result of northeast trade winds) may also have favored offshore birds in the wet season.

Along less exposed shores, there are submerged water weeds (formerly Chara species, now Hydrilla), and shore communities of floating grasses or emergents are gradually spreading as rainy season floods wash material into certain coves, such as opposite the ends of Shannon and Pearson trails. Shaded inlets lack aquatic vegetation, and are slowly filling with debris from the forest. The “esteros” referred to in Barro Colorado literature are long narrow inlets, actually drowned stream valleys. Exposed shores range from shelving cliffs to short rocky or muddy beaches, which attract only a few migrant sandpipers and waterthrushes.

Clearings and Forest Borders.—Grassy or weedy clearing, near navigation lights off Miller Trail and around a house at the end of Drayton Trail are cleared regularly. Tiny clearings for navigation signs and bush-overgrown former house sites at the ends of Barbour, Harvard, and Zetek trails also attract occasional birds of open habitats. The 66-km shoreline (measured from a 1927 map) forms an edge that attracts certain flycatchers and other birds of forest edge or open areas. Wind and treefall damage along exposed shores and on some ridges, such as near Wheeler Trail 8, keeps some forest fringes in a perpetually immature state. Within the forest, there are some large treefalls. The main area for open-country or forest-edge birds, and certainly the best-explored one, is the 2-ha (5-acre) laboratory clearing.

The laboratory clearing has become less open since a banana plantation north of the dock was allowed to revert to second growth in 1957, and canopy and forest-edge birds regularly cross it. Several birds of bushy and grassy areas, still common at Frijoles across the lake or on 4-ha (10-acre) Mona Grita Island near Burrunga Point (sometimes called Harvard Point), have disappeared from the clearing in recent years. Bushy undergrowth near little-used animal cages at Allee Creek north of the laboratory, and a weir-tower complex for environmental surveillance (Windsor, 1975) by Lutz Creek south of the laboratory, appear to repel some forest birds but do not attract those of disturbed areas.

Forests.—The forests of the island may be divided into old forest and young forest. Some 705 ha (much of the southwestern half of the island, plus some small areas near the laboratory) are in old forest, according to planimetric analysis of a map (Figure 1) kindly furnished by a plant ecologist, Robin B. Foster. Bennett (1963) suggests that Indians must have cleared much of this region before the Spanish conquest, and Knight (1975) thinks that old forests may be only 150 years old and still changing in species composition. For earlier views of the successional ecology, see Kenoyer (1929). In general aspect, the old forests seem to be changing little except for local regrowth following treefalls. Huge espave (Anacardium excelsum), almendro (Dipteryx panamensis), cativo (Priora copaifera), and ceiba (Ceiba pentandra), or other trees, are scattered through a patchwork of treefalls of various ages. Dense patches of wild pineapple (Ananas magdalenae) clutter the undergrowth in places. A clump-forming palm (Oenocarpus panamensis) is often common in the understory.

Young forests, some 770 ha on the northeastern half of the island or on points, have been growing for 50–80 years (Knight, 1975). Although they have some of the same plants as old forest, they seem to vary less than do old forests, perhaps because they are even-aged rather than a patchwork of treefall
zones. Generally they are uncluttered, except on windy ridges or edges where lianas loop through low vegetation. More trees are deciduous than in old forest, so that more light reaches the understory in the dry season. These forests have opened out underneath, increased in height, and changed in species over the years we have visited Panama.

The low stature of young forest is generally attributed to former agricultural use. Knight (pers. comm.) found one old resident who said that a windstorm felled much of the forest on Barbour Point in 1919, which could be an alternative explanation. Piles of bottles and evidence of houses near Wheeler Trail 8 and Lake Trail 5 indicate, however, that previous human use is likely to be the main reason why the young forest is under 100 years old.

In some places, such as the escarpment west of Conrad Trail 2, landslides and treefalls create large clearings, soon growing up to scrub or young forest, within the borders of old or young forest. Several days of drizzling rain in November 1959 caused numerous landslides; the south edge of the laboratory clearing is the site of one such major slide. On 1 October 1961, a windstorm that came up from the south toppled scattered groups of trees.
in old forest and created habitats that encouraged an increase in treefall birds (Willis and Oniki, 1972); a large treefall north of Zetek Trail 23 resulted from a 1973 storm. Normal northerly to easterly (rainy season) or northeasterly (dry season) winds have less effect.

Forest streams on the island dry up or become chains of pools in the dry season, as does a forest-shaded swamp of wild pineapple north of Armour Trail on the central and flat basalt cap of the island. The best streams, including small floodplains, are below American Museum Trail 3. A few herons, Pygmy Kingfishers, and wintering waterthrushes are nearly the only birds that use streams for feeding. Steep-walled canyons in the Bohio Conglomerate around the basalt cap provide humid forest zones favored by some birds (Willis, 1973b); the flat Caimito Formation of Barbour Point (Woodring, 1958) favors other species, such as Gray-headed Tanagers among the ant-following birds.

CLIMATE, PLANTS, AND ANIMALS.—The average annual rainfall (1925–1971) is about 2600 mm (106 in.); October and November are the rainiest months. The four warmer dry season months, January through April, supply only about 211 mm (8.5 in) of this total. Fluctuations from year to year and away from the mean for a given month are to be expected, with some rainy seasons (1968, for example) only six months long (Willis, 1974). Occasional dry weather in the rainy season marks hurricane weather to the north, while occasional frontal drizzles or downpours in the dry season mark cold waves to the north. Heavy rains in the 1970 dry season caused early flowering of almendro trees, but fruit failed to set because pollinators were absent; mammals that normally would have eaten almendros the following December starved or tore up wild pineapples and tree bark (Robin B. Foster, pers. comm.). Chapman (1958) records a similar period of starvation that brought white-lipped peccaries (Tayassu pecari) to the clearing. Little is known about the effects of such climatic or mammalian fluctuations on birds.

Some mammal and reptile populations have changed since the island became a reserve, and may compete with or prey on birds. White-faced monkeys (Cebus capucinus) and reintroduced spider monkeys (Ateles geoffroyi) may rob nests of birds or compete with them for food. Such mammals as white-lipped peccaries appear to have died out, but coatimundis (Nasua narica) and agoutis (Dasyprocta agouti) are flourishing. Puma (Felis concolor) are gone, but ocelots and jaguarundis (F. pardalis and F. yagouarundi) or tayras (Eira barbara) are occasionally seen. Myers and Rand (1969) note that some frogs and lizards have disappeared, but some snakes are very numerous—especially the nest-robbing Pseustes poecilonotus and Spilotes pullatus. Barro Colorado has unusually high nest-predation rates (Y. Oniki, MS), and there may be many small nest-robbers because of losses of large predators like pumas.

Little is known of changes in insect or plant populations over the years. Since 1965, the hydrilla mats have greatly increased populations of a mosquito, Anopheles albitarsus, whose larvae puncture the water plants for air. Such mosquitoes may be vectors for avian disease.

Ornithological Studies

Eisenmann (1952) has reviewed the early ornithological history (with bibliography) of Barro Colorado Island, so it is not repeated here. He visited the island many times from 1937 to 1951 (when his paper was completed), almost annually from 1952 to 1967, and was present for a day and a half in 1974; Barro Colorado data are included in several of his later papers (e.g., 1955, 1961, 1970). Johnson (1953, 1954) visited in 1948 and worked chiefly on mixed insectivorous bird flocks. C. B. Koford had charge of the island during the year 1956–1957; he netted and banded a number of birds, some of which provided interesting recaptures many years later (Crebbs, 1955). Martin H. Moynihan took charge of Barro Colorado in 1957 and his supervision continued until the mid-1970's; most of his work with birds was done off the island, but Moynihan (1960, 1962) and helpers did important studies of mixed flocks of tanagers and honeycreepers about the clearing, and, with the assistance of T. C. Crebbs, Jr., did some netting and banding on and near the Island. Neal G. Smith, another Smithsonian Tropical Research Institute scientist, who arrived in 1963 and contributed observations to this paper, has done his ornithological work chiefly off the island, particularly in relation to brood parasites and their hosts (see 1968). Meanwhile, Willis worked on the island every year from 1960

Other recent workers have included Kilham (1972) on woodpeckers; Leck (1972, 1975) on fruit-eating birds and bird weights; Oniki (1972, 1975) on bird temperatures and on Slaty Antshrikes; Ricklefs (1969, 1971) on nesting mortality and Mangrove Swallows; Wiley (1971), and J.N.M. Smith later in the 1970’s, on antwren flocks; W. John Smith (1966) and coworkers during the 1960’s to 1978 on flycatchers and caciques; and Michael Perrone during 1972–1973 on peacock bass and lakeshore birds. E. S. Morton (1971, 1973, 1975, 1977) did some of his work on bird vocalizations, fruit-eating birds, food of migrants, and wren behavior on the islands. Wetmore’s multi-volume Panama work (1965, 1968, 1972) contains numerous references to birds on Barro Colorado; and this is true of books and papers by many other authors. Skutch (1971 list) still publishes papers including material based on his early work on Barro Colorado, so that the bird publications from work done in the 1930s still outnumber publications from the second peak of research in recent years.

A Christmas census from Frijoles to Barro Colorado (Leck and Wilson, 1970) is useful but incomplete. Slud (1976) censused birds on the island briefly in 1966, but did not list species. Another census (MacArthur, Recher, and Cody, 1966) lacked comparability because of several misidentifications, including wrens for antwrens, and Myiarchus panamensis for M. crinitus. Even with a new Panama field guide (Ridgely, 1976; for some additional illustrations see Davis, 1972) the identification of tropical forest birds can be difficult. We have tried to be careful about accepting records of birds for the present list, but realize that occasional errors of identification may have been included. In questioning or rejecting the inclusion of a few species listed by Chapman (1987) or Eisenmann (1952), we have taken into consideration the previous experience in the neotropics of the observers who made the sight identifications, and the fact that at the time Panama bird distribution was very inadequately known and there was no guide for field identification covering all the species likely to occur on Barro Colorado Island or indicating their usual habitat. Even today distinguishing certain species in the field is difficult, and much remains to be learned as to habitat niche and details of distribution of many Canal Zone birds.

Comments on the Annotated List

The following list gives 366 kinds of birds that have been recorded on Barro Colorado Island. Asterisks mark birds that have been collected on the island. In view of the long-existing policy not to collect animals, lack of a specimen has little significance. Existence of a specimen need not mean that the species still occurs, and should never justify casual identification. Nomenclature and sequence of names follow Ridgely (1976). The annotations give relative abundance or specific records with dates, habitats, common vocalizations syllabized by Willis (unless otherwise specified), and breeding records. Details of many early breeding records and a number of additional vocalizations or different syllabizations are given by Eisenmann (1952). Ridgely (1976) also gives many other vocalizations, usually drawn from information provided by Eisenmann. Symbols indicate if a species is a breeding resident (R), occasional vagrant (V) from the mainland or ocean, or a migrant breeding to the north (N) or south (S). Birds that stay on the water or grassy marshes are marked “w”. If symbols are enclosed by parentheses the species no longer breeds on the island, although it may occur as a vagrant.

Birds that we assume or know to have bred on the island in the 1930s (Chapman, 1929, 1938) number 199 species, plus 9 species restricted to the lake or grassy marshes along the shores of the island. Seven other breeding species (Tiny Hawk, Long-tailed Tyrant, Great Kiskadee, etc.) immigrated from nearby areas of Panama to the island’s land area and two others (Least Grebe, Common Gallinule) to its water edges, bringing the total of residents to 217 species.

Four of the nine immigrants (Green-and-rufous Kingfisher, Plain Wren, Buff-rumped Warbler, and Dusky-faced Tanager) apparently have failed to maintain populations and are again gone from the island. Fifty-one other residents no longer breed on the island, so that the breeding avifauna has
decreased from 208 in the early 1930s to 162 species (including five immigrants) in 1977. Small numbers of two extirpated species (White-breasted Wood-Wren, Song Wren) were reintroduced in 1976 by E. S. Morton, which, if they became re-established, would bring the total to 164. If a few recent White-necked Puffbirds and one Nightingale Wren are breeding rather than vagrant, the present total would be 164. One additional species, the Slate-colored Seedeater, is considered a vagrant but may breed in years of bamboo seed crops.

Some species seem to breed on the island but disappear from it in nonbreeding months: Piratic Flycatchers, Red-legged Honeycreepers, Giant Cowbirds, and (formerly) Yellow-green Vireos. They are listed as resident species. The flycatcher and vireo are known to be migratory in Panama, apparently going to South America after the breeding season (Morton, 1977).

Vagrant species (or local migrants) from elsewhere in central Panama number 66; 15 wander to the lake or its edges rather than to the island itself. Some may breed occasionally or, without breeding, use the island as part of their home ranges—White-collared Swifts, for instance. Others probably once bred on the island, and perhaps should be listed among the residents that have vanished from it. (Gray-cheeked Nunlet, White-fronted Nunbird, Spot-crowned Barbet, and Red-billed Scythebill may well have bred; others not even on the list probably occurred in the 1920s but were overlooked.) Most vagrants appear in the clearing or along the lake shore, and might breed if there were suitable semi-open habitat. A few, notably a male Lance-tailed Manakin that sang near Wheeler Trail 8 for several years, require second-growth or dry forests. Only eight vagrant species are forest birds, and several of these are vagrants from nearby hill areas (altitudinal or seasonal migrants?: Green Hermits, White-ringed Flycatchers, White-throated Robins, and Bay-headed Tanagers) rather than from lowland forests. Yellow-headed Parrots may have been seasonal migrants from savanna areas, as some Red-lored Parrots are local migrants today. Plumbeous and Swallow-tailed Kites may be chiefly migrants from further north in Middle America; but, as the Panamanian populations are also migratory, some may be local vagrants.

Undoubted migrants number 83 species, two breeding south of Panama and 81 breeding north of Panama. Several other species presently listed as vagrants from elsewhere in Panama (Little Blue Herons, for instance) may also be migrants from the north. Of the northern migrants, 25 are lake birds and 56 are birds of the forest, clearing, or edges. The island seems good for migrants compared to similar forests on the mainland, perhaps because of declines in species of resident birds. Analyses (Willis, ms) suggest that one bird in seven on the island is a migrant during October, the peak month for migrants. Visitors often see migrants more easily than resident birds, since many migrants forage conspicuously around clearings rather than hide in the forest as do local birds.

Eisenmann believes that many vagrants (especially insectivores and seed-eaters) from cleared and semiopen mainland areas appear on the island during the dry season, when open areas become parched. Because of preservation of the forest, the island remains more humid than many nearby mainland areas at this season. Also, immature birds are likely to occur well after the breeding season (mainly March–August in Panama) when they have become independent and are searching for suitable habitats.

Loss of Species

The rate of bird extirpations is of considerable interest; but, to be certain, one needs the last dates when species were recorded. We would appreciate corrections if the last dates given in the annotated list are not the last dates recorded by visitors. Apparently 5 species disappeared in the decade 1926 to 1935, 9 more by 1945, 11 by 1955, and 13 per decade since then. The low rate of loss in the early years may reflect failure to record some species that soon disappeared. Ornithologists visiting the island should keep lists of all species seen and send them to us and the Smithsonian Tropical Research Institute, for a list may include what might turn out to be the last record of some species.

Losses of resident birds from Barro Colorado have attracted attention because this is the best-documented case of an isolated reserve losing species in the way predicted by theories of island biogeography (MacArthur and Wilson, 1967). Some of the birds, however, have disappeared because of habitat
changes rather than because of increased extinction rates due to small area of habitats. Amazon Kingfishers and immigrant Green-and-rufous Kingfishers have apparently lost in competition with the peacock bass, and would have survived in a larger reserve only if the bass could not enter certain coves or if prey species adapted to it. Thirty-four species are birds of second growth and forest edge, and probably disappeared because forest growth removed their habitats. Several of these 34 extirpated species probably would still be nesting on a reserve the size of Barro Colorado were there a stream large enough to flood occasionally and maintain extensive zones of low growth like those on the Agua Salud River behind Frijoles. Sunbitterns, Gray-capped Flycatchers, and three unsuccessful immigrants (Plain Wrens, Buff-rumped Warblers, and Dusky-faced Tanagers) are examples of species that might have remained if there were such a stream. With such a stream occupying part of the forest area, however, more forest species might have been lost.

Sixteen of the lost species are woodland or forest birds, which would disappear from central Panama in the event that forests other than those on Barro Colorado Island were cut. They are as follows: Harpy Eagle, Barred Forest-Falcon, Red-throated Caracara, Great Curassow, Marbled Wood-Quail, Rufous-vented Ground-Cuckoo, Barred Woodcreeper, Buff-throated Foliage-gleaner, Black-faced Antthrush, Streak-chested Antpitta (lost since 1970), Sulphur-rumped Flycatcher, Northern Royal-Flycatcher, Black-throated Foliage-gleaner, Black-faced Antthrush, Streak-chested Antpitta (lost since 1970), White-breasted Wood-Wren (reintroduced in 1976), Song Wren (reintroduced in 1976), Nightingale Wren. Ocellated Antbirds, down to two males at the 1977 census, will also soon be gone from the island. Although losses of these and further forest species are to be expected in such a small reserve (MacArthur and Wilson, 1967), the causes of losses are not clear. Willis (1974) studied declines of Barred Woodcreepers and Ocellated Antbirds, but found only that these birds were low in numbers and did not recover after fluctuations put their numbers close to zero.

It is possible that successional changes in the forest affect suitability even for forest and woodland birds, so that one cannot entirely eliminate the factor of forest maturation even for these 16 species. It seems doubtful, however, that one could pick or manage a forest area the size of Barro Colorado so that it would not lose species at the same rate as Barro Colorado or even more rapidly. One would expect that survival of some species on the island depends on occasional restocking from forests near the island, so that it is likely to lose even more species when mainland forests are cut and there is no longer interchange of these species (Red-lored Parrots, for instance).

Several losses of forest species on Barro Colorado involve "ecological truncation" of guilds of similarly foraging birds, in which large or specialized species are low in densities and drop out first when area of habitat is reduced; similar cases on Hawaii are mentioned in Wilson and Willis (1975). Among ant-following birds, the very large Rufous-vented Ground-Cuckoo disappeared first, then the large Barred Woodcreeper, and finally the fairly large Ocellated Antbird. Systematic truncation of guilds (not the random extinctions implicit in "island biogeography theory," as suggested by Simberloff and Abele, 1976) means that multiple small refuges of a given habitat (such as tropical forest in the case of Barro Colorado) probably will retain fewer species than one large refuge of that habitat. We may expect further species to disappear from Barro Colorado by ecological truncation, for even larger and formerly connected islands off the coast of Panama have fewer species than does Barro Colorado.

Some birds, such as Slaty Antshrikes, have become very common on Barro Colorado and may be replacing lost species (Oniki, 1975). Mammals of several species are very common, and also may take the niches of missing birds to some extent. Some niches on Barro Colorado, however, are clearly less well occupied than in larger forest areas in the Canal Zone. For instance, loss of ant-following birds during the period of 1960 to 1977 was not made up by other birds. Swarms of army ants seem almost deserted by birds compared to similar swarms of ants in larger forests. Jon Greenlaw and J. R. Karr, who netted birds in the undergrowth, captured few birds per net-hour on Barro Colorado compared to forests on the nearby mainland.

Barro Colorado has thus become less interesting than larger forest tracts elsewhere in Panama for those who hope to study interactions in a fairly complete avifauna. Tropical forests are always difficult places in which to see birds, for they are usually good at keeping out of sight behind the dense foliage. Birds of tropical forests stand up and sing
their territorial claims less often than do migratory birds in the north. One would scarcely believe estimates of 2000 birds per square kilometer as he walks through the forest on Barro Colorado. One easily sees 50 or 60 species around the clearing and two dozen more in the forest, but finding other species is difficult. Investigation of every strange call helps; the ornithologist here must work with his ears. Forests larger and better suited for birds elsewhere in central Panama are less likely than Barro Colorado to survive expanding human use and changes in governmental policies. Moreover, one can readily see hunted species like Great Tinamous and Crested Guans, as well as many mammals, only on Barro Colorado. Forest reserves like the island will continue to play an important part in tropical ornithology, even though new measures may be needed to avoid losses due to the "island effect."

Willis (1974) suggests that, whenever possible, future reserves not be "islands" but parks connected to each other by "corridor zones." Such zones would allow movement to wet areas in dry years and vice versa, and might allow immigration by forest species. Some tropical birds, especially forest ones, rarely cross open or water areas, and need corridor zones of natural vegetation to disperse.

The larger the areas left for natural ecosystems the better. Preserving large areas as natural zones would represent but a minor reduction of the area available for human exploitation. Willis believes that, for example, leaving half the world free for natural areas would cut only 35 years of human population growth at the present human doubling rate of 100 percent every 35 years. Since half the world was not even known to humans some few thousand years ago, geologically speaking, again removing from human exploitation part of the world is not unthinkable. Recently, there have been suggestions that even "nonresources" such as species and natural ecosystems should be granted some legal standing (Stone, 1974; Ehrenfield, 1976). Extending such protection to a network of natural areas and to natural objects might help assure that potentially "lost worlds" like the Panamanian forest ecosystem and its birds would only be withdrawn from human exploitation, not lost forever.

### Annotated List

**Family Tinamidae: Tinamous**

- **Tinamus major**: Great Tinamous
  
  Uncommon on the forest floor. Breeding: 26 Feb (1954, D. E. Davis), 8 young just able to fly; 17 records of 2 to 8 blue-green eggs 28 Feb (1958, T. Gilliard) to 7 Oct (1961, Willis), on ground between tree buttresses. Nests tend to be deserted and unsuccessful if parent is flushed.

- **Crypturellus soui**: Little Tinamous
  
  Formerly regular near the laboratory. Prefers second growth and forest edges, but last bird heard whistling deep in forest near summit of island in 1965-1966 (last 8 Apr 1966, Stud). Breeding: 16 Mar 1926, 2 eggs (Van Tyne); 13 Jul 1927, 2 eggs that hatched 29 Jul 1927 (Gross and Van Tyne); 4 Aug 1925, 2 eggs (Gross).

**Family Podicipedidae: Grebes**

- **Podiceps dominicus**: Least Grebe
  
  Fairly common in hydriilla mats since 1965; first noted 8 Feb 1960 (Eisenmann). Breeding: Fair with large young 21 Jan 1971 (Willis).

- **Podilymbus podiceps**: Pied-billed Grebe
  
  Fairly common in open water near or in hydriilla mats, mainly on Gigante Bay. Winter concentrations may be of northern subspecies, *P. p. podiceps*. Male in breeding condition collected 5 Aug 1927 (Van Tyne).

**Family Pelecanidae: Pelicans**

- **Pelecanus occidentalis**: Brown Pelican
  
  Small groups often fly over the island and lake on their way across the isthmus.

**Family Sulidae: Boobies**

- **Sula leucogaster**: Brown Booby
  
  Flying north past the clearing, Jun 1964 (6 birds) and 11 May 1967 (2; N. G. Smith). Four Masked Boobies (*Sula dactylatra*), a more pelagic species, were reported by Mrs. G. G. Fry flying together over the lake on 14 Feb 1940.

**Family Phalacrocoracidae: Cormorants**

- **Phalacrocorax olivaceus**: Neotropic Cormorant
  
  Formerly common on the lake, especially on projecting tree
trunks; mainly immatures. Few in recent years, probably due to declines of fish prey with peacock bass predation.

Family **Anhingidae**: Anhingas

*Anhinga anhinga*: Anhinga  Rw

Family **Fregatidae**: Frigatebirds

*Fregata magnificens*: Magnificent Frigatebird  Vw
Individuals and small groups sometimes fly over on their way across the isthmus.

Family **Ardeidae**: Herons

*Ardea herodias*: Great Blue Heron  Nw
Individuals, possibly all northern-breeding migrants, visit the lake shore at all seasons.

*Casmerodius albus*: Great Egret  Vw
Occasional on low stumps offshore.

*Egretta thula*: Snowy Egret  Vw
27 Feb 1940 (Mrs. A. Edey and Mrs. M. Edey).

*Egretta (Florida) caerulea*: Little Blue Heron  Vw
Occasional along the lake shore in all months; most are immatures. Some, perhaps all, may be northern-breeding migrants. Walk on hydrilla mats, probably seeking small fish.

*Egretta (Hydranassa) tricolor*: Tricolored Heron  Vw
No recent records; earlier noted occasionally (Chapman).

*Butorides virescens*: Green Heron  Nw
Rare along the lake shore, more common September to May, when northern-breeding birds arrive. Now considered conspecific with the following form, with which it apparently interbreeds. Breeding: 24 Mar, 3 eggs (T. Gilliard); 28 Apr, 2 eggs (Skutch). Sighted identification of breeding birds as this form, rather than representing an intermediate or hybrid population, is uncertain. Van Tyne, who collected specimens, identified all breeding *Butorides* on the island as *B. striatus*.

*Butorides striatus*: Striated Heron  Rw
Formerly common along the lake shore, now almost extirpated apparently because of food competition with peacock bass. Breeding: 28 Jul 1925, nest and 2 eggs; 11 Aug, 2 half-grown young (Van Tyne). 9 Aug 1970, 3 eggs; one very large young in another nest, near Frijoles 20 Jun 1968 (Willis).

*Agamia agami*: Chestnut-bellied Heron  R
Occasional along the lake shore or forest streams, generally in the shade of the forest; rarely seen.

*Bubulcus ibis*: Cattle Egret  V

*Nycticorax nycticorax*: Black-crowned Night-Heron  Vw
No recent records; earlier “not common” (Chapman).

*Tigrisoma lineatum*: Rufescent Tiger-Heron  R
Occasional along coves or larger streams, sometimes well inland. Chapman reported *Tigrisoma cabanisi* (= *T. mexicanum*) but we and Wetmore think these observations were of *T. lineatum*.

*Ixobrychus exilis*: Least Bittern  Rw
Occasionally flushed in marshes of Gigante Bay; very furtive. The northern *I. e. exilis* may winter. Notes: A low, drawling moan at brief intervals (Wetmore).

Family **Ciconiidae**: Storks

*Mycteria americana*: Wood Stork  Vw
Flying over 12 Feb 1940 (Mrs. Fry, Mrs. Francke, Mrs. Teague).

Family **Threskiornithidae**: Ibises

*Mesembrinibis cayennensis*: Green Ibis  Vw
Six flying over Gigante Bay, June 1971 (N. G. Smith). Mrs. G. G. Fry reported eight “all dark ibis” flying over 8 Feb 1940. The Glossy Ibis, *Plegadis falcinellus*, now a regular migrant to Panama, would be hard to separate from the Green Ibis and is more likely in the Canal Zone, at least during the northern winter.

Family **Anatidae**: Ducks

*Anas discors*: Blue-winged Teal  Nw
Sometimes common migrant since 1966 (Slud), near the edges of hydrilla mats on the lake.

*Anas americana*: American Wigeon  Nw

*Aythya affinis*: Ring-necked Duck  Nw
Oxyura dominica: Masked Duck  

Family Cathartidae: American Vultures

*Sarcoramphus papa: King Vulture  
Occasionally one to four soar over the clearing and forest or flush from dead animals on the forest floor. Breeding: Two eggs in hollow stump in Gigante Bay, 11 Jan 1973 (M. Perrone). Two eggs laid on Pepper Island, just off Salud Point, between 28 Oct and 6 Nov 1976, were near site where two fledged young were present 9 Apr 1976 (L. McHargue).

*Coragyps atratus: Black Vulture  
Fairly common; occasionally flushed from dead animals on the forest floor. Formerly very common near the dump. Breeding: Two eggs in nest in Ceiba pentandra at clearing edge, 29 Jun 1951 (Laughlin, 1952).

*Cathartes aura: Turkey Vulture  
Common soaring over the forest or at carcasses within it. In addition to local C. a. ruficollis, large flocks of migrants, probably western C. a. meridionalis (see Wetmore, 1965) recorded 25 Feb to Apr (Chapman, C. W. Cottrell) and in Oct (30 Oct 1956, 2000 between 08:15 and 08:22; C. Koford). These northern birds, without yellow napes, also winter in fair numbers. Breeding: Young about 24 days old 8 Apr 1976 on Pepper Island probably came from egg laid in early Feb (L. McHargue).

Family Accipitridae: Hawks

*Elanoides forficatus: Swallow-tailed Kite  
Groups or scattered birds occasionally soar over the forest, 3 Jan (Leek) to early Sep. This species breeds in Panama and northward, so that some birds are passage migrants. Twenty on 3 Jun 1949 (Eisenmann) were probably of the local population.

*Leptodon cayanensis: Gray-headed Kite  
Occasional in the upper levels of the young forest; collected 18 Aug 1927 (Van Tyne). Notes: A loud flicker-like wick wick wick . . . of 15-20 notes, also a loud cat-like miaow. Breeding: Nest near Gamboa in Aug, 1972 (N. G. Smith).

Chondrohierax uncinatus: Hook-billed Kite  
Rare in the upper levels of the forest; soars regularly. Notes: A rapid, chuckling wi-i-i-i-i-i-i-i-u-h!

*Harpagus bidontatus: Double-toothed Kite  
Fairly common in the forest midlevels and at the clearing; sometimes soars; follows troops of White-faced Monkeys (Greenlaw, 1967). Notes: A high, shrill pee-sip and a pee-
Buteogallus anthracinus: Common Black-Hawk

V

Rare, mostly immatures; commonest in coastal Panama, particularly near mangroves.

Buteogallus urubutinga: Great Black-Hawk

V

Occasional vagrants of race ridgwayi, both at clearing and along the lake shore.

*Morphnus guianensis: Crested Eagle

R

Specimen 30 Mar 1936 (R. J. Niedrach and A. C. Rogers); seen occasionally, including the rare banded phase (8 Feb 1950, Wetmore).

Harpia harpyja: Harpy Eagle

(R)

No recent records. Seen 1924 (T. Barbour), 8 Jan 1947 (C. W. Quaintance) and 22 Jun 1950 (K. Stott); one was killed by a hunter 14 Sep 1951 in the nearby Bohio, Canal Zone, area (Wetmore, 1965).

Spizaetus tyrannus: Black Hawk-Eagle

R

Regular in canopy; soars and calls persistently at midday. Notes: A mellow whistled wheet, wheet, wheet, wheee, with variations (Eisenmann).

*Micrastur ornatus: Crested Hawk-Eagle

R

Rare in forest midlevels; seldom soars and calls. Notes: A repeated set of a few brief whistles, the second note in each series emphasized—what WHEE what what. Breeding: Two large stick nests high in cativo trees in tall forest near the end of Wheeler Trail; nest found 29 Dec 1960 had one large young 13 to 27 May 1961; nearly grown young in other nest 4 Oct 1965 gave series of 5-10 whew notes and parent answered the same (Wills).

Circus cyaneus: Northern Harrier (Marsh Hawk)

N

No recent records; “winter visitant” (Chapman).

Geranospiza caeruleascens: Crane Hawk

R

Occasional at the clearing or in the forest; crossing from mainland, 8 Feb 1977 (S. Robinson).

Family Pandionidae: Ospreys

Pandion haliaetus: Osprey

Nw

Regular Oct to Apr visitor along the lake shore; nonbreeders occasional in other months.

Family Falconidae: Falcons

*Micrastur semitorquatus: Collared Forest-Falcon

R

Occasional in the forest or calling in treetops; not seen 1960-1969, but noisy calling bird present 18 Aug 1970 to 9 Jan 1971 (Willis) and others seen since as if the species reinvaded successfully.

*Micrastur ruficollis: Barred Forest-Falcon

(R)

Formerly “not common” (Chapman); last seen 22 Mar 1966 (Slud). A bird of the lower layers of forest edge and secondary woodland, but also of forest.

*Daptrius americanus: Red-throated Caracara

(R)

Formerly fairly common in small and noisy groups in the forest canopy and edge; last seen 29 Aug 1963 (Willis). This species disappeared at about the same time from nearby Panamanian forests, so that loss from Barro Colorado may have been connected with general loss rather than with small size of the island.

Falco peregrinus: Peregrine Falcon

Nw

Rare migrant to dead trees of the lake, from 9 Oct (1972, M. Perrone) to 5 May (1953, Wetmore).

Falco rufigularis: Bat Falcon

(R)

Formerly regular in the treetops and along the lake shore. Last pair at hollow almendro near Armour Trail 1 in Feb to Nov, 1961; last stray 30 Sep 1965 (Willis). Notes: A rapid kee kee kee kee. Breeding: Defending tree cavities 28 Mar 1955 (Wetmore) and in 1961.

Falco femoralis: Aplomado Falcon

V

Accidental wanderer, probably from savannas of western Panama, circled over Salud Point, 19 Feb 1954 (Wetmore).

Falco sparverius: American Kestrel

N

One over clearing 9 Oct 1968 (Leek); a bird of open areas, where known as a migrant and winter visitor.

Family Cracidae: Curassows, Guans, Chachalacas

*Crax rubra: Great Curassow

(R)

Noted only by Van Tyne, 1925 to 18 Apr 1927. Pair introduced in 1960 were killed by predators.

*Penelope purpurascens: Crested Guan

R


*Ortalis cinereiceps: Gray-headed Chachalaca

R

A few groups remain near the lake shore, especially on Barbour and Burrunga Points; a bird of forest edge and second growth.

Family Phasianidae: Partridges

Odontophorus gujanensis: Marbled Wood-Quail

(R)

Formerly in groups near the clearing; last heard 5 May 1953 (Wetmore).
Family Rallidae: Rails

*Aramides cajanea*: Gray-necked Wood-Rail  
Uncommon in woodland along the lake and in the Armour 9 swamp.

*Laterallus albigularis*: White-throated Crake  
Common in grassy marshes of Gigante Bay and the southwestern shores of the island.

Gallinula chloropus: Common Gallinule  
Increasingly common since 26 Mar 1966 (Slud) in mats of hydrilla. Breeding: Nest with 3 eggs, islet near end of Shannon Trail, 30 Jun 1967 (Karr, Willis); similar nest and 4 eggs nearby 12 Feb 1977 (D. Glanz, Willis). Chicks seen nearly all months of the year.

*Porphyryula martinica*: Purple Gallinule  
Fairly common in bushes and small marshes along shore, especially on the south and west. Breeding: 14 Mar 1929, two young about a week old (Chapman); young in natal down near Frijoles (mainland), 5 Nov 1927 (Gross, Van Tyne). Nest and 5 eggs 15 May 1935 (Skutch); 4 eggs in nest near laboratory, 13 Jul 1925 (Gross, Van Tyne).

Fulica americana: American Coot  
Regular in winter on hydrilla mats; first recorded 26 Mar 1966. (Slud).

Family Helornithidae: Finfoots

*Heliornis fulica*: Sungrebe  
Scattered along shore where trees overhang quiet waters, especially in narrow bays; rare recently. Notes: Hollow code barks, usually 3-4 per series, sometimes ending in kwa bark (Willis, M. Perrone). Breeding: Flightless fledgling with adult in Wheeler Estero, 8 Jan 1961 (Willis). Female with two half-grown chicks, mid-Jul 1973 (M. Perrone).

Family Eurypygidae: Sunbitterns

*Eurypygia helias*: Sunbittern  
No recent records. Collected 15 Mar 1926, in creek bed on Shannon Trail (Van Tyne); seen on lake and streams in 1920’s (Sturgis).

Family Jacanidae: Jacanas

*Jacana jacana*: Wattled Jacana  
Common along the lake shore, especially since 1967 on hydrilla mats. Breeding: Small chicks out of nest, mid-Feb 1969 (Wiley). Nest and 4 eggs, 12 Feb 1977 on Burrunga Point (D. Glanz, Willis); 3 eggs in nest at Gigante Bay, 6 Apr 1969 (Leek). Nests recorded at Summit Gardens (mainland) 15 Feb 1942 (J. Abbott) and 17 May to 26 Nov 1941 (G. R. Meyer).

Family Scopelapidae: Sandpipers

Tringa flavipes: Lesser Yellowlegs  
Three 26 Mar 1966 (Slud).

*Actitis macularia*: Spotted Sandpiper  
Uncommon winter visitor along lake shore, more frequent during migration, 9 Aug (1970, Willis) to 12 May (1926, collected, Van Tyne)).

Family Stercorariidae: Skuas

Stercorarius parasiticus: Parasitic Jaeger  
Six immatures, probably of this species, harried Laughing Gulls (about same size) over lake 27 Dec 1960; one did so until 18 Jan 1961 (Willis). Normally marine birds, but occasional over lake Oct-Dec (N. G. Smith).

Family Laridae: Gulls and Terns

Larus delawarensis: Ring-billed Gull  
Occasionally winters on lake (Moynihan, N. G. Smith).

Larus argentatus: Herring Gull  
Several over lake in winter of 1957–1958 (Moynihan). One 27 Dec 1968 (Leek), other 29 Jan 1977 (Willis).

Larus atricilla: Laughing Gull  
Formerly common migrant and winter resident on the lake; nonbreeding birds occasional May-Aug. Often flocked around groups of small fishes chased by larger ones. Less common since spread of peacock bass (Zaret and Paine, 1973).

Larus pipixcan: Franklin’s Gull  
One on lake 3 Jul 1951, 21 Aug 1954 (Eisenmann); seven on 22 Jun 1952 (J. Bull, Eisenmann); two on 9 Apr 1973 (M. Perrone); nonbreeding birds occasional throughout year in Panama.

*Chlidonias niger*: Black Tern  
Migrants and nonbreeders formerly common over the lake in the wet season, May-Dec, rare in the dry season. Sometimes common in recent years. Large numbers are offshore in the Gulf of Panama, Jan-Apr (Eisenmann).

Gelochelidon nilotica: Gull-billed Tern  
Once on lake, winter 1957–1958 (Moynihan).

Sterna hirundo: Common Tern  
Migrants and nonbreeders uncommon to rare over the lake in the wet season; one in Feb, 1969 (Leck).

Sterna fuscata: Sooty Tern  
One found unable to fly in laboratory clearing about 30
Nov 1970; Morton saw it still alive the first week of December. A pelagic species.

**Sterna albilfrons**: Least Tern  
Nw

One over lake near Frijoles (mainland), 11 and 17 Aug 1961 (Willis).

**Sterna maxima (Thalasseus maximus)**: Royal Tern  
Nw

Migrants and nonbreeders (May-Aug) occasional over the lake; collected 28 May 1927 (Van Tyne). A banded bird from the Atlantic coast of the United States has been recovered on Gatun Lake (J. Weske).

**Sterna (Thalasseus) sandvicensis**: Sandwich Tern  
Nw

Migrants and nonbreeders (May-Jun) occasional over the lake, less often in dry season.

**Anous stolidus**: Brown Noddy  
Vw

One over ship channel in lake, mid-Jul 1973 (M. Perrone). Pelagic species.

Family **COLUMBIDAE**: Pigeons

**Columba cayennensis**: Pale-vented Pigeon  
R

Uncommon along the lake shore, flying mostly over water. Commoner at Frijoles (mainland). Breeding: Several nests, one containing one egg, over water of laboratory cove 6 Feb 1977. Five nests in tops of bushes over water by Buena Vista Point had young 21 May 1961 to 8 Jun 1962; in one nest the single egg hatched between 2 and 6 Jul 1962 (Willis). Notes: Usual call oo, kuk-tu-coooo, kuk-tu-coodoo, kuk-tu-coodoo (Eisenmann).

**Columba speciosa**: Scaled Pigeon  
R

Rare, mostly along shores of Gigante Bay; commoner at Frijoles (mainland). Notes: A groaning, low ooo, ook-coooo, ook-coooo, ook-coo.

**Columba nigrirostris**: Short-billed Pigeon  
R

Fairly common in canopy. Easily attracted by whistling the call, a melodious, melancholy ho, cu-cu-cooo (Eisenmann).

**Columbina minuta**: Plain-breasted Ground-Dove  
V

One reported in the clearing, 24 Mar 1950 (G. W. Cottrell). A species of open country; confusion with female of next species is easy.

**Columbina talpacoti**: Ruddy Ground-Dove  
V

Formerly occasional in the clearing in the dry season (W. A. Weber, Skutch); Feb, 1962 (Mr. and Mrs. A. Schnitzer). Common in clearings and semi-open areas at Frijoles and elsewhere in Panama.

**Claravis pretiosa**: Blue Ground-Dove  
(R)

Rare recently, probably nonbreeding stragglers from large populations in light woods at Frijoles (mainland); a few pairs present to 1965 in young woodland.

**Leptotila verreauxi**: White-tipped Dove  
R

A few pairs in the clearing and along shore in young or windswept woodland. Notes: A low woob, w-wooooh. Breeding: Mar (1947, Quaintance) to 8 Oct (1927, Gross); elsewhere in Panama eggs January to 19 Sep (1968, J. Karr).

**Leptotila cassinii**: Gray-chested Dove  
R

Common in the forest, especially young forest, on the ground. Notes: A low-pitched coooooooooo, longer than the note of either species of quail-dove. Sings from 2-5 m up. Noisy flight. Breeding: Feb-Apr (1935, Skutch) and commonly to 25 Sep (1965, Willis); stick platforms 1-4 m up hold 2 whitish eggs each.

**Geotrygon violacea**: Violaceous Quail-Dove  
R

Uncommon on the ground in the young forest, mainly from Zetek 1 across to Barbour 15. Also on Bohio Peninsula (mainland). Possibly immigrant, but more probably overlooked prior to 1960. Silent flight. Notes: A short hollow coooo, repeated about 18 per minute from 5-15 m up; higher in pitch than song of Gray-chested Dove or Ruddy Quail-Dove. Breeding: Incubating two buff eggs in shallow stick nest 2.3 m on sapling limb at Balboa Trail 3.4, 11 to 17 Jul 1963; nest destroyed 19 Jul (Willis).

**Geotrygon montana**: Ruddy Quail-Dove  
R

Uncommon on the ground in the forest. Silent flight. Notes: A low humming mmmmmmm (Eisenmann), intermediate in length between the songs of the last two species. Sings on or near the ground. Breeding: Six slight leaf platforms, 1-2 m up, each with two buff eggs, Jun to Aug in 1961 to 1969 (Willis).

Family **PSITTACIDAE**: Parrots

**Brotogeris jugularis**: Orange-chinned Parakeet  
R

Common in the treetops and forest edge, flocking after the breeding season. Breeding: Jan-May (Van Tyne). Digging nest in termitarium on tree in Gigante Bay, 22 Jun 1952 (J. Bull, Eisenmann).

**Pionus menstruus**: Blue-headed Parrot  
R

Fairly common in the treetops; some fly over from the mainland. Breeding: At nest cavity, 22 Jan 1960 (Willis); young in nest 12 Apr 1937 (T. Gilliard); 6 Apr 1950, in stub in water (Wetmore). At Ft. Davis (mainland), fledgling at hole in topless royal palm, 5 May 1961 (J. Ambrose).

**Amazona autumnalis**: Red-lobed Parrot  
R

Fairly common in the treetops. Large flocks flying from the mainland to Barbour Point before 07:00 each day in early

Amazona ochrocephala: Yellow-headed Parrot

Until 1950, casual from dry Pacific woodlands.

Amazona farinosa: Mealy Parrot

Fairly common in the treetops, especially in old forest.

Family Cuculidae: Cuckoos

Coccyzus americanus: Yellow-billed Cuckoo

Migrant 18 Apr (1961) to 11 May (1966) and 14 Apr (1965, Willis) to 19 Nov (1972, M. Perrone); uncommon to rare transient; some winter in Panama.

Coccyzus erythropthalmus: Black-billed Cuckoo

Immature hit window, later released and stayed, 14-21 Oct 1976 (C. O. Handley). In Panama rare to uncommon fall transient; very rare in spring.

Piaya cayana: Squirrel Cuckoo

Fairly common in liana-covered treetops and at forest edges; at times follows army ants in the forest interior. Notes: A loud wreep-wurr or geep-kareer much like call of Greater Kiskadee; in alarmed flight a loud stit or stit-it; song a series of 5-8 ringing wheep notes; an accented wik-i-y'er in disputes. Breeding: Nest in mango tree by kitchen, May 1935 (Skutch). Nest being constructed on Escobal Road (mainland), 28 Jun 1955 (Eisenmann, F. O. Chapelle, J. Ambrose).

Crotophaga major: Greater Ani

Scattered small groups in dense vines along sheltered parts of the lake shore, favoring moist areas; at times follows army ants in the forest interior. Notes: A loud wreep-wurr or geep-kareer much like call of Greater Kiskadee; in alarmed flight a loud stit or stit-it; song a series of 5-8 ringing wheep notes; an accented wik-i-y'er in disputes. Breeding: Nest in mango tree by kitchen, May 1935 (Skutch). Nest being constructed on Escobal Road (mainland), 28 Jun 1955 (Eisenmann, F. O. Chapelle, J. Ambrose).

Crotophaga ani: Smooth-billed Ani

Formerly (to 1962) bands in the clearing; recently only in grassy marshes of Gigante Bay. Breeding: Jan, Feb (Chapman, T. Gilliard); Feb-May 1955, repeated nestings, all destroyed; Jun 1929 (Skutch).

Tapera naevia: Striped Cuckoo

Formerly occasional in the clearing; a bird of bushy savannas. Notes: Melancholy whistles, sa-see or sa-seh-see, see-tah (Wetmore). Breeding: Parasitic.

*Dromococcyx phasinellus: Pheasant Cuckoo

Rare: in young woodland, mainly near Shannon 13; collected 15 Mar 1926 (Van Tyne); last noted 23 Jan 1971 (Willis). Decoys to whistled imitation of voice. Notes: Melancholy whistles, see-see-wurrurr, the last note quavering. Also, sa, seh, si-see, four notes rising in pitch. Breeding: Parasitic.

*Neomorphus Geoffroyi: Rufous-vented Ground-Cuckoo

Collected 7 Jan 1926 (Chapman, Potter); last seen 22 Mar 1935 (Skutch). Terrestrial bird of vine-crowded forest; follows army ants. Breeding: Not parasitic (H. Sick, Willis).

Family Strigidae: Owls

Otus guatemalae vermiculatus: Vermiculated Screech-Owl

Fairly common in the lower levels of the forest; probably overlooked before 1960. Specimen from one found dead 30 Mar 1969 (Leek). Notes: A short, quavering ro-o-o-o-oh, suggestive of but much shorter than call of *Otus asio of North America and unlike call of *O. guatemalae in British Honduras (Willis; see L. I. Davis 1972).

Otus cholina: Tropical Screech-Owl

Formerly about the clearing; a bird of clearings and second growth. Last reported Feb 1950 (Kilham). Seen on nearby Mona Grita Island 5 Feb 1977 (N. Brokaw, J. Pickering, Willis). Notes: A short series of bubbling or purring notes usually ending in a higher, catlike whistle.

Lophostrix cristata: Crested Owl

Seen rarely, but often heard at night in treetops from summit of island westward, at least in the wet season; rests during day low in lianas or tangles. Notes: A grunting, froglike grroof (P. Schwartz).

Pulsatrix perspicillata: Spectacled Owl


*Ciccaba virgata: Mottled Owl

Uncommon in the forest, resting in vine tangles during the day. Notes: A loud slow luoff, woof, woof in western Mexico and in Panama (Willis); a catlike keeeoweeyo and a gruff hrrr (Eisenmann).

*Ciccaba nigrolineata: Black-and-white Owl

Reported mainly since 1952 (Ingles) at the laboratory clearing, where it often takes bats (Mrs. H. Burkhardt) or
insects attracted by lights; presumably overlooked earlier. Notes: An abrupt bu at short intervals, often in groups of three; weaker than calls of Mottled Owl (Willis); a deep, resonant, very deliberate whoof, whoof, whoof (Eisenmann). A catlike keeeery (Ingles).

**Rhinoptynx clamator:** Striped Owl  
Vagrant to dense cover on Slothia Island near the laboratory, 19 Aug 1970 (M. Sunquist, photograph). A bird of bushy, grassy areas.

**Family Nyctibiidae:** Potoos

**Nyctibius grandis:** Great Potoo  
Occasionally seen in or at the edges of tall forest. Sits quietly on high open limbs during the day, rarely low. Notes: A harsh, growling ahrrr (Eisenmann); also ooorroo (Haverschmidt).

**Nyctibius griseus:** Common Potoo  
No recent records; “not uncommon” (Chapman). Nocturnal, woodland edges, perching in vertical posture on bare limbs. Notes: A melancholy musical series of wailing notes, going downscale (Eisenmann).

**Family Caprimulgidae:** Nightjars

**Lurocalis semitorquatus:** Short-tailed Nighthawk  

*Chordeiles acutipennis:* Lesser Nighthawk  
Migrant. Specimen 30 Oct 1927; large flocks of silent nighthawks seen from mid Sep on (Cross, Eisenmann). Willis noted silent birds and groups 8 Sep 1961 and 2 Nov 1960. Some are probably northern transient Common Nighthawks (Chordeiles minor), which migrate through Panama.

*Nyctidromus albicollis:* Pauraque  
Occasional on nearby Slothia Island, in the clearing, and at Wheeler Trail 7.5. Breeding: Mar 1935 in clearing, 30 Apr 1935 on Slothia (Skutch). Notes: A hoarse whistled por-weeeeer; also a series of hiip's on a single tone (Eisenmann).

*Caprimulgus carolinensis:* Chuck-will’s-widow  
Winter resident in the forest 7 Oct (1960) to 18 Apr (1961, Willis). One sitting on ground in forest Jul, 1967, may have been the similar Panamanian C. rufulus, but seemed large (Karr, Willis).

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**Family Apodidae:** Swifts

**Streptoprocne zonaris:** White-collared Swift  

**Chaetura pelagica:** Chimney Swift  
A flock of 500 moving eastward on 22 Oct 1960 and some going westward on 17-25 Apr 1961 seemed this migrant species (Willis).

**Chaetura spinicauda:** Band-rumped Swift  
Common over coves and the island; other species may occur in their flocks. Flocks of large dark swifts, apparently some species of Cypseloides, occasionally soar with the Chaetura or separately.

**Chaetura brachyura:** Short-tailed Swift  
Several with Band-rumped Swifts over cove below Wetmore Trail, 3 Mar 1977 (Willis). Common in open areas, as Frijoles (mainland).

**Panyptila cayennensis:** Lesser Swallow-tailed Swift  
A few often circle high in pairs or small groups in flocks of Chaetura swifts or alone.

**Family Trochilidae:** Hummingbirds

**Glaucis hirsuta:** Rufous-breasted Hermit  
Few recent records; formerly uncommon. Usually at streamside plants, Heliconia thickets, or treefall openings.

**Threnetes ruckeri:** Band-tailed Barthroat  
No recent records; formerly occasional (Eisenmann). Humid forest bird.

**Phaethornis guy:** Green Hermit  
No recent records; formerly “not uncommon” (Chapman), perhaps as seasonal migrant from upland forests. Eisenmann now suspects misidentification.

*Phaethornis superciliosus:* Long-tailed Hermit  
Fairly common in the lower levels of the forest and clearing. Males sing noisily one to five meters up at small leks near American Museum Trail 1, at Standley Trail 16, south of Armour Trail 8 some 350 m, and northwest of Fairchild 8; the first three sites were occupied at least 1961 to 1971. Notes: A whees as it darts through the forest; males sing monotonously, wheeish, over and over. Breeding: Seven nests about eye level under tips of palm frondlets had two white eggs each 24 Jun (1951; L. J. Milne, Eisenmann) to 15 Sep (1965, Willis); one egg in the first nest hatched 26 Jun.
**Phaethornis longuemareus:** Little Hermit R
Rare in young forest and at the clearing; one or two males sang until 1971 at lek near ground at Wheeler Trail 7.6 (Willis).

**Florisuga mellivora:** White-necked Jacobin R
Common at flowering plants or hawking aerial insects at the clearing or other forest edges, less common deep in forest. Breeding: Seven nests with two eggs or young, yellow-felted, cup-shaped structures 0.3-2.1 m atop large leaves in deep forest, 10 Jan (1937, T. Gilliard) to 20 Jul (1964, Willis).

**Anthracothorax nigricollis:** Black-throated Mango R
Rare, formerly more common, at the clearing and along shore. Breeding: Dec to Mar (Chapman, Skutch, A. A. Allen).

**Lophornis delattrei:** Rufous-crested Coquette V
Rare around flowering plants at the clearing; 30 Jun 1948, 28 Jun-5 Jul 1949, and Jun 17-19, 1952 (Eisenmann); 19 Dec 1960 (Willis); 1968 (Leek); Mar 1977 (George Angehr).

**Chlorostilbon canivetii:** Fork-tailed Emerald V
A few records from the laboratory clearing; an open-country bird, chiefly of Pacific slope.

**Thalurania colombica:** Crowned Woodnymph R

***Damophila julie:** Violet-bellied Hummingbird R
Common low in the forest and clearing. Notes: Males hiss an insectlike vieii, veei, viii, viii series from perches 1-10 m up during the breeding season. Alarm note, see see seek. Breeding: Four nests on branches 2.5-4.2 m up in forest, 15 Mar 1961 to 10 Jul 1967 (young; Willis). A nest at Summit Gardens (mainland) had two eggs 19 Jan 1941 (Meyer).

**Lepidotryga coeruloeugularis:** Sapphire-throated Hummingbird V
Formerly occasional around the laboratory. Common in open areas; in Panama usually near the coast.

**Hylocharis eliciae:** Blue-throated Goldentail
Eisenmann now questions his original identifications; they were probably Rufous-tailed Hummingbirds with reddish bills.

***Amazilia amabilis:** Blue-chested Hummingbird R
Common in the laboratory clearing and at treefall clearings, but often mistaken for a female of the four preceding species. Males call singly or in small groups, centered 10-15 m up, especially at dawn and dusk in the dry season. Notes: A monotonous pseik at 120 per minute, with some pauses or faint buzzes as of fluttering wings.

**Amazilia edward:** Snowy-breasted Hummingbird V
Males at laboratory 2-6 Jul 1948 and 4-6 Jul 1950 (Eisenmann), 20 Mar 1969 (Leck) and Dec 1977 (George Angehr). Generally in more open country.

***Amazilia tzacatl:** Rufous-tailed Hummingbird (R)
A few were at the laboratory clearing until 1971, where formerly considered commonest hummingbird (Eisenmann). A bird of semi-open habitats. Breeding: Dec (1950, Skutch) to 10 Jul (1950, collecting nest material, Eisenmann); on mainland, Canal Zone nests also recorded in Apr and May (Stone, 1918).

**Chalpybura buffonii:** White-vented Plumeleteer (R)
Occasional around the laboratory; usually in Heliconia thickets at forest edges.

**Heliomaster longirostris:** Long-billed Starthroat V
Male near laboratory 27 Jan 1951 (Collias) and 12 Apr 1961 (Eisenmann). Primarily a bird of partly open country and the edges of the lake. Breeding: Young flew near but returned to nest 9 m at tip of dead twig of tree by Gamboa railroad station (mainland), 30 Jan 1961; female sitting on same nest 12 and 24 Feb; two young overflowing nest 28 Apr (Willis).

**Family TROGONIDAE:** Trogons

**Trogon massena:** Slaty-tailed Trogon R
Fairly common in the forest midlevels. Observed following Cebus monkeys (Stott and Selsor, 1961). Notes: A loud, long series of cah or cow notes, at the rate of about two per second. Breeding: In termite nests, Mar-Jun (Chapman, T. Gilliard); 13 Jul 1927, nest with young (Gross).

**Trogon melanurus:** Black-tailed Trogon R
Rare in the forest upper levels or midlevels; most regular near the middle 500 m of Shannon and Balboa Trails. Notes: A series of 10-20 resonant kwo notes, at 2-3 per second, higher in pitch than those of T. massena and increasing in volume like the calls of a Crested Guan. Breeding: Pair building a nest in termite nest at head of Gigante Bay, 10 May 1961 (Willis). In other Canal Zone areas, pairs at holes in termite nests 29 Mar 1967 (Eisenmann, N. G. Smith), Apr-May 1970 (Morton).

**Trogon viridis:** White-tailed Trogon R
Fairly common in the midlevels of young forest, uncommon in old. Notes: In addition to accelerating song, starting as
slow coo notes and gradually becoming a roll (Eisenmann, 1952), a soft cop every second or two; alarm a rattling kirrrrrik (Willis). Breeding: In termite nests, 11 Mar (1946, Wetmore) to 3 Jul (1968, young calling; Willis). Building 17 Jun 1992 (Eisenmann, J. Bull).

*Trogon rufus*: Black-throated Trogon  
Common in the forest understory. Notes: A cow, repeated three or four times, with pauses between notes, at rate of about one per second (Eisenmann). Breeding: One or two white eggs in eight nests in hollows in sides of low decaying stubs, Apr (1935, Skutch) to 25 Jul (1964, Willis); young in Jun 1952 (J. Bull, Eisenmann). Eisenmann now feels that ninth nest 3 Jul (1973, M. Perrone). A nest with two eggs in a stump, 25 Feb 1950 (Kilham) and attributed to the next species (see Eisenmann, 1952) probably belonged to this species.

Trogon violaceus: Violaceous Trogon  
Fairly common in the treetops of young forest, coming lower at the forest edge. Notes: A rather soft cow, repeated at a steady pace, 10–15 times, at about 2 per second (Eisenmann). Breeding: Feeding young in a pendent wasp nest at clearing Jun 1952 (J. Bull, Eisenmann). Eisenmann now feels that nesting in termitearia reported by Chapman (1938), Wetmore (1968), and himself (1952) need confirmation. All recent nests he and Skutch have seen were in soft material, such as wasp nests and dense masses of ferns and other epiphytes, high in trees.

Family Alcedinidae: Kingfishers

*Ceryle torquata*: Ringed Kingfisher  
Formerly fairly common along the lake shore, now rare. Breeding: Building tunnel in earth cliff at Barbour Point, 21 Jan 1971 (Willis); 29 Mar 1969 on island (Leck); food to young in nest across canal from Salud Point, 21 May 1961 (Willis).

*Ceryle alcyon*: Belted Kingfisher  
Rare migrant to the lake shore, until 28 Mar (1966, Stud).

*Chloroceryle amazona*: Amazon Kingfisher  
Once fairly common, now extirpated, along the lake shore.

*Chloroceryle americana*: Green Kingfisher  
Once common along the lake shore, now very rare. A recent decrease in all kingfishers on the lake is probably due to spread of introduced peacock bass.

*Chloroceryle ina*: Green-and-rufous Kingfisher  
One to two pairs formerly in narrow coves near end of Wheeler Trail, 22 Feb 1952 (Junea Kelly) to 28 Jun 1970 (Willis). Note: Short, buzzy jij and tih-gi; also a clicking tik-tik-ik-ik and a higher see-ee-jee-jee.

*Chloroceryle aenea*: Pygmy Kingfisher  
Uncommon in overhanging limbs along narrow, quiet coves; occasional along forest streams up to the center of the island. Notes: A sharp chick or cheet; also a faint tik. Breeding: Two fledglings near nest in small hole 1 m up in earth of uprooted part of fallen tree, near end of Wheeler Trail on cove, 1 May 1961 (Willis).

Family Momotidae: Motmots

*Electron platyrinchum*: Broad-billed Motmot  
Fairly common in the forest midlevels near gulches. Notes: A nasal, resonant kwong every 2–3 seconds; at times there is a duet, one bird calling kwong slowly and the other kong at three notes per second; call especially at dawn and dusk.

*Baryphthengus martii*: Rufous Motmot  
Common in the low to middle levels of the forest, often following army ants. Notes: Commonly a mellow, rhythmic hoo-boo-too-too-too; ka alarm notes at close range. Breeding: Seven nests in holes at sides of gullies; excavating 24 Apr (1961) to 21 Aug (1969), flushed from nests 9 May to 15 Sep (1961, Willis).

Momotus momota: Blue-crowned Motmot  
Casual 12 Apr 1961 near Allee Stream (Eisenmann); formerly “occasional; irregular” (Chapman). Favors woodland borders and second growth; collected at nearly Frijoles.

Family Buccoidea: Puffbirds

*Notharchus macrorhynchus*: White-necked Puffbird  

*Notharchus pectoralis*: Black-breasted Puffbird  
Common in the treetops and forest midlevels; often follows army ants. Notes: A loud series of 10 or more wheel whistles followed by 3 or so whee notes at a lower pitch and ending with a few whee-whee couples that gradually fade away; in territorial fights, rasping chah-chah-chah-chah. Breeding: In termite nests, building 16 Mar (1961, Willis) to Apr (1935, Skutch); incubating or feeding young in five other nests to 24 Jul (1969, Willis).

Notharchus tectus: Pied Puffbird  
Fairly common in the canopy and at the forest edge.

*Malacoptila panamensis*: White-whiskered Puffbird  
Fairly common low in the young forest or in treefall zones of old forest. Notes: High, faint seeee in alarm; in territorial fights, various high-pitched squeaks and a rapidly repeated high see-it-hee-hee or similar phrase. Breeding: Eleven nests
in holes in the ground, May to Aug; digging 1 Jan (1961) to 4 Oct (1965); loose earth is removed and the edges of entrances are concealed by sticks or leaves (Willis).

_Nonnula frontalis:_ Gray-cheeked Nunlet  V

Possibly a resident earlier; 7 Sep 1935 off Drayton Trail (D. W. Lamm); 23 Jun 1950 near the start of Wheeler Trail (K. Stott). Prefers riverine or vine-tangled woodlands.

_Monas morphoeus:_ White-fronted Nunbird  V

At least two on Wheeler Trail, 6 Apr 1950 (Wetmore). Usually in humid hill-country forests.

**Family Capitonidae:** Barbets

_Capito maculicoronatus:_ Spot-crowned Barbet  V

Seen once (Sturgis), perhaps resident formerly. Wet-forest bird.

**Family Ramphastidae:** Toucans

*Pteroglossus torquatus:_ Collared Aracari  R


_Ramphastos sulphuratus:_ Keel-billed Toucan  R

Common in forest and edge. Breeding: In natural cavities of large trees, eggs laid Mar and Apr (Van Tyne).

_Ramphastos swainsonii:_ Chestnut-mandibled Toucan  R

Common in forest and edge. Breeding: Nest hole in jacaranda tree shown by E. Mayr to Eisenmann, 15–16 Mar 1974; said to have been used also in previous years.

**Family Picidae:** Woodpeckers

_Celeus loricatus:_ Cinnamon Woodpecker  (R)


*Melanerpes rubricapillus:_ Red-crowned Woodpecker  (R)

To 4 Mar 1956 (Wetmore), occasional at the clearing. Common in more open areas.

*Melanerpes pucherani:_ Black-cheeked Woodpecker  R


_Campephilus melanocephalus:_ Crimson-crested Woodpecker  R

Fairly common in the forest. Notes: Alarm a loud stit-ik; also a rasping kiarhh, often followed by a snarling ri-ai-ai-ai; double to quintuple raps on tree trunks. Breeding: December-February; young left one nest about 20 Feb 1925 (Chapman). Building, Jan 1971 and 1977 (Kilham, Willis).

**Family Dendrocolaptidae:** Woodcreepers

*Dendrocinclus fuliginosa:_ Plain-brown Woodcreeper  R

Fairly common in the forest, usually with army ants. Notes: A loud sharp stieek; faint rattling; and a rapid descending whinny of 20 to 30 notes. Breeding: On Pipeline Road (mainland), carrying nest material 10 May 1969 (J. Karr). In hollow of stub, 1966; breeding May to Sep (Willis, 1972).

*Glyphorynchus spirurus:_ Wedge-billed Woodcreeper  R

Common in the lower levels of the forest. Notes: Sharp, repeated sneezes, chiff. Rising trill or warble. Breeding: 16 nests, most with two eggs or young, 0–3.5 m up in natural tree cavities; young 25 May to 25 Oct 1961 (Gross, F. Loetscher, Willis).

_Dendrocolaptes certhia:_ Barred Woodcreeper  (R)

No records since the last bird of two pairs banded in 1960–1961 was seen 24 Aug 1969 (Willis); usually follows army ants. Notes: A whistled ūrit ūrit; in fights a snarling wi-kaih.

*Xiphorhynchus guttatus:_ Buff-throated Woodcreeper  R

Common in the young forest, uncommon in the old. Notes: Besides song, given at three notes per second, has a slurred pyewl and a loud, slow peer peer peer peer. Breeding: 14 Apr 1956 in partly covered box (Chapman); May 1935 in hole in papaya tree (Skutch).

*Xiphorhynchus lachrymosus:_ Black-striped Woodcreeper  R

Common in the forest, especially in the treetops. Notes: A soft, descending whinny of 10–30 we notes at about four per
second; a loud choo-reep; a loud, descending wheep-wheep-wheep. Breeding: Visiting narrow slit 1.5 m up, 10 Apr to 7 Jun 1961 (Willis).

Campylorhamphus trochilurostris: Red-billed Scythebill V

On Snyder-Molino Trail, 17 Aug 1955 (D. W. Lamm); possibly was resident. Usually in riverine forests and hill country.

Family Furnariidae: Ovenbirds

*Automolus ochrolaemus: Buff-throated Foliage-gleaner (R)

No records since 2 Apr 1966 at Fuertes House (Slud); formerly uncommon resident. Usually in medium-height woodlands. Breeding: 23 Mar 1926, nest with two young in burrow in clay bank (Van Tyne).

*Xenops minutus: Plain Xenops R

Common in lighter woodland, creeping on rotten twigs of low trees and high shrubs. Notes: A sharp peek; a stuttering chip-chip chee chee chee-chee-chee-cheep! rising in pitch and speed; a whit whit whit whit ending at times in spit-spit. Breeding: Two nests, 1.3 and 7.5 m in holes in slender rotten stubs, 9 Jun and 30 Sep 1961; noisy young in second nest (Willis).

*Sclerurus guatemalensis: Scaly-throated Leaftossler R

Uncommon on ground in forest. Notes: A piercing wheel. Song a descending series of accented whistles at about three per second: whit whit whit peet peet peet peet pert pert, often repeated over and over. Breeding: 30 Mar 1935, one nesting in burrow in stream bank (Skutch). 27 Sep 1961, adult fled burrow in Madden Forest Reserve (mainland) (Willis).

Family Formicariidae: Antbirds

*Cymbilaimus lineatus: Fasciated Antshrike (R)

No recent records; last 1961 along lake shore near end of Armour Trail (Willis); a bird of thick vines of woodland and borders.

Thamnophilus doliatus: Barred Antshrike (R)

Vagrant 4 Apr 1966 (Slud) and at Buffavanga Point 5 Jan 1971 (Willis); formerly "occasional" in clearing (Eisenmann). A bird of semi-open areas, common at Frijoles (mainland).

*Thamnophilus punctatus: Slaty Antshrike R

Abundant in the forest understory and midlevels; one pair per hectare (Oniki, 1975). Notes: Ten to 30 rapid, low whistled hu notes end with a nasal wenk; a loud ang-rrrr; a nasal cawing, cao or cao-cao; a catlike meow; a brief stutter. Breeding: Occupied nests recorded every month except Oct and Nov, from 22 Dec (1930, Skutch) to Sep (Willis); mostly Apr to Sep.

*Dysithamnus puncticeps: Spot-crowned Antvireo R

Uncommon in the upper understory of forest. Notes: A soft Otus-like series of whistles accelerating to a roll, without a nasal ending: hu-hu-hu-hu-hu-hu-hu-u-u-u; also a brief roll, t-t-rrrr; faint chirps. Breeding: Nests with two eggs 9 and 11 Jul 1925, Jul 1949 (Gross), 6 Jul 1966 (Willis); food carried to nest 22 Apr 1951 (Collias).

Myrmotherula brachyura: Pygmy Antwren V


Myrmotherula surinamensis: Streaked Antwren (R)

Formerly "not uncommon" (Chapman); a bird of streamside tangles.

*Myrmotherula fulviventris: Checker-throated Antwren R

Very common, probing into hanging dead leaves in the forest understory, often in mixed flocks. Notes: A sharp peek; a high loud tseek-seek-seek-seek; territorial males often bow back and forth a meter apart, throats puffed out, as they repeat squeaky chirps (yip-yip-yip-yip-) for minutes on end. Song reported by Eisenmann (1952) for species is probably that of Dot-winged Antwren. Breeding: 58 oval-entrance pousch nests low (0.4-2.0 m) at tips slender twigs, mainly in rainy season (no Dec, Feb, or Apr nests); two eggs or young, rarely one (1 A. A. Allen; 2 Skutch; 55 Willis).

*Myrmotherula axillaris: White-flanked Antwren R

Very common in mixed flocks in the lower midlevels, fluttering in green foliage. Notes: A loud, descending cheap doo or cheap cheap doo; faint chirps; alarm at nest a dry rattle, t-t-t-rrrr; song at dawn or in disputes a measured series of six to ten descending whistles at two per second: pyee, peee, piy, pey, peh, pu. Breeding: 27 nests (3 Skutch, 24 Willis) 0.2-4.0 m suspended from twig forks, always with large overhanging leaf or leaves, 9 Mar (1961) to 16 Aug (1964), with two (rarely one) eggs or young.

*Microhoyias quixensis: Dot-winged Antwren R

Common near dense vine tangles and foliage, especially in young forest; often in mixed flocks. Notes: A rapid series of five to ten whistles going upscale, pu-peh-pye-pih-pee-pee; often alternated in disputes with one to five rough shaiet notes; alarm notes are a falsetto peep and chew and a tinny buzz like the chirp of a Spotted Antbird; also faint chirps and twitterings. Breeding: Building 22 Feb 1955 (Skutch) and 24 Jul 1961 (Willis).

*Cercomacra tyrannina: Dusky Antbird R

Now uncommon on Burrunga Point; once "common" (Eisenmann) scattered in dense lower growth along lake shores and borders of clearings.
*Myrmeciza longipes: White-bellied Antbird (R)

Once “not uncommon” in young woodlands (Eisenmann); last heard in 1971 near end of Chapman Trail (Willis). Notes: A whistled, di-i-i-i-i-i-i-it; a fast loud rattle similar to series of 20-30 notes that descend in pitch and slow to three long notes on one pitch at the end: see-ee-see-see-see- (etc.)-jew-jew-jew-cherr cherr, cherrp.

*Myrmeciza exsul: Chestnut-backed Antbird (R)

Common in the forest, low near thickets. Notes: A loud, emphatic dee, dew, or dch, dee, dew, the last note lower; a nasal, catlike nyah; a clucking quick-ick alarm; a rattle; and soft chirps and warbles. Breeding: 15 nests (3 Gross, 12 Willis) low on debris, with one or two eggs or young 7 Jun to 12 Oct 1961; nearly independent young 4 Jun 1966 came from eggs laid in Apr; laying is thus at least Apr to Sep (Willis and Oniki, 1972).

*Gymnophithys bicolor: Bicolored Antbird (R)

Uncommon, formerly fairly common; keeps low with army ants. Notes: A low, whining chirrr or sharp chip-ip of alarm; the song, a ringing series of loud whistles that rise and then fall in pitch, often ends with snarling why noises. Breeding: Nests through the rainy season, eggs 15 Apr (1927, Van Tyne) to early Dec (Willis, 1967).

*Hylophylax naevioides: Spotted Antbird (R)

Common in the undergrowth; with army ants about half the time. Notes: A short chrr or rattle and a sharp peeep, often repeated several times; a soft, wheezy song—peety weety weety weety weety weety weety weety; a sharp chit and whining peeel in disputes. Breeding: Nests with eggs Apr to Oct (Willis, 1972a).

*Phaenostictus mcleannani: Ocellated Antbird (R)

Once uncommon (50 birds on island), now almost gone—two males at the 1977 census. Notes: A sharp chrr, cheeeee-yy; a sharp chip-ip-ip; a soft upscale set of whistles, often with a low final note, whee-hi-hih-choo; a loud, thin series of whistles going upscale and then slowing to several long cherr notes. Breeding: Records of fledglings show eggs laid Apr to Dec but nest not definitely located; one cup nest, probably of this species, sunk in ground between tree butresses, with one egg 7 May 1961 (Willis, 1973b).

*Formicarius analis: Black-faced Antthrush (R)

No records since 28 Feb 1951 (Wetmore); formerly “common” (Eisenmann). In Panama, seems to favor young shady woodland, although also found in hill forests; still common on Buena Vista Point across from Salud Point. Notes: A sharp tleet alarm (Skutch), sometimes repeated several times; basic song is peh, peu-pueu, the last notes lower in pitch than the first. Breeding: Nest with one egg in tree stump, 19 May 1929 (Cleaves).

Hylopus perspicillatus: Streak-chested Antpitta (R)

Once fairly common; probably extirpated, as last seen at 150 m south of Armour 6, 21 Jan 1971 (J. Strassenburg). Declined greatly in the 1960's, for it was common from Barbour 4 to Shannon 9 until 1965. Notes: One call a resonant pew, you-you-you-you; more often a series of clear, melancholy whistles, deh deh-see-deh-deh. dew, dew, dew; usually three long and low final notes. Breeding: On Pipeline Road (mainland), two eggs 4 Jul 1969 on leafy platform low on vines (J. Karr).

Family Pipridae: Manakins

*Pipra mentalis: Red-capped Manakin (R)

Common in the lower levels of the forest. Breeding: 19 nests, 10 Mar with eggs (Skutch) to 22 Aug 1964 with young (Willis).

Chiroxiphia lanceolata: Lance-tailed Manakin (V)

Occasional; 11 Mar 1946, female at Miller Trail 15 (Wetmore). Males sang near Balboa Trail 3 from 12 to 18 Oct 1961 and near Wheeler Trail 7.5 from 27 Jan 1965 to 11 Jul 1970 (Willis). A bird of scrub and thickets in second growth. Eisenmann now feels sure that one of the vocalizations credited (1952) to this species—the song starting with whit (not heard on Barro Colorado)—was actually uttered by the Rufous-and-white Wren (Thryothorus rufalbus).

*Manacus vitellinus: Golden-collared Manakin (R)

Uncommon in low woodland on the lake shore and in the clearing, keeping low. Leks along shore include one across the inlet north of dock, active at least since Chapman's time (1935). Breeding: Displays began in mid-Dec, 1968 (Leck). Nest with eggs 27 Feb-1 Aug (Skutch, Van Tyne, Gross).

Schipfornis turdinus: Thrushlike Manakin (R)

Singing south of Wheeler Trail 7.5 to 9 Jun 1967 (Willis); across cove from end of Shannon Trail 23-24 Apr 1978 (Brokaw). A bird of dense growth in low or secondary woodland. Notes: A loud, plaintive whistled see-right-by-key.

Family Cotingidae: Cotingas

Cotinga nattereri: Blue Cotinga (R)


*Atila spadiceus: Bright-rumped Attila (R)

Uncommon, mostly in vine-crowded areas of young forest; perches low to high. Notes: Alarm a sharp di-di-di; songs whistled we-we-two, we-we-two, we-we-two, we're, took! or weed weary weary weary weary two, weed-we-two, sometimes

*Laniocera rufescens: Speckled Mourner R
Rarely seen. Males sang persistently 10-20 m up in vines of dark ravines above American Museum Trail 3.5 and west of Fuertes House at least to 1967, the Fuertes bird still in 1977. Notes: High-pitched, whining songs every minute or two for hours; two to eight hee-pet couplets, often introduced by a nasal whine.

*Rhytipterna holerythra: Rufous Mourner R
Uncommon, a treetop bird of young forest.

*Lipaugus unirufus: Rufous Piha R
Uncommon, a bird of the treetops and upper levels of old forest. Lek 150 m north of Wetmore Trail 10 occupied at least 1960 to 1977. Notes: An emphatic, loud chu-weel-you, sometimes doubled, often given at a loud noise. Also a rattling trrr-trrr-trrr.

Pachyramphus cinnamomeus: Cinnamon Becard (R)
Infrequent around the clearing as late as 24 Aug 1963. Notes: Loud musical trill, teedeedeedee (Eisenmann), varying to whining trills like creaking branches. Breeding: Carrying nest material second week of Apr, 1962 (J. Zimmerman); nests on Pipeline Road (mainland) 19 Apr 1969 (Ridgely) and at Tocumen (mainland) 9 Jul 1952 (Eisenmann).

Pachyramphus polychropterus: White-winged Becard (R)
Few recent records; one at Van Tyne Trail 12 on 21 Jan 1977 (Willis) perhaps vagrant. Earlier "infrequent" (Chapman). Upper to midlevels of second growth and forest edges. Breeding: Feeding young in globular nest in orange tree behind kitchen, 12 Jul 1955 (J. Ambrose, Eisenmann).

Tityra semifasciata: Masked Tityra R
Fairly common in the treetops and at forest edges. Breeding: Building 9 Feb (1961) to feeding young 28 Jul (1963, Willis); nests in woodpecker holes or bare tree cavities (Skutch, Eisenmann, Willis).

Tityra inquisitor: Black-crowned Tityra R

*Querula purpurata: Purple-throated Fruitcrow R

Family Tyrannidae: Tyrant Flycatchers

Colonia colomus: Long-tailed Tyrant I
6 Jul 1962 (H. Holgersen); 6-14 Jan 1971 (Willis); several records 1975-1977. A bird of dead treetops of humid forests. Notes: A high wheeeest. Breeding: Feeding young 15 m up in hole of stub by Agua Salud River at Pipeline Road (mainland), 21 Jul 1964 (Willis); feeding young near Gatun (mainland), 1 Sep 1954 (Arrib).

*Tyrannus tyrannus: Eastern Kingbird N
Common transient; occasionally in huge flocks, as over 500 on 10 Apr 1961 (J. Zimmerman, Willis). Usually in treetops, especially along the lake shore. Recorded 22 Mar (1927, Chapman) to 28 May (1961, Willis) and 14 Sep (1938, Eisenmann) to 1 Nov (1961, Willis). Flocks feeding on fruits of Trichilia cipo in fall (Mark Leighton). They are mainly frugivorous while in Panama, and seem more numerous in spring migration (Morton, 1971).

Tyrannus melancholicus: Tropical Kingbird R

Tyrannus dominicensis: Gray Kingbird N
February, 1940 (D. E. Davis). 21-22 Feb 1952 (Mr. and Mrs. Schnitzer). 15 Mar 1966 (Slud). Winters mainly in more open areas.

Legatus leucophaius: Piratic Flycatcher R
Now rare, formerly uncommon. Favors treetops in semi-open areas. Breeding: Seizes closed nests of others; using oropen-dola nests Feb-Apr (Chapman, Sturgis); appropriating Myiozetetes nests in late March (Chapman). The species is essentially frugivorous, and leaves Panama in the nonbreeding season (Morton, 1977).

Myiodynastes luteiventris: Sulphur-bellied Flycatcher N
Rare transient, recorded 27-30 Sep 1968 (Leck) and by Willis.

Myiodynastes maculatus: Streaked Flycatcher R
A few pairs in the laboratory clearing and along the lake shore; rare in the forest. Breeding: Several broods in tree holes, root corners, window sills, from late Dec (1925, Chapman) to 7-10 Jul (1949, Gross); eggs of the last nest hatched 25 Jul.

*Megarynchus pitangua: Boat-billed Flycatcher R
**Conopias parva**: White-ringed Flycatcher  
28 Feb 1951, along shore east of laboratory (Wetmore). 13–18 May 1961, one in crowns of high second growth by Gigante Bay across from end of Shannon Trail (Willis). Normally in humid or foothill forests.

*Myiozetetes similis*: Social Flycatcher  
Common, foraging high to low along the clearing and lake shore; also atop the canopy in some areas. Breeding: Egg dates Feb-Jun (Chapman, Eisenmann, Leck, Skutch, Van Tyne, Willis).

*Myiozetetes cayanensis*: Rusty-margined Flycatcher  
Scattered pairs low along the lake shore, mainly near grassy marshes; formerly more common. Breeding: Jan-May (Chapman, Eisenmann, G. Hunt, Willis); according to N. G. Smith and W. J. Smith, *M. cayanensis* captures nests begun or built by *M. similis*.

*Myiozetetes granadensis*: Gray-capped Flycatcher  

**Pitangus sulphuratus**: Great Kiskadee  
First 14 Apr 1961 (Eisenmann); 1973 (M. Perrone) to 1977 (Willis and others) increasing and nesting along the lake shore. This species has been steadily extending its range in Panama.

*Pitangus lictor*: Lesser Kiskadee  
Fairly common in coves and at marsh edges, low over water. Notes: Buzzy dzee and dzee-ur. Pairs greet with wip-wip-wip-you in flight. Breeding: Cup nests in bushes or on stumps over water; 2 eggs 4 Mar 1977 and 1 Jul 1962 (G. Hunt, Willis); two broods from one nest at Buena Vista Point left about 20 Jun and 10 Sep, 1961; see Willis, 1962.

*Myiarchus crinitus*: Great Crested Flycatcher  

*Myiarchus panamensis*: Panama Flycatcher  
Until 1967, uncommon in the clearing and along the lake. A bird of second growth and scrub edges. Reported 21 Aug (1970) to 14 Dec (1960) and 12 Mar to 21 May (1961, Willis). Also seen and heard at edges of clearing 9–10 Feb 1940 (Mrs. Fry and party). Notes: Calls often in migration, a peewee (rarely, pee-urr) unlike the pe-e-e-e-e-e-eeet of the Tropical Pewee at Summit Gardens (mainland) or the silence of presumed Western Wood Pewees (*Contopus sordidulus*), migrant chiefly in the mountains of Panama.

**Contopus cinereus**: Tropical Pewee  
Reported at the laboratory clearing 2 Apr 1957 (Wetmore); normally in more open areas.

*Empidonax virescens*: Acadian Flycatcher  
Common in the forest understory from 6 Sep to 1 May (1961, Willis); collected 19 Feb 1927 (Chapman). Notes: A sharp wreep usually marks territorial wintering birds. The Yellow-bellied Flycatcher (*Empidonax flaviventris*) was reported seen 17 Oct 1944 (A. A. Allen) and 23 Feb 1952 (Mr. and Mrs. A. Schnitzer), but as there are many Acadian Flycatchers with yellow bellies, we await collection or recording of the voice of *E. flaviventris* before listing it.

**Empidonax traillii**: Traill’s Flycatcher  
Winter visitor in bushy marshes along shore; no specimens. Notes: A light wit. Currently this complex is divided into two species, not certainly separable in the field except by song. *E. traillii*, the Willow Flycatcher (which sings fitzbew), winters in Panama; *E. alnorutn*, Alder Flycatcher (which sings feebeeo) is a regular transient. We use “Traills Flycatcher” to cover both or either species; in Panama, at least during the northern winter, the Willow Flycatcher is the likely bird (Eisenmann).

*Terenotriccus erythrurus*: Ruddy-tailed Flycatcher  
Fairly common in the forest lower layers. Notes: A thin tee, peet and a faint pe-e-e-e-eet, Breeding: 25 and 29 Mar 1935, two nests with eggs; 18 May, pendent domed nest with nestlings (Skutch).

*Myiobius sulphureapygius*: Sulphur-rumped Flycatcher  
Formerly “not uncommon” (Chapman). Breeding: Nests over stream at rear of clearing, Mar and Apr 1925 (Skutch).
*Myiobius atricaudus: Black-tailed Flycatcher (R)
Formerly "fairly common" along streams and lake shore (Eisenmann). On the mainland, a bird of second growth. Breeding: Five pendent domed nests with eggs, low over water, 28 Jun-9 Aug 1935 (Gross).

*Onychorhynchus mexicanus: Northern Royal-Flycatcher (R)
Formerly uncommon (Chapman); on the mainland, a forest-stream bird. Notes: A soft pee-yuk. Breeding: Nesting over stream Feb–Mar 1935 (Skutch). At Summit (mainland), one nestling and one addled egg 9 May 1966 (S. Olson).

*Platyrinchus coronatus: Golden-crowned Spadebill (R)

*Cnipodectes subbrunneus: Brownish Flycatcher (R)

Tolmomyias assimilis: Yellow-margined Flycatcher (R)
Fairly common in the upper levels of the forest and along shore, often with mixed flocks. Breeding: Building 6 Apr 1948 (Wetmore) and 11 Apr 1962 (Eisenmann). A reported sighting of T. sulphurescens Yellow-olive Flycatcher, on 23 May 1933 (G. Carleton) may refer to this species or to Myiopagis gaimardii.

*Rhynchocyclus olivaceus: Olivaceous Flatbill (R)
Fairly common in vine-crowded forests and woodland. Breeding: 13 Apr 1937, young about four days old in nest (T. Gilliard).

Todirostrum cinereum: Common Tody-Flycatcher (R)
Rare on islets and in scrub along shore; in the clearing to 1961. Common in semi-open areas of Panama. Notes: A sharp chip; a de-e-eet. Breeding: 4 Apr 1957 (T. Gilliard); two eggs, 2 May 1955 (Skutch); two eggs hatched 10 Jul 1950 in orange orchard (Eisenmann).

Todirostrum sylvia: Slate-headed Tody-Flycatcher
Chapman reported it "not common", but the records are uncertain. A bird of low, dense shrubbery in drier areas. Notes: Distinctive tuk, grrrrt.

*Oncostoma olivaceum: Southern Bentbill (R)
Fairly common low in thickets or around treefalls. Breeding: Nests Apr 1937 (Chapman); two eggs, 2 May 1935 (Skutch); young in nest 27 Jul 1970 (Willis). Nest with eggs 7 Aug 1935 in Canal Zone (Harrower).

Myiornis atricapillus: Black-capped Pygmy-Tyrant (R)
Common but rarely seen in the midlevels of tall forest; probably overlooked before 1960. Eisenmann had often heard it calling before 1952, but thought it a tree-frog. Notes: Tseek, repeated faster and faster 2–20 times, like a tree-frog. Call a sibilant sisp. Breeding: Ovoid nest with entrance in side being built by one bird, 5 m on Desmoncus (vine-palm) petiole, 29 Apr 1961 (Willis).

Capsiempis flavola: Yellow Tyrannulet (V)

*Elaenia flavogaster: Yellow-bellied Elaenia (V)
Occasional in the laboratory clearing. Common in more open country and suburban habitats.

Elaenia chiriquensis: Lesser Elaenia (V)
Occasional in the clearing; an open-country bird. Breeding: Off two eggs at Frijoles (mainland), 21 Mar 1961 (Willis); 30 Jul, nest with young in the Canal Zone (T. Imhof).

Sublegatus arenarum: Scrub Flycatcher
"Not uncommon" (Chapman). Probably misidentified, for it is normally a bird of dry Pacific scrub.

Myiopagis gaimardii: Forest Elaenia (R)
Fairly common along the lake shore and at the clearing, high in the edges of the forest; easily mistaken for a Tolmomyias, and probably overlooked prior to 1960.

Camptostoma obsoletum: Southern Beardless Tyrannulet (R)
Fairly common along the lake shore and at the clearing. Notes: pee, dree dree dree; also a peee and chee-yuk and other faint notes. Breeding: 11 Feb 1962, building (Willis); feeding grown young 9 Mar 1949 (Wetmore); 16 May 1966, into nest in laboratory clearing (E. Morton, Willis).

Tyranniscus vilissimus: Paltry Tyrannulet (R)
Very common in the canopy, along the lake shore, and at the clearing. Notes: A heavy chee-yip (Eisenmann) or vireo (Willis); a fast pier-he-he-he-he. Breeding: Building on the Pipeline Road (mainland) in late Feb, 1977; feeding nestlings in domed nest there, 14 Jul 1969 (J. R. Karr).

Tyrannulus elatus: Yellow-crowned Tyrannulet (R)
Common in the clearing and along the lake shore, occasional

**Ornithion brunneicapillum**: Brown-capped Tyrannulet  
Common in the upper levels of the forest and forest edge. Notes: A high, piping whistle, usually of four or five notes with a pause after the first, descending in pitch: *peee, pip-pee-pee*. Breeding: Building on high palm frond on Pipeline Road (mainland), 1 Aug 1970 (Oniki, Willis).

*Pipromorpha oleaginea*: Ochre-bellied Flycatcher  
Fairly common in the lower levels of woodland or clearings, mainly in young forest. Breeding: 2 Mar 1926, two pendent pear-shaped nests against one tree; 12 Jul 1925, two nests (Van Tyne). 23 Nov 1939 nest (Skutch). Three eggs at Lutz Creek, 21 May 1966 (Willis).

**Family Hirundinidae**: Swallows

*Riparia riparia*: Bank Swallow  

*Tachycineta bicolor*: Tree Swallow  

*Tachycineta albilinea*: Mangrove Swallow  
Fairly common, flying low over the lake. Breeding: Rickles (1971) found first egg laid 19 Jan 1968, one fledged; second brood fledged late Apr or May. Young in nest at Frijoles (mainland), 18 May 1966 (Willis).

*Hirundo rustica*: Barn Swallow  
Common transient, 15 Mar (Willis)-17 May (Van Tyne) and 9 Aug (M. Perrone)-12 Dec (Willis); 30 Dec 1934 (D. E. Davis).

*Petrochelidon pyrrhonota*: Cliff Swallow  

*Progne chalybea*: Gray-breasted Martin  
Common over the lake and island. Breeding: In tin-can channel markers, 6 Apr 1950 and 6 Feb 1952 (Wetmore), 20 May 1935 (Skutch); nestling 2 Jul 1951 (R. Laughlin).

*Progne subis*: Purple Martin  
Male over laboratory clearing 30 Aug 1970 (Willis). A transient through Panama, especially on Caribbean slope.

*Phaeoprogne tapera*: Brown-chested Martin  
Migrant breeding in southern South America (*P. t. fusca*); three over laboratory 4 Jul 1949 (Eisenmann, Gross); common at Frijoles (mainland) 29 Apr to 6 Oct 1961 (Willis).

**Family Corvidae**: Jays

*Cyanocorax affinis*: Black-chested Jay  
A single bird 19 Jan 1971 (D. Wechsler, S. Kistler, Willis) near Barbour 15 was last of flock present there in 1965; formerly several flocks resided on island. A bird of woodland and edges.

**Family Troglodytidae**: Wrens

*Campylorhynchus albobrunneus*: White-headed Wren  
6 May 1953 one chattered at edge of clearing (Wetmore). A species of very wet lowland or hill forest.

*Thryothorus leucotis*: Buff-breasted Wren  
Formerly “occasional in thickets around the clearings” (Eisenmann) and in the 1960's on Mona Grita Island. A bird of thickets, especially near water.

*Thryothorus modestus*: Plain Wren  
Formerly occasional pairs in clearing, on Slothia Island, and grassy islands of southwestern lake shore, 6 Sep 1958 to 1967; last heard 1971 on southwestern shore (Eisenmann, Willis). A bird of cleared, semi-open, and grassy areas with scattered bushes or thickets.

*Thryothorus fasciatoventris*: Black-bellied Wren  
Last recorded 22 Aug 1964 along Burrunga Point (Willis); formerly “occasional in thickets” (Eisenmann). Notes: A rough scold followed by loud whistles, *soo-soo, ho-e-trick*; also rich whistles like *choop per cheer ho ho* repeated several times.

*Troglodytes musculus*: Southern House Wren  
No records since 2 Jul 1966; formerly one or more pairs at the laboratory and sometimes at houses along shore. Breeding: Egg dates, early Jan through Aug (Chapman, Van Tyne, Skutch, Eisenmann).
*Henicorhina leucosticta: White-breasted Wood-Wren (R)

*Cyphorhinus phaeocephalus: Song Wren (R)
Last noted near Fuertes House in 1961 (Willis); formerly fairly common. Two pairs reintroduced 1976 and both bred successfully (Morton). A bird of humid woodland thickets. Notes: A strange mixture of froglike grunts and musical whistles, often from one bird—ong cutta cutta, whong cutta cutta glut, WHOO HEE, etc.

*Microcerulus marginatus: Nightingale Wren (R)

Family Mimidae: Mockingbirds

Dumetella carolinensis: Gray Catbird N
A few migrants recorded in the dry season.

Mimus gilvus: Tropical Mockingbird V
Vagrants at laboratory, 11 Aug 1967 (Karr) and 6 Sep 1970 (Willis). Common around houses and lawns in the Canal Zone, where introduced from South America.

Family Turdidae: Thrushes

Turdus assimilis: White-throated Robin V
Rare vagrant from hill country; one followed army ants near the Tower 28 Oct 1960-14 Jan 1961; also near the Tower 16 Sep 1961 and 2 Jan 1971 (Willis).

*Turdus grayi: Clay-colored Robin (R)
Last noted 16 Mar 1966 (Stud); until 1961, usually a pair or two in the clearing. Common on lawns in Canal Zone.

Hylocichla mustelina: Wood Thrush N
Uncommon winter visitor on forest floor, 16 Oct to 20 Apr (1961, Willis). Often follows army ants.

*Catharus ustulatus: Swainson’s Thrush N

*Catharus minimus: Gray-cheeked Thrush N
Common fall transient, rare winter visitor and spring transient. 5 Oct-3 Dec 1960 and 25 Jan, 4 Feb, and 15 Apr 1961 (Willis). Often follows army ants.

Catharus fuscescens: Veery N

Family Sylviidae: Gnatcatchers and allies

*Polioptila plumbea: Tropical Gnatcatcher (R)
Uncommon in the treetops and woodland borders, fairly common along shore.

*Ramphocacaeus rufiventris: Long-billed Gnatwren R
Uncommon in vine tangles in lighter woods. Breeding: On nest 23 Apr and building 6 Jul 1961 on Buena Vista Point (Willis); newly hatched young in Panama City, 15 Jul 1950 (Eisenmann).

Family Cypharhidae: Peppershrikes

Cyclarhis gujanensis: Rufous-browed Peppershrike V
Singing at laboratory 9-10 Mar 1949 (Wetmore). In Panama, mostly in trees of open country of Pacific slope.

Family Vireolanidae: Shrike-Vireos

*Smaragdolanius pulchellus: Green Shrike-Vireo R
Uncommon, singing recently mainly at tops trees near Wheeler Estero Dec to Sep. Formerly more widely distributed and fairly common in the forest. Breeding: Female building mossy vireo-like cup 14 m up as male sang and watched, 15 May 1966 in the Madden Forest Reserve (mainland) (Willis). Notes: A frequently repeated phrase of three whistles, peeea, peeea or pee, pee pee, suggestive of the call of the temperate North American Tufted Titmouse, Parus bicolor.

Family Vireonidae: Vireos

Vireo flavifrons: Yellow-throated Vireo N
Common fall transient and uncommon winter visitor and spring transient. 5 Oct-13 Nov 1960, 12 Mar (Skutch); sings persistently in the fall. Notes: Burry short phrases, eeyeh, duree, earwit, vireo, etc. Rasping riit jii jii jii jii jii jii jii jii jii jii jii jii jii.

Vireo olivaceus: Red-eyed Vireo N
Common transient in treetops and forest edge 19 Aug (1970, Willis) to 5 May (1955, Wetmore); commonest Sep to Nov. Notes: Song is much like that of a white-eyed vireo.

Vireo flaviviridis: Yellow-green Vireo N
Common transient in treetops and forest edge 19 Aug (1970, Willis) to 5 May (1955, Wetmore); commonest Sep to Nov. Notes: Song is much like that of a white-eyed vireo.
of northern Red-eyed Vireo, but phrases tend to be shorter (Eisenmann).

_Hylophilus flavipes:_ Scrub Greenlet  

*Hylophilus decurtatus: Lesser Greenlet  
Very common in the treetops, often the center of mixed flocks there or in groups of its own kind. Notes: A cheet-geet or similar phrase, often repeated two or three times; uttered monotonously, and easily mistaken for a song of the Yellow-green Vireo.

**Family Coerebidae: Honeycreepers**

*Coereba flaveola: Bananaquit  
Fairly common, especially in forest edges and lighter forest. Breeding: Nest Nov to Apr (Skutch), 30 Aug 1947 (Eisenmann). Old nests often used for sleeping, and sleeping nests are built.

_Cyanerpes lucidus:_ Shining Honeycreeper  
Uncommon at forest edges and in the canopy.

*Cyanerpes cyanus: Red-legged Honeycreeper  
Common in the canopy and at forest edges; rarely seen or absent during post-breeding period, 8 Sep (1958, molting male) to 10 Nov (1962, full-plumaged male; Eisenmann). Breeding: Nest being built 27 Feb 1952 (Mr. and Mrs. Schnitzer). Two fluffy fledglings 21 Jun 1952 (Eisenmann).

*Chlorophanes spiza: Green Honeycreeper  

*Dacnis cayana: Blue Dacnis  

_Dacnis venusta:_ Scarlet-thighed Dacnis  
Occasional at forest edges or in the treetops, first recorded 8 Feb 1951 (Collias) but probably overlooked earlier. Commoner in humid foothill forests. Breeding: Two males with female, she feeding grown fledgling at the laboratory, 18 Jul 1962 (G. Hunt, Willis).

**Family Parulidae: Wood Warblers**

_Mniotilta varia: Black-and-white Warbler  
Uncommon winter resident; late date, 27 Mar (1966, Slud).

_Protonotaria citrea: Prothonotary Warbler  
Fairly common 15 Sep (1972, M. Perrone) to 23 Mar (1955, Wetmore), low along the lake shore.

_Helmitheros vermivorus: Worm-eating Warbler  
Rare winter visitor in forest, reported 21 Oct (1960, Willis) to 16 Mar (1966, Slud).

_Vermivora chrysoptera: Golden-winged Warbler  
Rare transient, 19 Sep (1951, Bourlière) to 8 Oct (1960) and 16 Mar (1966, Slud) to 17 May (1961, Willis).

_Vermivora peregrina: Tennessee Warbler  
Common fall migrant, fairly common winter and spring along the lake shore and in the clearing and canopy; recorded 8 Oct to 23 Apr (1961, Willis).

*Dendroica petechia: Chestnut-sided Warbler  
Fairly common winter visitor and transient, especially in the clearing and along the lake shore, 18 Aug (1965, Willis) to 4 May (1929, collected, Van Tyne). Birds are of the northern aestiva group.

_Dendroica magnolia: Magnolia Warbler  
Rare in winter in tangles in the forest; 15 Jan (1961, Willis) to 12 Apr (1961, Eisenmann).

_Dendroica cerulea: Cerulean Warbler  
Uncommon transient in mixed flocks high in forest, 14 Apr 1970 and 17 Sep 1961 (Willis); 18 to 28 Mar 1966 (Slud).

_Dendroica fusca: Blackburnian Warbler  
Rare transient, 5 Sep (1958, Eisenmann) to 26 Oct (1972, M. Perrone) and 20 Mar (1950, Cottrell).

*Dendroica pensylvanica: Chestnut-sided Warbler  
Common winter visitor in the lower midlevels of the forest and edges, 7 Sep (1970, Willis) to 21 Apr (1958, F. Chapelle).

_Dendroica castanea: Bay-breasted Warbler  
Common winter visitor in the midlevels of the forest and edges, 16 Oct (1960) to 21 Apr (1961, Willis).

_Dendroica striata: Blackpoll Warbler  
Vagrant, reported 6 Nov 1944 (A. Allen) and 8–9 Feb 1940 (Mrs. G. G. Fry, Mrs. L. J. Francke). At most casual in continental Middle America.

_Seiurus aurocapillus: Ovenbird  
Rare winter visitor on the ground in forest, 18 Oct to 31 Mar (1961, Willis).
Seiurus noveboracensis: Northern Waterthrush N
Fairly common winter visitor along streams and the lake shore, 29 Sep (1968, Leek) to 6 May (1953, Wetmore).

Seiurus motacilla: Louisiana Waterthrush N

Oporornis formosus: Kentucky Warbler N
Common winter visitor on or near the ground within lighter forest, less common in old forest; recorded 4 Sep–18 Apr (1961, Willis).

Oporornis philadelphia: Mourning Warbler N
Uncommon winter visitor in bushes in and near grassy marshes.

Geothlypis trichas: Common Yellowthroat N
Collected by Chapman, 28 Jan 1929.

Wilsonia citrina: Hooded Warbler N
Males 24 Sep 1951 (Bourlière) and 5 Jan 1977 (N. Brokaw).

Wilsonia canadensis: Canada Warbler N

Setophaga ruticilla: American Redstart N
Rare winter visitor, 17 Sep (1961 and 1965, Willis) to Feb (1940, Mrs. Fry).

Basileuterus delatrii: Chestnut-capped Warbler (R)

Basileuterus fulvicauda: Buff-rumped Warbler (I)
1960 to 1962 one or two sang loudly along creeks near the clearing.

Family Icteridae: Troupials

Zarhynchus wagleri: Chestnut-headed Oropendola R
Small bands occasional in the clearing and forest canopy from Dec through Jul; nest colonially in the clearing or along shore in some years. Breeding: Building in early Jan, egg laying late Jan to Apr, young gone by the end of Jun (Chapman). Nesting is later in some years.

Psarocolius decumanus: Crested Oropendola V
Several around laboratory 5 May 1953 (Wetmore).

Cacicus cela: Yellow-rumped Cacique R
Individuals or small groups sometimes forage in the canopy or along the lake shore, mainly Dec to May near Gigante Bay. Breeding: Colony of 16 nests over water Apr-May 1935, destroyed by snake (Skutch); colony of about 16 nests over Gigante Bay, 3 Apr 1969 (Leek).

Amblycercus holosericeus: Yellow-billed Cacique V
19 Febr 1940 at clearing (Mrs. Fry). Thicket bird of more open and cleared areas of Panama. Notes: Mellow whistles, often doubled (weew-weew) from the male answered by a wheee, churr from the female (Skutch, Willis).

Scaphidura oryzivora: Giant Cowbird R
Occasional at colonies of oropendolas or caciques, in whose nests it lays its eggs. Feeds in more open parts of Panama.

Cassidix mexicanus: Great-tailed Grackle V
Near the laboratory 17 Apr 1942 (T. Imhof), 12 Mar 1946, 8 Mar and 3 May 1949 (Wetmore). Common on lawns and in trees around towns and along coasts in Panama.

Icterus spurius: Orchard Oriole N
Rare winter visitor around the laboratory and along the lake shore. 19 Feb (1937, Chapman) to 2 Apr (1961, Willis). Common during northern winter about Panama City and the Canal Zone.

Icterus mesomelas: Yellow-tailed Oriole V
Near the laboratory 17 Apr 1942 (T. Imhof), 12 Mar 1946, 8 Mar and 5 May 1949 (Wetmore). Common in trees of thickets along marshy edges of streams elsewhere in much of Panama.

Icterus chrysater: Yellow-backed Oriole R
Fairly common in young forest along the lake shore. Notes: A repeated loud gai-eek; song a rambling series of loud, clear whistles, up and down scale but ending inconclusively. Breeding: In palm tree near dock, Feb 1972 (Schnitzers). Five birds at nest being built on Mona Grita Island, 5 Feb 1977 (N. Brokaw, J. Pickering, Willis).

Icterus galbula: Northern Oriole N
Rare winter visitor in treetops and at the clearing, 24 Sep (1972, M. Perrone) to 19 May (1961, Willis). The race galbula (Baltimore Oriole) winters commonly in Panama. Female with characters of the western bullocki seen in lab clearing 15 Nov 1972 (M. Perrone).

Dolichonyx oryzivorus: Bobolink N
Male sighted on a cove of Dickcissels, 16 Apr 1961 (Eisenmann, Willis, J. Zimmerman).
Family Thraupidae: Tanagers

Euphonia minuta: White-ventued Euphonia
Male or pair seen in clearing, 1 Feb 1969 (Leck) to 1971 or later (Ridgely, Willis). Foothill bird, perhaps post-breeding wanderer to island.

Euphonia fulvicrissa: Fulvous-vented Euphonia
Common in the treetops and at the forest edge, usually in pairs.

*Euphonia laniirostris: Thick-billed Euphonia (R)

*Tangara larvata: Golden-hooded Tanager
Pairs and small groups formerly occasional around the clearing and in the treetops. Not seen 1977. Breeding: Feb-May 1937 (Skutch) to (two eggs in old oropendola nest) 20 Aug 1954 (Eisenmann).

*Tangara inornata: Plain-colored Tanager
Common in small groups around the clearing and along the lake, usually in the canopy. Breeding: Young left 23 Mar 1955 (Wetmore); carrying nest material 23 Aug 1954 (Eisenmann). Three banded by C. Koford in 1956 were recaptured by T. C. Crebbs, Jr., and S. Harty in 1963 when more than six and a half years old (Crebbs, 1965).

Tangara gyrola: Bay-headed Tanager

*Thraupis episcopus: Blue-gray Tanager
Fairly common in the clearing and along the lake shore. Rare in the forest canopy. Breeding: Nests January (Chapman) to 10 May (1935, Skutch); building 4 Jul 1948 (P. Longenecker, Eisenmann).

*Thraupis palmarum: Palm Tanager
Fairly common in the clearing, occasional along the lake shore or in the canopy, especially of palms and buildings, Jan (1926, Chapman) to 1 Jun (1935, Skutch).

*Ramphocelus dimidiatus: Crimson-backed Tanager (R)
Only vagrant young males to clearings and lake shore since 28 Mar 1966 (Slud); formerly a few pairs bred in the clearings. A bird of thickets and smaller trees in towns, clearings, and semi-open areas, common at Frijoles (mainland). Breeding: Feb-May 1935 (Skutch). Notes: Song a monotonous but somewhat musical chikéé chikéé; dawn song cheeawee repeated ten or more times; call a sharp nasal nyëhk or yeenk; also chewik and keeya (Eisenmann).

Ramphocelus icteronotus: Yellow-rumped Tanager
Until 1962, irregular in the laboratory clearing; no recent record. A bird of marshy borders and thickets in humid zones; common at Frijoles (mainland). Notes: Much like those of Crimson-backed Tanager; common calls ppiii, also nyëek and cheecik (Eisenmann).

*Piranga rubra: Summer Tanager
Uncommon winter visitor around the clearing and in the forest treetops, 11 Sep (1965, Eisenmann) to 20 Apr (1961, Willis).

*Piranga olivacea: Scarlet Tanager

*Habia fuscicauda: Red-throated Ant-Tanager
Uncommon in the young woodland, mainly along the lake shore. A bird of secondary woodland and thickets; follows army ants at times. Breeding: In the Canal Zone, nests 14 May (Stone) to early Jul (Willis, 1972).

Tachyphonus rufus: White-lined Tanager
To 1961, irregular in the clearing; a bird of thickets and semi-open areas at the edge of humid woodlands.

*Tachyphonus luctuosus: White-shouldered Tanager
Fairly common in the canopy and occasional at the edge of the clearing, often in mixed flocks.

Heterospingus rubrifrons: Sulphur-rumped Tanager
Fairly common in the canopy, in groups. Notes: A sharp tseet.

*Eucometis penicillata: Gray-headed Tanager
Fairly common in the undergrowth, mainly with army ants. Notes: A sharp chip and high stet; a high sweeyie tsweeyie; song a musical sputter, eat eat meat chop, 'safurry chew, 'sfurry chew or the like. Breeding: Nest with eggs 1-2 Apr 1935 (Skutch); one egg hatched 11 Jul 1948 (P. Longenecker, Eisenmann); other records Apr to Sep (Willis).

Mitrospingus cassini: Dusky-faced Tanager
Immigrants about edge of laboratory clearing from 2 Nov 1972 (M. Perrone); gone by 1977. Notes: A loud, rattling repeated tsrip-tsrip varied to tsriep-tsriep (Eisenmann).
Rhodinocichla rosea: Rosy Thrush-Tanager  V

Family Fringillidae: Finches
Saltator atriceps: Black-headed Saltator  V
15 Jul 1962 at southern tip of island (Willis). Local in damp second growth of western and central Panama. Notes: A loud wheek and rough shaw at intervals, also other loud calls.

Saltator maximus: Buff-throated Saltator  (R)
To 1 Sep 1964, occasional around the clearing; common in woodland edges and second growth, as at Frijoles (mainland). Notes: A sharp seeeeeep; song short robinlike musical phrases.

Saltator albicollis: Streaked Saltator  V
Formerly occasional at the clearing; common in open areas, as Frijoles (mainland).

Pitylus grossus: Slate-colored Grosbeak  R
Fairly common in the upper midlevels of the forest. Notes: In addition to songs, a metallic cardinal-like chip and a jay-like nyah.

Pheucticus ludovicianus: Rose-breasted Grosbeak  N
Rare to uncommon in clearing or canopy in migration and winter, 14 Oct (1960) to 21 Apr (1961, Willis).

Cyanocompsa cyanoides: Blue-black Grosbeak  R
Fairly common in thickets in valleys and young forest. Notes: pick; also a rising and then descending clear series, do- do, deh, dee, deh, do, often ending with a soft twitter. Breeding: Eggs Jul 1947 (C. A. Moore).

Passerina cyanea: Indigo Bunting  N
Occasional in migration or winter: several winter 1957–1958 (Moynihan); 22 Mar (1955, Wetmore) to 14 Apr (1961, Eisenmann).

Spiza americana: Dickcissel  N
Occasional in winter (Chapman) and on migration; many records 13 Mar to 17 May 1961, when J. Zimmerman kept birds in outdoor cages. 5 Sep 1958, one at laboratory (Eisenmann).

Volatinia jacarina: Blue-black Grassquit  V

Sporophila schistacea: Slate-colored Seedeater  V
An irruption of singing birds to clearings where trees were felled by windstorm of 1 Oct 1961 lasted from 16 Oct 1961 to 18 Feb 1962 at least (Willis). Male singing in planted bamboo thicket at clearing, 15–19 Mar 1975 (Eisenmann, Morton). Feb–Mar 1977 in bamboo near Armour Trail 1 (N. Brokaw, D. Schemske, Willis). Singing commonly in early 1978 (N. Brokaw). Evidently attracted by bamboo seed crops, and wanders widely to such areas. Notes: Song tsee, tisititisiti, the last part very thin and high, sometimes varied by a thin rattle (Eisenmann).

Pterocles aurita: Variable Seedeater  R
Irregularly common in the clearing; occasional in shrubbery of grassy marshes along shore. Breeding: Juvenile at laboratory 25 Jun 1973 (M. Perrone). Nests as early as late May (Gross, 1992) and with fresh eggs as late as Sep (Gross, Eisenmann).

Sporophila nigricollis: Yellow-bellied Seedeater  V
Occasional in the clearing; a common bird in grassy semi-open country.

Oryzoborus funereus: Thick-billed Seed-Finch  V
Occasional in the clearings; a bird of bushy, semiopen areas, as at Frijoles (mainland).

Arremonops conirostris: Black-striped Sparrow  (R)
As late as 28 Mar 1966 (Slud), there was a pair or two in the clearing; and in 1961 one pair was at the Miller Trail outer lighthouse. A bird of bushy fields and cleared areas in Panama. Breeding: In central Panama, nests with eggs 18 Apr (Stone) to 7 Oct (Karr).
Bennett, C. F., Jr.

Chapman, F. M.

Crebbs, T. C, Jr.

Davis, L. I.

Ehrenfield, D. W.

Eisenmann, E.

Kilham, L.

Knight, D. L.

Laughlin, R. M.

Leck, C. F.

MacArthur, R., H. Recher, and M. Cody

Moynihan, M. H.

Morton, E. S.

Myers, C. W., and A. S. Rand
1969. Checklist of Amphibians and Reptiles of Barro Colorado Island, Panama, with Comments on Faunal Change and Sampling. Smithsonian Contributions to Zoology, 10: 11 pages.
Oniki, Y.  
Ricklefs, R. E.  
Ridgely, R.  
Simberloff, D. S., and L. G. Abele  
Slud, P.  
Skutch, A. F.  
Smith, N. G.  
Smith, W. J.  
Stone, C. D.  
Stott, K., Jr., and C. J. Selsor  
Wetmore, A.  
Wiley, R. H.  
Willis, E. O.  
Willis, E. O., and Y. Oniki  
Wilson, E. O., and E. O. Willis  
Windsor, W. M., editor  
Woodring, D. F.  
Zaret, T. M., and R. T. Paine  
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Taxonomic keys in natural history papers should use the aligned-couplet form in the zoology and paleobiology series and the multi-level indent form in the botany series. If cross-referencing is required between key and text, do not include page references within the key, but number the keyed-out taxa with their corresponding heads in the text.

Synonymy in the zoology and paleobiology series must use the short form (taxon, author, year), with a full reference at the end of the paper under “Literature Cited.” For the botany series, the long form (taxon, author, abbreviated journal or book title, volume, page, year, with no reference in the “Literature Cited”) is optional.

Footnotes, when few in number, whether annotative or bibliographic, should be typed at the bottom of the text page on which the reference occurs. Extensive notes must appear at the end of the text in a notes section. If bibliographic footnotes are required, use the short form (author/brief title/page) with the full reference in the bibliography.

Text-reference system (author/year/page within the text, with the full reference in a “Literature Cited” at the end of the text) must be used in place of bibliographic footnotes in all scientific series and is strongly recommended in the history and technology series: “(Jones, 1910:122)” or “. . . Jones (1910:122).”

Bibliography, depending upon use, is termed “References,” “Selected References,” or “Literature Cited.” Spell out book, journal, and article titles, using initial caps in all major words. For capitalization of titles in foreign languages, follow the national practice of each language. Underline (for italics) book and journal titles. Use the colon-parentheses system for volume/number/page citations: “10(2):5–9.” For alignment and arrangement of elements, follow the format of the series for which the manuscript is intended.

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(2) Use hyphens in spelled-out fractions: “two-thirds.”
(3) Spell out numbers “one” through “nine” in expository text, but use numerals in all other cases if possible.
(4) Use the metric system of measurement, where possible, instead of the English system.
(5) Use the decimal system, where possible, in place of fractions.
(6) Use day/month/year sequence for dates: “9 April 1976.”
(7) For months in tabular listings or data sections, use three-letter abbreviations with no periods: “Jan, Mar, Jun,” etc.

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