

## Avifauna of Little Tobago Island

JAMES J. DINSMORE

IN RECENT years the study of island populations has received considerable attention, especially the dynamic aspects of species composition (e.g. Diamond, 1969). As some of these studies have depended on limited lists of insular faunas, the following intensive study of the avifauna of one island should be of value. From 23 September 1965 to 4 July 1966 I lived on Little Tobago Island in the southern West Indies and compiled a list of the birds found there along with population counts and other notes on the bird's habits. Roldan George of Speyside, Tobago, assisted throughout my stay and continued observations from 4 July to 30 September 1966. Unless otherwise noted, all records refer to the period 1 October 1965 to 30 September 1966.

Little Tobago, a 280-acre island located at  $11^{\circ}18'N$ ,  $60^{\circ}30'W$ , is about 1 mile off the northeast coast of Tobago. The island is very hilly with virtually no level ground and a maximum elevation of 464 feet. It has no permanent ponds or streams but one small spring flows throughout the year.

Little Tobago has no permanent human inhabitants although a caretaker spends occasional nights on the island and people have lived there at various times in the past. Since 1928 it has been a game sanctuary and all forms of wildlife are protected. Local people have released goats on the island but in mid-1966 all of them had been removed. Although a tree rat (*Rhipidomys*) has been described from the island (Goodwin, 1961), I found no evidence of it in 1965-66 and believe that perhaps its type locality is Tobago proper.

Temperatures normally reach the low 80's during the day and drop to about 70F at night. Rainfall in 1966 exceeded 85 inches. The dry season lasted from mid-February to 19 April when 3.42 inches of rain fell. June and November were the wettest months. Hurricanes are rare on Little Tobago but one in 1963 did extensive damage to the vegetation.

The vegetation is mainly a deciduous seasonal forest (Beard, 1944), within which several distinct vegetation types occur. The deciduous forest has an almost closed canopy and a scattered under-story, and it is found over much of the wind-protected parts of the



island. The upper canopy ranges up to 50 feet in height but most of the trees are from 35-45 feet tall. The fan palm (*Coccothrinax australis*) and Gumbo-limbo (*Bursera simaruba*) are by far the most common trees in the upper canopy. Young *Coccothrinax* are the most common trees in the understory but *Eugenia* sp. and *Mayepea caribaea* are also common. The aroid *Anthurium hookeri* is abundant at ground level. The degree of deciduousness varies with the length of the dry season, *Bursera* being one of the first to drop its leaves. In wet years leaf fall is incomplete. Most of the understory species are evergreen.

Several parts of the island that were probably originally deciduous forest were extensively damaged by the hurricane in 1963. These parts now have few tall trees and are covered with thick masses of almost impenetrable low brush. The rapid growing tree *Cordia collococca* and the shrub *Aphelandra incerta* are common in these areas.

Thick tangles of cactus (*Cereus hexagonus*, *Hylocereus lemairei*, and *Cactus broadwayi*) and *Plumbago scandens* cover the steep slopes and cliffs on the lower levels of the island, particularly on the windward (east) side. Near sea level the vegetation is windswept and planed off with a low mat of vines covering the ground.

Several almost pure stands of *Coccothrinax australis* are concentrated on the windward side of the island above the cliff vegetation. These stands have few trees in the understory and again *Anthurium hookeri* is abundant at ground level.

Eleven small garden plots cover about 8 acres, mainly in bananas (*Musa* sp.). The gardens also have guava (*Psidium guajava*), spondilla (*Achras zapota*), and mango (*Mangifera indica*) with lesser numbers of several other species. Papaya (*Carica papaya*) was cultivated on the island for the birds but now grows wild, mainly in openings such as those produced by the hurricane. Several abandoned gardens and a few acres around the two cabins are overgrown with tall grass.

Although many ornithologists and naturalists have visited Little Tobago to see the introduced birds of paradise, few have made more than casual reference to other birds they saw. I have reviewed the history of birds of paradise on Little Tobago elsewhere (Dinsmore, 1970) and will not consider it in detail here. Despite all this



work, no one has previously published a complete listing of the avifauna of this island.

The most recent listing of the birds of Tobago (Bond, 1970) mentions several species that occur on Little Tobago, all of which were either seen by me in 1965-66 or have been published previously.

In an attempt to estimate the population of all nesting land birds, I divided Little Tobago into 36 sections, using paths and natural features for division lines. These sections varied considerably in size. I traversed each of these alone or with another experienced observer and stopped often to note birds heard or seen. Except for thrushes which were more active in the evening, all counts were made prior to 10:00 AM from March through June. Each bird seen or heard was recorded on a field map and later these records were transferred to maps of the whole island, one map per species. Except for the extremely rough southeast corner of the island, all sections were covered at least once and some counts were refined when it was obvious that I had erred in my original count. The totals of the counts for each species are given in the left column of Table 1. While many times we saw what probably were both members of a pair, other times we saw or heard only one individual but undoubtedly a second was present, perhaps on a nest. The right column of Table 1 gives totals per species when these "unseen but probably present" individuals are added to the totals. This gives a probable maximum number per species for the island.

I am aware of the pitfalls of my methods but with the limited time available it was the only means possible. The counts were made over a long period of time and certainly some birds moved from one section to another, died, or young birds were added to the island although I excluded the latter whenever their age was obvious. The counts are certainly better than a guess and give at least some idea of the abundance of birds on Little Tobago.

I counted other nesting species by a variety of methods. Some were counted as they entered roosts (anis, cowbirds), as they flew at peak hours of activity (swifts, martins, hawks), at nesting colonies (oropendolas), or from a boat or promontory where I could see a lengthy stretch of shoreline (seabirds). Population estimates



TABLE 1  
Population estimates of some Little Tobago birds

| Species                   | Number seen<br>in counts | Probable maximum<br>number present |
|---------------------------|--------------------------|------------------------------------|
| Wild Fowl                 | 141                      | 150                                |
| Pale-vented Pigeon        | 92                       | 120                                |
| White-tipped Dove         | 297                      | 400                                |
| Rufous-breasted Hermit    | 57                       | 75                                 |
| Black-throated Mango      | 17                       | 30                                 |
| Ruby-topaz Hummingbird    | 90                       | 175                                |
| Copper-rumped Hummingbird | 57                       | 80                                 |
| Blue-crowned Motmot       | 245                      | 350                                |
| Tropical Kingbird         | 101                      | 130                                |
| Brown-crested Flycatcher  | 304                      | 375                                |
| Yellow-bellied Elaenia    | 173                      | 235                                |
| House Wren                | 359                      | 600                                |
| Tropical Mockingbird      | 704                      | 725                                |
| Bare-eyed Thrush          | 179                      | 310                                |
| Red-eyed Vireo            | 129                      | 210                                |
| Bananaquit                | 583                      | 840                                |
| Blue-gray Tanager         | 250                      | 310                                |
| Blue-black Grassquit      | 13                       | 25                                 |
| Black-faced Grassquit     | 134                      | 175                                |
| Lined Seedeater           | 14                       | 25                                 |
| Yellow-bellied Seedeater  | 12                       | 25                                 |

for these species are given in parenthesis after the species account.

In all I saw 59 species of birds on Little Tobago. The vernacular and scientific names follow those of Meyer de Schauensee (1966).

#### ANNOTATED LIST OF SPECIES

*Puffinus lherminieri*. Audubon's Shearwaters nest in the thick masses of cactus and vines on the sea cliffs and in open stands of fan palm where they burrow among the root masses of *Anthurium*. I first found adults in nest burrows in early December and first saw eggs on 24 January. Egg-laying continued until at least mid-February but most occurred during the last week of January and the first of February. Two eggs had incubation periods of 51 and 52 or 53 days. The young remained in the nest burrows until late May or early June. Eleven young birds stayed in the burrows an average of about 75 days before leaving.



I found 27 dead shearwaters with the sternum and neck stripped of flesh. As I never saw shearwaters flying near the island in daylight, they were probably killed by Barn Owls (*Tyto alba*). Seven that I found on 9 June had been killed in the previous two days and were probably young birds just out of the nest burrow.

I did not hear adults calling over the island in June when the young were leaving the nests but by mid-August adults again were near the island. Brown (1947) found numerous eggs and some downy chicks on 31 March 1940 and Collins (1969) found partially grown downy young on 29 April 1967, indicating that the breeding cycle apparently is annual. (1,000)

*Phaethon aethereus*. I first saw Red-billed Tropicbirds on 27 September 1965 when two circled near the island. Their numbers gradually increased, reaching a peak from December through February and then decreasing until the last ones left in August. They nest in crevices or under masses of cactus on the cliffs. I saw a downy chick as early as 4 January but other nests contained an egg as late as 21 March. Young birds started leaving the nests in April but some were still present in late June.

Brown (1947) saw some eggs and downy to nearly fledged chicks on 31 March 1940. Bond (1958) saw this species here on 29 January 1958 and considers the records of *P. lepturus* from Tobago (Belcher and Smooker, 1934) doubtful (Bond, 1962), a stand I agree with. (500)

*Pelecanus occidentalis*. Except for three seen on 25 March, Brown Pelicans were absent from 15 February to 4 July, but during the rest of the year I saw some at least several times each month. In the period of absence, which coincides with their nesting season at their nearest colony on Saut D'Eau Island, Trinidad (Brown, 1947), pelicans were still common on the western end of Tobago. I saw no sign of pelicans nesting on Little Tobago.

*Sula sula*. Red-footed Boobies nest on St. Giles Island and outlying rocks 3.5 miles north of Little Tobago (Dinsmore and French, 1969) and commonly fly near or over Little Tobago.

*Sula leucogaster*. A common resident, Brown Boobies usually nest on steep slopes near the sea. Of 220 nests I located, I was able to estimate the date of laying of 103 eggs to the nearest third of a month, using the dates young reached various plumages and back dating. I used plumage information compiled by Dorward



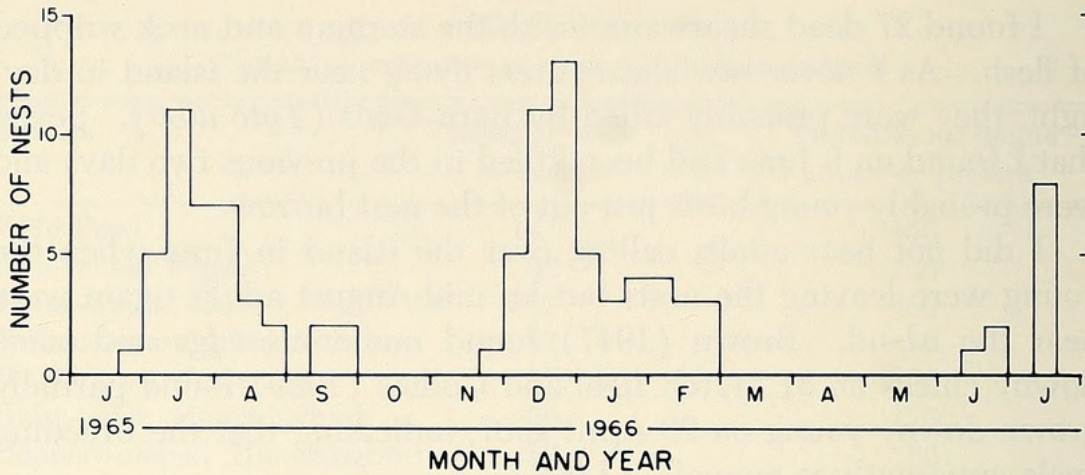


Fig. 1. Estimated time of egg-laying, in one-third month intervals, for 103 nesting attempts by *Sula leucogaster* on Little Tobago, West Indies.

(1962) as a guide to ages. I found two definite peaks of egg-laying (Fig. 1), one in July and early August and the second in December. Limited data from a small part of the island indicates another peak of laying in the summer of 1966, roughly a year after the one in 1965. All the young in the other nests I located seemed to fit into one or the other of the two main peaks but I could not accurately determined the date of egg-laying. Schreiber and Ashmole (1970) note that Brown Boobies often have two peaks of breeding per year. (600)

*Fregata magnificens.* A few Magnificent Frigatebirds nearly always are flying over Little Tobago but I never saw one land on the island. Several thousand frigatebirds frequent nearby St. Giles Islands where they nest (Dinsmore and ffrench, 1969).

*Florida caerulea.* Both adult and immature Little Blue Herons were common along the rocky shoreline from September 1965 to December, February, and again from June through September 1966. I saw no nesting activity.

*Nyctanassa violacea.* I saw Yellow-crowned Night Herons every month except November and December. They often roosted in the dense shrubs above the cliffs and fed along the rocky shoreline. On 26 April I saw two adults manipulating sticks at what appeared to be the start of a nest, but they soon abandoned it. (4)

*Coragyps atratus.* I saw single Black Vultures over Little Tobago on six occasions between 25 September and 27 May. Only recently added to the avifauna of Tobago (Herklots, 1961), it also has been seen at nearby St. Giles (Dinsmore and ffrench, 1969).



*Buteo platypterus*. I saw Broad-winged Hawks almost daily but I saw no sign of their nesting. The nest mentioned by Baker (1923) presumably was of this species.

On 2 May I counted 41 Broad-wings circling high over the island while two others stayed low and away from them. The large group gradually circled back toward Tobago where I lost sight of them. These may have been migrants although on 31 March I saw 13 Broad-wings over the island. A specimen of the North American race of the Broad-wing has been taken on Trinidad (Bond, 1968). (3)

*Pandion haliaetus*. I occasionally saw a single Osprey from 16 October through 17 March and again from 29 August through 10 September.

*Falco peregrinus*. I saw Peregrine Falcons often from 21 October to 17 December and again from 28 January to 27 April. At least two individuals were present. A regular winter visitor to Little Tobago (Herklots, 1961), both Bond (1958) and Gilliard (1969, p. 413) have seen it there in recent years.

*Gallus gallus*. Wild fowl may have been introduced to Little Tobago around 1875 (Ingram, 1913) and certainly were present in 1909 (Ingram, 1911). They are shy and stay low in the brush, being most abundant near the gardens. Wild fowl nested in December, May, and June.

*Arenaria interpres*. I saw groups of two to four Ruddy Turnstones along the rocky shoreline on three occasions (24 October, 22 April, 19 May).

*Actitis macularia*. Spotted Sandpipers are rather common along the shoreline, extreme dates being 10 September 1966 and 19 May.

*Larus atricilla*. Laughing Gulls arrived on 9 March and rapidly built up to peak numbers. I first found a nest with eggs on 27 April. Egg-laying reached a peak by mid-May and many eggs had hatched by 10 June. Most nests contained one or two eggs although a few had three. All the gulls had left the island by late August. Gulls may have nested on Little Tobago in April 1930 (Belcher and Smooker, 1935). (750)

*Sterna dougallii*. A few *Sterna* terns were present until early October in both 1965 and 1966. On 7 April I saw *Sterna* terns near Little Tobago and on 22 April 30-40 Roseate Terns were on the



south side of the island. Late in May I saw terns (almost certainly Roseates) foraging near Little Tobago and on 28 May I located their nesting colony on the northeast tip of Tobago (Dinsmore and French, 1969). They continued to feed near Little Tobago in June and July and several times I saw adults with flying young.

*Sterna anaethetus*. I found Bridled Tern eggs close to the shoreline all around Little Tobago, sometimes under rock and rubble just out of reach of high waves. As this species resembles the Sooty Tern, I may have overlooked it before I first noted one on 2 April. Eggs apparently were laid from mid-April through May and I saw several chicks in June. By late August this species had left the island. Although Herklots (1961) lists only Smith Island as a breeding locality for this species on Tobago, it probably nests regularly on Little Tobago. (150)

*Sterna fuscata*. I first saw Sooty Terns near the island on 8 March and on 9 March they were landing. I first noted eggs on 23 March and egg-laying continued into April. I first saw chicks in early May but some probably hatched earlier. Sooty Terns nest on the steep sea cliffs, especially under masses of cactus and in clumps of *Plumbago*. By 8 August most had left the island. An earlier record for Little Tobago indicates egg-laying occurred in April 1959 (in Ashmole, 1963). (2,100)

*Anous stolidus*. A few Brown Noddies were present around Little Tobago as late as 22 October 1965 but then were absent until 9 March when they arrived with the Sooties and Laughing Gulls and rapidly built up in numbers. I first saw eggs on 12 April and by mid-May chicks were present. They nest in low trees, among the thick masses of cactus, and on rocky ledges all around the island. Most had left the island by mid-August but a few remained into September and perhaps later.

Belcher and Smooker (1935) suggest that the Brown Noddy and Sooty Tern nest in Tobago both in April and July but I saw no evidence of this in 1966. (1,200)

*Columba cayennensis*. Pale-vented Pigeons are common in the deciduous forests. I found one nest in November and two each in May and June. Of the latter four, three each had a single white egg and the fourth had a young bird. Nests were generally low in trees, often in the thick dry cliff vegetation.

*Columbina talpacoti*. Although the Ruddy Ground-dove is



common in dry shrubby areas on nearby Tobago, on Little Tobago I saw single birds only four times in late October. All were in the dry shrubby areas around the cabins.

*Leptotila verreauxi*. The White-tipped Dove is most abundant in the deciduous forest and fan palm stands. I found ten active nests, most of them a shallow platform of twigs and sticks low in a tree or bush. Egg-laying in nine of them apparently started in March (3), May (2), June (3), and July (1).

*Coccyzus americanus*. I saw a single Yellow-billed Cuckoo in one of the gardens on 12 October.

*Crotophaga ani*. Smooth-billed Anis are a common resident in the open brush and gardens. On 1 January I found an abandoned nest in some tall grass between the two cabins. (70)

*Tyto alba*. I occasionally saw two Barn Owls from 23 March to July but they probably had been present prior to that time. Sea-birds, especially the nocturnal Audubon's Shearwater, apparently form a major part of their diet. (2)

*Nyctibius griseus*. I regularly heard a Common Potoo on calm evenings throughout the year. Although I searched for it, I never saw one. The visitor's book on Little Tobago contains a record of one being seen on 4 March 1963. (2)

*Caprimulgus cayennensis*. The resident White-tailed Nightjar is conspicuous over open areas in early morning and late evening. I found two nests on bare ground, one with one egg on 14 February and subsequently deserted and the second with a fresh egg on 3 May. A second egg was present by 7 May and both hatched on 23 May. Adults gave no distraction display when disturbed from brooding. By 4 June the young could fly and on 8 June the nest site was deserted. (10)

*Chaetura brachyura*. The Short-tailed Swift is a common resident. On 30 May I could hear young birds calling from inside two hollow trees but I could not reach the nests themselves. (200)

*Glaucis hirsuta*. The Rufous-breasted Hermit is a resident in deep forested ravines, especially near *Heliconia*. I found only two nests containing eggs, one each in December and March.

*Anthracothonax nigricollis*. I usually saw Black-throated Mangos perched high in trees at the edge of openings in the forest. I found one nest 20 feet up in a *Cecropia* tree on 3 May but could not reach it to see if it had eggs or young.



*Chrysolampis mosquitus*. I first saw a Ruby-topaz Hummingbird on 3 December and soon they were common throughout the island. They seemed to prefer the forest edge but stayed lower than *Anthracothorax*. I found nests with eggs on 20 January and 17 June but both were soon abandoned. I saw other nests being built but found no broods.

Some birds were still present in early August but then apparently left. Their calls and flashy colors make them hard to miss and I am sure that they were absent until early December 1965. On Tobago they have been noted as being absent from August to February (Jardine, 1833).

*Amazilia tobaci*. The Copper-rumped Hummingbird is a common resident low in the deciduous forest. I found nests with two eggs in November, January, and June and several others that were abandoned before eggs were laid.

*Ceryle alcyon*. I saw a Belted Kingfisher on 26 and 29 November and 10 June and another one at nearby Speyside on 4 November.

*Momotus momota*. The Blue-crowned Motmot is an abundant resident, seldom leaving the protective canopy of the deciduous forest and fan palm stands. I located many nest burrows on steep hillsides and banks on the island. In two I could examine the eggs hatched around 30 May and 5 June at which time nesting seemed to be active throughout the island. Both nests fledged two young although a third egg in one failed to hatch and a third young bird in the other grew slowly and was evicted from the nest when about 15 days old. One nest was at the end of a straight 4-foot burrow in a bank while the other was in an *Anthurium* root mass and just a few inches from the entrance. I saw adults bring millipedes, scorpions, large insects, and small lizards to the young.

*Tyrannus melancholicus*. Tropical Kingbirds are a common and conspicuous resident of openings in the deciduous forests and hurricane-disturbed areas, usually staying high in the vegetation.

*Tyrannus dominicensis*. I saw single Gray Kingbirds in hurricane-disturbed habitat on Little Tobago on 13 October, 26 April, and 2 May.

*Myiarchus tyrannulus*. The Brown-crested Flycatcher is abundant in deciduous forests and fan palm stands, generally staying lower in the canopy than does *Elaenia*. I found several nests in



hollow trees but none were accessible to me. Egg-laying apparently took place from early January into February. I saw adults taking food to one nest early in February.

*Cnemotriccus fuscatus*. I saw single Fuscous Flycatchers only four times (5 and 17 October, 21 April, 3 July) but it may have been resident. Each was in dry brush at the edge of a garden or in a clump of bamboo.

*Elaenia flavogaster*. Yellow-bellied Elaenias are common high in the canopy throughout the heavily forested parts of the island. Although I found no nests, it probably nested in February and March.

*Progne dominicensis*. Caribbean Martins were common on Little Tobago in late September 1965, still present on 17 and 29 October, and then absent until 10 February. After 15 February I saw them almost daily. I saw birds going into cracks and crevices in cliffs along the coast in May and June and they probably nested there. (50)

*Paradisaea apoda*. In September 1909 Sir William Ingram released 48 Greater Birds of Paradise on Little Tobago (Ingram, 1911). These birds, of unknown sex, had been secured on the Aru Islands off the coast of New Guinea. By 1958 certainly 15 and perhaps 35 birds were present (Gilliard, 1969, p. 414).

In 1965-66 I located with certainty only 7 *apoda*; 4 adult males, 1 sub-adult male, and 2 female-plumaged birds. Males displayed in every month with a peak in late February and March (Dinsmore, 1969). I saw birds copulate but found no nests or signs of nesting activity. They mainly utilized undisturbed areas of deciduous forest but occasionally visited hurricane-disturbed areas and fan palm stands. (7)

*Troglodytes aedon*. The House Wren is an abundant resident on Little Tobago, almost every brushy area and ravine having a pair.

*Mimus gilvus*. Next to the Bananaquit, the Tropical Mockingbird is the most abundant land bird on Little Tobago. It is common in all habitats, especially the brushy hurricane-disturbed areas. I found nests with young on 3 April and 18 June. On 24 June I found a nest with a mockingbird egg and chick and one *Molothrus bonariensis* egg.

*Turdus nudigenis*. Bare-eyed Thrushes are abundant in hur-



ricane-disturbed areas and thick stands of deciduous forest but are retiring and heard more often than seen. I found nests with 2 and 3 chicks in late June and early July.

*Vireo olivaceus*. Red-eyed Vireos are common in deciduous forests and hurricane-disturbed areas but were less evident from October to mid-February and some may have left the island in that period. One nest started on 8 March was soon abandoned, apparently after eggs had been laid. Another nest contained three young on 22 June, two of which fledged.

*Molothrus bonariensis*. The Shiny Cowbird is common in the open areas around the cabins and gardens. I found one cowbird egg in a mockingbird nest on 24 June. (50)

*Psarocolius decumanus*. Crested Oropendolas are common in the deciduous forests and fan palm stands although they range over the whole island. I located six nesting colonies containing about 120 nests. Five were in tall Royal Palms (*Roystonea oleracea*) and the sixth was in a tall *Spondias monbin*. They probably nested in January as young birds appeared out of the nests in late February. (200)

*Protonotaria citrea*. I caught, photographed, and released a male Prothonotary Warbler on 24 October.

*Dendroica striata*. I saw single Blackpoll Warblers foraging in low brush in hurricane-disturbed areas on 15 October and 2 November.

*Seiurus aurocapillus*. I saw an Ovenbird on 21 November and again on 11 March, apparently the first sight records for this species in Trinidad and Tobago. In both cases I clearly saw the striped breast, reddish crown, and lack of an eye stripe. Ovenbirds previously have been reported wintering in northern South America and also as far down the Lesser Antilles as St. Vincent, 170 miles to the north (Bond, 1956).

*Seiurus noveboracensis*. I saw single Northern Waterthrushes 10 times between 2 October and 5 January and again on 4 and 7 April.

*Coereba flaveola*. Bananaquits are the most abundant and widely distributed land bird on the island. I saw them most often in deciduous forests and hurricane-disturbed areas but they occur throughout. I found nests with eggs in November and December and nests with young in March.



Red-legged Honeycreeper (*Cyanerpes cyaneus*). This species occurs sporadically in the gardens and deciduous forest, birds being seen in October and fairly regularly from March to June. Roldan George saw a pair copulating on 5 April but we found no nests.

*Thraupis episcopus*. Blue-gray Tanagers are abundant in the deciduous forests and fan palm stands. I did not find any nests but I saw recently fledged young on 10 January and 18 March.

*Volatinia jacarina*. Blue-black Grassquits live in the dry shrubby cover around the gardens. They were absent from late October until mid-March except for one seen on 15 February.

*Tiaris bicolor*. The Black-faced Grassquit is the commonest finch on Little Tobago, and apparently the only one that is resident. It is common in brushy areas around the gardens and hurricane-disturbed areas. Roldan George found a nest containing three eggs on 10 September.

*Sporophila lineola*. Lined Seedeaters are absent from the island from late October until late May. They occur in open areas around the cabins and gardens and probably breed on the island.

*Sporophila nigricollis*. Yellow-bellied Seedeaters are fairly common in open areas around the gardens and cabins. Except for single birds on 17 December and 9 and 10 April, I saw none on Little Tobago from late October to May. I saw recently fledged young early in October 1965.

Besides the species I saw in 1965-66, several others have been reported from Little Tobago. These include the American Oystercatcher (*Haematopus palliatus*) (Herklots, 1961), *Zenaida auriculata* (Bond, 1959), another hawk, possibly *Buteo nitidus* (Gilliard, 1969, p. 413), and the Black Noddy (*Anous tenuirostris*) (Kleinwort, 1967).

#### DISCUSSION

A puzzling feature of the avifauna is the lack of suboscines other than the flycatchers. Ten species in five families occur on Tobago (Herklots, 1961), some of them being abundant. At least three are montane forest forms and thus would not find suitable habitat on Little Tobago but others such as *Thamnophilus doliatus* and *Formicivora grisea* live in low shrubby woodland on Tobago, only 2 miles from similar habitat on Little Tobago.

Thus Little Tobago has less than half the number of species of



birds found on nearby Tobago (ca 170) although the lack of montane rain forest and freshwater habitats certainly account for much of the difference. Tobago has a land area of 114 square miles, some 200 times the size of Little Tobago and this too helps account for the difference in number of species.

Of the 59 species reported here, I saw an egg, a nest, or recently fledged young or know of breeding records for 30 species. An additional seven species (*Tyrannus melancholicus*, *Elaenia flavogaster*, *Progne dominicensis*, *Troglodytes aedon*, *Cyanerpes cyaneus*, *Volatinia jacarina*, and *Sporophila lineola*) almost certainly breed on the island. The potoo, Barn Owl, Yellow-crowned Night Heron, and Fuscous Flycatcher also may breed there occasionally.

Most species for which I have nest records nest in May through July at the start of the wet season. The limited evidence I have for finches indicates they breed late in summer. On nearby Trinidad the Snows (1964) found a seasonal nesting pattern similar to that I found on Little Tobago.

Several land birds seem to leave Little Tobago for part of the year. All four finches probably nest on the island but apparently only *Tiaris* is resident. I did not see the other three for most of the winter and I doubt that I could have overlooked them. This movement may be very local as the Eastmans (1958) saw all four on Tobago between 16 January and 20 February.

I have already commented on the absence of *Chrysolampis mosquitus* in the fall and *Progne dominicensis* in winter. *Vireo olivaceus* seemed to be much less abundant in winter but may have just called less then and was not noticed.

On the basis of observations in 1965-66 and records from the literature, with the possible exception of the Brown Booby, all the seabirds on Little Tobago breed annually although not all at the same time. The terns and the Laughing Gull are absent from late summer to March or April and begin laying eggs soon after they return. Tropicbirds have a more extended laying period, extending at least from November to February. All leave Little Tobago for at least a month in late summer and individual birds are absent for longer periods. Audubon's Shearwaters apparently are present for much of the year. Their egg-laying is more synchronized and is mainly in late January and early February. The Brown Boobies have two peaks of laying, late summer and again in winter, but



individual birds have not been marked to determine whether these are separate groups of adults or if some are renesting attempts.

All of the above seabirds probably nest on nearby St. Giles Islands. The nesting information available indicates that the individual species have similar nesting periods on St. Giles and Little Tobago (Dinsmore and French, 1969). Both the Brown Noddy and Sooty Tern lay in April on Soldado Rock off the southwest coast of Trinidad (Belcher and Smooker, 1935; Ashmole, 1963).

Aruba, Bonaire, Curacao, Islas Las Aves, Isla La Orchila, Islas Los Roques, Islas Los Hermanos, and Los Testigos, all at about the same latitude as Little Tobago and to the west, have a variety of seabirds breeding on them. These include all the terns found on Little Tobago, the Laughing Gull, and, on some, boobies, Red-billed Tropicbirds, and Audubon's Shearwaters. In general the terns and Laughing Gulls breed from May to July although the two noddies on Los Roques and the Sooties on La Orchila start breeding in February and March (Van der Werf et al., 1958; Phelps and Phelps, 1959a, b; and Voous, 1963).

Shearwaters and tropicbirds breed in February and February to April respectively, while Brown Boobies have a more extended nesting period, perhaps from February to September. On Los Testigos and Los Hermanos the boobies and tropicbirds had eggs or young birds in January (Lowe, 1909). More information on the shearwaters, boobies, and tropicbirds especially is needed. In general however, the breeding seasons of seabirds on these islands roughly coincide with those on Little Tobago.

The factors determining the timing of these seasons remain unknown. The two peaks of breeding by Brown Boobies are particularly puzzling but for the spring nesting species I can suggest two possibilities. On Little Tobago, much as on Curacao (Ansingh et al., 1960), local fishing activity intensifies in March and April when numbers of large predatory, commercially valuable species arrive. Presumably this also means the arrival of smaller fish which may be food for both fish and seabirds. Another possibility on Little Tobago is that the Orinoco River in Venezuela floods from March to mid-summer. Changes in the water are evident at Little Tobago and perhaps this has some effect on seabird food supplies but again more information is needed.



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*Department of Natural Sciences, University of Tampa, Tampa, Florida 33606.*

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