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RAROTONGAN BIRDS, WITH NOTES ON LAND BIRD STATUS

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ABSTRACT

Observations made during visits to Rarotonga in July and August 1976 are detailed, with particular reference to land birds and petrels, a group not previously recorded. The outstanding feature of the land bird ecology is the apparent total restriction of the native species except Long-tailed Cuckoo to the central primitive forests and adjacent second growth. The native land bird fauna consists of only five species: Long-tailed Cuckoo, Pacific Pigeon, Rarotonga Fruit Dove, Rarotonga Flycatcher and the Rarotonga Starling, of which the last three are endemic. The Flycatcher and the Starling are now very rare. The settled parts of Rarotonga contain virtually a single species, the introduced Myna. Although its presence suggests a restriction on the spread of native birds into settled areas, similar conditions elsewhere might indicate that other factors may well have been responsible for such a habitat restriction. Early information on land birds and their status dating from Gill's missionary times of the 1840s-1860s is noted. Observations of sea birds, especially the Herald Petrel, a probable breeding species, are given.

INTRODUCTION

Since little has been published in recent years on the birds of Rarotonga, and nothing on the land birds [Holyoak's (1974) taxonomic descriptions of seven new forms from the Cook Islands refer to birds collected on Atiu, Mangaia, Mauke and Mitiaro in 1973], the following notes made during a seven-day stay are being placed on record, together with some comments on land bird status. Observations on petrels are of particular interest since there are no previous records of this group from Rarotonga.

The island (6719 hectares; 16,602 acres) has two remarkably clear-cut environmental zones: (a) the fertile coastal strip — long

inhabited — and (b) the uncultivated forested interior rising steeply at several points to prominent peaks (highest: Te Manga, 652 metres (2140 feet)). The fringing reef is comparatively close to the shore except at the south-west end of the island (Muri district) where four islets lie inside the reef. The principal road (21 miles) circles the island along the coast, while valley roads penetrate quite deeply into the interior along the cultivated valley bottoms.

Philipson (1971) has provided an up-to-date summary of the main vegetational features, noting that "the narrow belt of good soil between the coast and the hills has long been under cultivation. Fine specimens of many species of trees occur here, but they are either of coastal species or are species introduced for their usefulness or ornamental value. . . . A feature of this belt of cultivation is the abundant weed-flora. . . . The present extent of cultivation is evidently less than formerly. In all the valleys extensive traces of earlier cultivation were seen, often well beyond the present limits. These consisted of *taro* beds constructed from river boulders. There was some evidence that marginal parts of this land are being brought back into cultivation. . . . The old abandoned areas of cultivation are now covered with second growth forest, much of which consists of dense thickets of *Hibiscus tiliaceus* L. Some of these thickets are being burnt and cleared, and valley roads are being extended."

Referring to the forested interior, Philipson continued "... the vegetation of the central parts of the island has suffered remarkably little. The forest cover of the deep heads of the valleys and of the sharp ridges and peaks appears to be in a completely primitive condition. . . . Little change appears to have taken place in this central part of the island since the report of Cheeseman seventy years ago. Very few adventive plants have established themselves in the forest. . . . Citrus trees and pineapple plants . . . occur in the central forests, though rarely".

One additional type of modified area, especially prominent when the island is seen from the sea or by air, is that due to the burning which has in many places spread on to the lower ridges; of this Philipson said: "... burning has spread up the sides of the valleys so that hills near the sea mostly bear *Gleichenia* ["umbrella fern"] thickets or grassland".

LAND BIRDS

The outstanding feature of Rarotongan land bird ecology today is the apparently total restriction of the native land bird species — with the exception of the Long-tailed Cuckoo — to the central primitive forests and adjacent second growth. My observations were made from 23 to 29 July 1976, mainly in the coastal inhabited area, with several excursions into the central forested area which is readily entered along the valley roads, and by tracks several of which cross the island. I am most grateful to Mrs Beth Brown of Auckland, an

observer with much experience of Fijian as well as New Zealand birds, who made observations on the island between 16 July and 7 August 1976, and has kindly allowed me to include these in the present paper. In addition, both Mrs Brown and I were able to compare our observations and impressions with those of interested Rarotonga residents or visitors of long standing, and were thus able to confirm our impression of land bird status and distribution.

Rarotonga has a comparatively small total native land bird fauna, comprising only five species: Pacific Pigeon, *Ducula pacifica* (Gmelin); Rarotonga Fruit Dove, *Ptilinopus rarotongensis* Hartlaub & Finsch; Long-tailed Cuckoo, *Eudynamis taitensis* (Sparman); Rarotonga Flycatcher, *Pomarea dimidiata* (Hartlaub & Finsch) and Rarotonga Starling, *Aplonis cinerascens* Hartlaub & Finsch. Three species (Fruit Dove*, Flycatcher and Starling) are endemic.

The sixth land bird species is the Common Myna, *Acridotheres tristis* (L.), introduced from New Zealand in the 1920s apparently in the hope of controlling agricultural insect pests (Syme, 1975).

The observations which Mrs Brown and I made, summarised below, indicated that both the Rarotonga Flycatcher and Rarotonga Starling are now to be regarded as very rare; both species are restricted to the central unmodified forests, but, although only in small numbers, they fortunately appear to be well established. The two species of pigeon were recorded both in the unmodified central forests and in fringing areas probably comprising mainly second growth; they may both tend to come into modified vegetation adjacent to the primitive forest edge, but so far as we could ascertain are never seen in the inhabited lowlands proper. The Long-tailed Cuckoo is, as mentioned above, regularly observed in both types of habitat.

In strong contrast to the above there is a single common land bird species in the lowland inhabited belt and along the cultivated valley bottoms — the introduced Myna; its ubiquity is perhaps most evident when a Long-tailed Cuckoo appears, its distinctive elongated, stream-lined shape providing contrast as it darts through the trees.

The limitation of the land bird fauna of the settled portions of Rarotonga to virtually a single species, the Myna — and a species suspected of affecting other birds through competition, including competition for nest sites, and even predation — inevitably tempts the observer to conclude that its presence restricts the spread into settled areas of native land birds. However, as may be seen under similar conditions elsewhere, some presumably more specialized forest species have been unable to adopt modified habitats, or at least not readily; it may well be that investigation of native Rarotongan land birds will

* A subspecies (*goodwini*) has been described recently from Atiu (Holyoak 1974).

ultimately show that factors other than the presence of the Myna have been responsible for the restriction of most Rarotongan land bird species to the remaining unmodified habitat.

OBSERVATIONS ON LAND BIRDS

PACIFIC PIGEON. One at forest edge, above the DSIR Research Station (Totokoitu) cropping area; one Takuvaine Valley in forest (EGT). Two, Avatiu Valley, in flight over forest (BB).

RAROTONGA FRUIT DOVE. One edge track in forest, Avatiu Valley (EGT). One at forest edge, Muri; Avatiu Valley, one seen and a number heard (BB).

LONG-TAILED CUCKOO. Lowlands (scattered); in forest by track, Avatiu Valley (EGT). Two, Muri area, and one, Ngatangia Village (both localities on coast); one in forest, Takuvaine Valley (BB).

RAROTONGA FLYCATCHER. No record by EGT. On 4 August 1976, BB at the Needle, at top of Avatiu Valley, saw a small dark bird fly from one tree to another in fairly heavy cover, presumably this species. (Part of white eggshell, approximately size of goldfinch's egg, on ground in this locality may have been Flycatcher's).

RAROTONGA STARLING. Avatiu Valley, three calling and in flight; others calling (EGT). Avatiu Valley, two seen low down in valley and others heard towards the Needle (BB). (Both observers noted that calls of this species include musical notes like those of the New Zealand Bellbird *Anthornis melanura*; BB also noted that the pattern of calls was like that of the Fijian Starling *Aplonis tabuensis vitiensis*, with a similar grouping of notes.)

MYNA. Throughout in cultivated areas and valley bottoms; also feeding on tidal flats, and in flocks on grass of airfield. In more open valley bottoms, but not observed actually inside unmodified forest. (EGT and BB).

EARLY INFORMATION ON RAROTONGAN LAND BIRDS AND THEIR STATUS

Rarotongan bird life appears to have been first described in the following paragraph in Gill's *Life in the Southern Isles*, an account of his missionary work in the Cooks in the 1840s - 1860s:

"The birds of this group are not numerous. Hervey's Island [i.e. Manuae] was once famous for yielding the red feathers sacred to the gods, consisting really of the two long feathers in the tail of the handsome Tropic bird. Tern, boobies, black and white herons, woodpeckers, kingfishers, pigeons, linnets and doves abound."

The main source of information subsequently, apart from the few specimens to reach European museums, is that of accounts of two collections written, respectively, by Hartlaub & Finsch (1871) and Ogilvie-Grant (1905). Unfortunately related field notes or comments

(except for colour of soft parts) are very limited, and it can only be surmised that the acquisition of the material described must have required some little time spent in the field.

Hartlaub and Finsch's collection was made in 1869-70 for the Museum Godeffroy, in Hamburg, by A. Garrett, evidently a collector at that time in the Pacific for various museums (Hartlaub & Finsch say: "Mr Andrew Garrett is an American, who has been collecting already several years for the Smithsonian Institution and for the Cambridge Museum, U.S.A."). The paper includes the original descriptions of three species: Rarotonga Flycatcher (6 specimens: 3 males, 3 females), Rarotonga Starling (5) and Rarotonga Dove (2: adult and immature). Four additional species were collected — Pacific Pigeon (1 immature), Wandering Tattler (1, winter plumage), Reef Heron (1, white phase, with a few slate-coloured feathers on the back), White Tern (1). As regards the land bird species, it seems clear from the number collected that two species, Flycatcher and Starling, must have been present in the 1860s in greater numbers than today.

The collection described by Ogilvie-Grant was obtained for the British Museum (Natural History) in March 1901, at the request of the Earl of Ranfurly (then Governor of New Zealand) by Lt.-Colonel W. E. Gudgeon. Colonel Gudgeon had been appointed British Resident to the Cook Islands in 1899, stationed at Rarotonga, and would accordingly have been familiar with the bird life and might have been expected to provide some indication of the status of the various species. Unfortunately, however, his comments were restricted to his remark that the Flycatcher was "rare." Nine species were collected: Rarotonga Dove (1 male), Pacific Pigeon (1 female), Common Noddy (1 male, 1 female), White Tern (1 female), Wandering Tattler (1 male, winter plumage), Reef Heron (1 male, dark phase), Long-tailed Cuckoo (1), Rarotonga Flycatcher (1 male, 1 female) ("a rare bird on the island"), and Rarotonga Starling (3 males). These numbers suggest roughly the kind of collection which could be expected if a similar attempt were made today. They certainly suggest that two species, Flycatcher and Starling, had undergone a reduction in numbers during the approximately 30 years since Hartlaub & Finsch's material was collected.

FRESHWATER AND SHORE BIRDS

The only species of waterfowl (Amadon 1943), the Grey Duck (*Anas superciliosa* Gmelin) was not recorded by Mrs Brown or myself.

Three species of wader have been recorded (Holyoak 1976): Lesser Golden Plover, *Pluvialis dominica* (Muller), Bristle-thighed Curlew, *Numenius tahitiensis* (Gmelin) and Wandering Tattler, *Tringa incana* (Gmelin). The Wandering Tattler was regularly observed by both Mrs Brown and myself.

The Reef Heron, *Egretta sacra* (Gmelin), is, with the Wandering Tattler, characteristic of Rarotongan reefs and tidal pools. Both white

and blue phases were observed, the latter appearing to predominate. In addition, Mrs Brown noted one coloured mainly white with dark mottling on the upper surface, near Arorangi village. Two seen in flight over the airfield had apparently been feeding in wet ground inland from the air strip (EGT).

SEA BIRDS

HERALD PETREL *Pterodroma arminjoniana heraldica* (Salvin)

On 27 July in the Takuvaine Valley, in clear fine weather, at 3.45 p.m., I watched a petrel overhead for several minutes; this was from the track between forested slopes leading up to Ikurangi and Te Manga peaks, the bird being at an elevation of perhaps 300 m. Flight was alternate sailing and flapping, with comparatively slow, deep wing-beats. The main characters noted were: size medium to large (i.e. length approximately that of Red-billed Gull: c. 370 mm); general shape that of a medium-sized *Pterodroma*, with broadly wedgetipped tail; underparts dark with darker breast-band and pale throat; underwing with clearly marked narrow irregular white centre line down the whole length.

The bird was tentatively identified from King (1967) as of this form in the intermediate colour phase: I am indebted to Mr F. C. Kinsky, National Museum, for discussion following my return to New Zealand, and for confirming the identification (Mr Kinsky notes that the intermediate colour phases of the Herald Petrel and of the Kermadec Petrel *Pterodroma neglecta* are practically impossible to tell apart in the field; however, the distinctive underwing pattern of the Rarotongan bird points to *P. heraldica* rather than *P. neglecta*, the latter in most cases having white on the underwing only at the bases of the primaries and the outermost wing coverts — exceptionally this patch can extend in *P. neglecta* into a longer stripe, during the moult of the underwing coverts).

I discussed the bird seen with Mrs Brown, who mentioned that she had on 21 July seen a petrel coloured dark above and pale below at some distance flying inland from Muri. Mrs Brown subsequently watched carefully for petrels, and made the following additional records: on 31 July, 1 August and 6 August, one with the same general coloration seen flying inland (each time in the late afternoon, and at some distance); on 7 August, Muri, offshore beyond the reef, 12 recorded in 47 minutes, all having dark upperparts and pale underparts with some dark coloration on the breast; again on 7 August at 3.43 p.m. at Muri one was seen quite closely as it flew from the reef and directly overhead — the plumage was dark brown above, small white area on forehead, underparts white possibly with some dark coloration on the breast, underwing dark crossed almost diagonally by a white flash.

Our observations thus suggest that this Central and South Pacific form breeds in the inner forested zone on Rarotonga; further, Mr Kinsky has commented that this and other tropical petrels tend to fly over

their breeding grounds by day and especially in the afternoon, confirming the view that the birds seen were flying in to the breeding grounds.

UNIDENTIFIED PETRELS

Mrs Brown recorded a large, dark bird with typical shearwater flight at some distance away beyond the reef at Muri on 18 July, possibly either a Wedge-tailed Shearwater (*Puffinus pacificus*) or Christmas Shearwater (*Puffinus nativitatis*). King (1967) listed the Christmas Shearwater as a doubtful vagrant to the group.

In addition, calls which I heard at about 4.00 p.m. on 28 July from the forested slopes on the western side of the Avatiu Valley seem likely to have been those of a petrel, but have so far remained unidentified; the calls, loud and several times repeated, consisted of three to four harsh and rapidly repeated syllables, with some resemblance to the "pa-ka-ha" of the Fluttering Shearwater *Puffinus gavia*. The slopes from which the calls came were by this time of the afternoon in shadow.

Slater *et al.* (1970: 159) stated that the call of the Herald Petrel is — "A sequence of squeaky and sibilant notes 'hi-hi-hi . . . ' up to a dozen or more times. Also a sharp monosyllabic 'hik'."

Species with calls very roughly of the type heard are the Wedge-tailed Shearwater and Kermadec Petrel. The Christmas Shearwater is likely to have a similar call although the voice of this species has so far as is known to me not been recorded. (Mr Kinsky has kindly mentioned (*in litt.*) that the Wedge-tailed Shearwater would not normally be on land in this region at this time of the year: eggs in late December, Niue; young leave in May, Fiji.)

WHITE-TAILED TROPIC BIRD *Phaethon lepturus* Daudin

It could perhaps have been expected that tropic birds of either common Pacific species would nest in Rarotonga's clifly interior. However, the only previous published record seems to have been that of the botanist Wilder (1931) who said that ". . . high up on the rocky cliffs, the tropic bird builds its nest." On 28 July Mrs Brown heard high-pitched chattering notes high in the air over the Takuvaine Valley; nine birds were seen in display or courtship flights, chasing being observed within small groups; the birds were dipping out of sight behind trees on the ridges at over 300 m, and it seemed probable that they had nests or nest sites in the rocky faces. The long, white tail streamers were seen distinctly. (Mrs Brown discussed the birds with Rarotongans working in the adjacent taro gardens and was informed that the birds (known as *kawake*) nested on the high inland cliffs.)

On 4 August Mrs Brown again saw this species in the Avatiu Valley, where six were watched displaying in flight in the same manner. Shortly after her return from Rarotonga, Mrs Brown heard from Mr Bruce Hancock who, with Mr Hancock Snr, had accompanied her and watched the Tropic Birds over the Avatiu Valley on 4 August;

Bruce Hancock had climbed a rock chimney on the Needle and had seen a pair of White-tailed Tropic Birds hovering about a rock ledge. Although the ledge was not fully visible it seemed likely that this was a nest site.

GREATER FRIGATE BIRD *Fregata minor* (Gmelin)

Two Frigate Birds seen by Mrs Brown over the reef at Muri on 17 July were probably of this species. One bird — evidently a female in view of the considerable amount of white on the underparts, including the breast — was joined shortly afterwards by a second, and both then chased a flock of Sooty (?) Terns and a Noddy (see notes on these species below).

There is no previous published record of the species from the island.

CRESTED TERN *Sterna bergii* (Lichtenstein)

Mrs Brown on 19 July saw two large terns, almost certainly of this species with which she was familiar in Fiji, offshore beyond the reef on the south coast; on 5 August in the Muri area she saw one flying over one of the lagoon islets, and another was seen in the same area on 7 August. The species, the common large tern of the tropical Pacific, has not previously been recorded from the Cook group.

SOOTY TERN *Sterna fuscata* (L.)

On 17 July Mrs Brown, as mentioned above, watched a Frigate Bird chasing four terns which she believed were of this species (white below, dark wings).

COMMON NODDY *Anous stolidus* (L.)

Recorded by Mrs Brown over the reef at Muri on 17 and 18 July (one on each occasion).

WHITE TERN *Gygis alba* (Sparrman)

My first observation was of three adults performing display or courtship flights low over trees on the coast at Arorangi; later a larger group (7 or more) were seen flying well up towards the high forested slopes on this (western) side of the island. Mrs Brown on 21 July recorded c. 20 inland over the Takuvaine Valley (a flock of 12, and the others in two's and three's); smaller numbers were seen on 4 August over the Avatiu Valley. Breeding is probably at various points in the forest; further field work is now needed on this species to discover the nesting sites.

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APPENDIX

I am indebted to Captain J. A. F. Jenkins for extracting the following records of the Herald Petrel from his observations of petrels at sea over the past two years, to the north-west, west and south-west of the Tongan group: 5 March 1975, 20°10' S, 17°05' W (one light phase); 11 May 1975, 19°57' S, 175°01' W (five, one light phase); 12 May 1975, 22°04' S, 176°09' W (one); 25 May 1975, 18°31' S, 174°28' W (three light phase); 25 May 1975, 19°20' S, 174°50' W (one); 25 May 1975, 19°59' S, 175°00' W (five); 13 July 1975, 20°21' S, 175°12' W (two); 14 July 1975, 21°13' S, 175°29' W (two light, two dark phase); 25 April 1976, 20°03' S, 175°03' W (six); 6 July 1976, 15°37' S, 173°07' W (one); 8 July 1976, 19°58' S, 175°01' W (three, one doubtful); 9 July 1976, 25°43' S, 178°31' W (one, doubtful); 26 July 1976, 19°06' S, 174°39' W (one); 27 July 1976, entrance to Nukualofa Harbour (one); 27 July 1976, 20°59' S, 175°19' W (one dark, one light phase); 27 July 1976, 21°08' S, 175°29' W (two light phase); 8 September 1976, 20°50' S, 175°14' W (eight, six light phase). Captain Jenkins notes that while he has been in Tongan waters during all other months, no records were made in the summer months. Although Murphy & Pennoyer (*Amer. Mus. Novit.* 1580: 1-43; 1952) considered it likely that the breeding season of the Herald petrel is "prolonged or nearly continuous, at least in lower latitudes of the range", the above observations by Captain Jenkins would suggest that in Tonga at least it is a winter breeder; young were found in the nest in the Tongan group during the Whitney Expedition on 24 July 1925 (Murphy & Pennoyer 1952).

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