

## SOME NOTES ON FIJIAN BIRDS

By A. BLACKBURN

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### SUMMARY

A survey of the land birds in three areas of the Fiji Group, viz. the Nausori Highlands of Viti Levu, Taveuni and Kadavu Islands, was made in August/September 1970 by members of the Society. All existing species and subspecies previously recorded from these areas, with the exception of a few ground-dwelling species, were observed and their present status assessed. Notes are made on the several species which have been exterminated or seriously depleted since the introduction of predators; but none of the existing avifauna appears to be endangered at the present time. One species new to Fiji is recorded; a megapode whose existence is only suspected from early native lore was probably sighted; and a probable new subspecies observed. Sea-birds and migratory waders are listed.

### INTRODUCTION

When the idea of a field trip to Fiji was first mooted, it was anticipated that some 18 to 20 members would be interested, and the original planning was for a party of this size to spend three weeks in the high altitude rain forest of Taveuni. However the proposal was received with unexpected enthusiasm, and there were no less than 54 applications. Plans were modified, three reasonably accessible forested areas being selected, and the members divided into three parties, each to spend up to six days in each of the three areas, which were:

1. A selected area in the Nausori Highlands, some 30 miles by road east from Nandi, much of the route being a winding mountain road ascending to about 1800 feet. Fletchers are milling much of the heavy rain forest in this part of Viti Levu, and the last few miles of the route are on well-surfaced forestry roads.
2. Taveuni Island, 26 miles long by 9 miles wide, lying to the south of Vanua Levu and 170 miles north east of Suva. Charter planes were used from Suva to Matei Airstrip at the northern tip of the island, and thence the only road runs down the north western coast. The selected area was about 14 miles down this road, near Somosomo, and inland  $1\frac{1}{2}$  miles at an altitude of 1500 feet, in tall rain forest. A narrow strip along the coast is taken up by coconut and cocoa plantations, and from these the terrain rises steeply to a heavily forested backbone range, 4007 feet at its highest point. One or two tracks, negotiable by 4-wheeled drive vehicles, lead up to the forest.
3. Kadavu Island, lying some 50 miles south of Suva. It is some 30 miles long and about 5 miles wide, mountainous with large areas of rain forest, and apparently of more recent volcanic origin than Taveuni. There is a small Government station at Vunisea, where the coastline is not enclosed by coral reefs, and otherwise settlement consists of little native villages scattered along the shores, connected in some cases by foot tracks. The only road on Kadavu runs some distance inland from Vunisea, and has been formed by Fletchers, who are logging in the area.

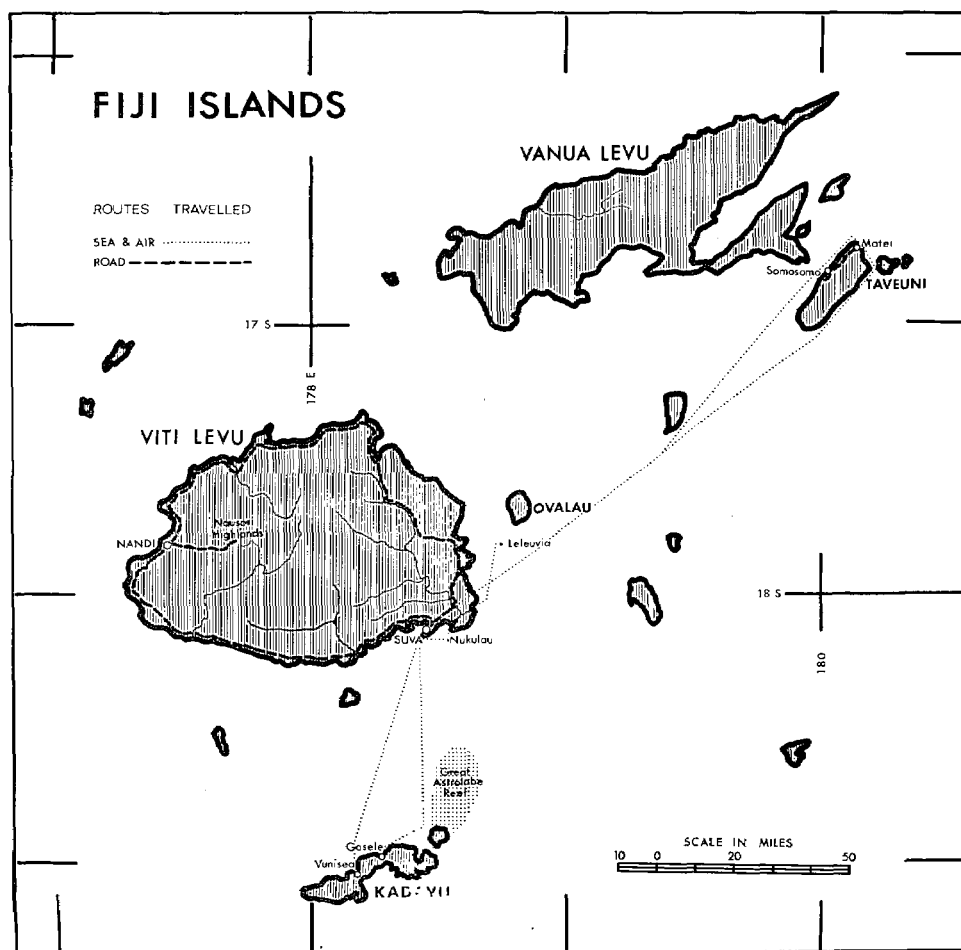
In the event, 38 members took part, and were divided into parties as follows:

'A' party: K. Rowe (leader), C. Challies (deputy), V. Davis, Mrs. N. Davis, Miss J. Davis, Mrs. H. Harty, Mrs. P. Jenkins, Miss E. Kennedy, Dr. G. Nicholson, A. Ringer, Mrs. M. Ringer, L. Rowe, and Mrs. P. Thynne.

'B' party: A. Blackburn (leader), L. Henderson (deputy), Dr. C. R. Barnicoat, Mrs. N. Barnicoat, Dr. Elizabeth Bowie, T. A. Brown, P. Crombie, J. Cook, Miss J. Hornabrook, D. McNeil, Miss J. Morton, G. P. Robinson, and Mrs. C. Veitch.

'C' party: R. B. Sibson (leader), J. Brown (deputy), Mrs. B. Brown, W. F. Cash, J. R. M. Chorlton, Mrs. P. Chorlton, R. V. J. Clark, Miss H. Cook, Dr. Elsie Gibbons, Miss A. Hutson, S. W. Johnson, and Mrs. J. Tizard.

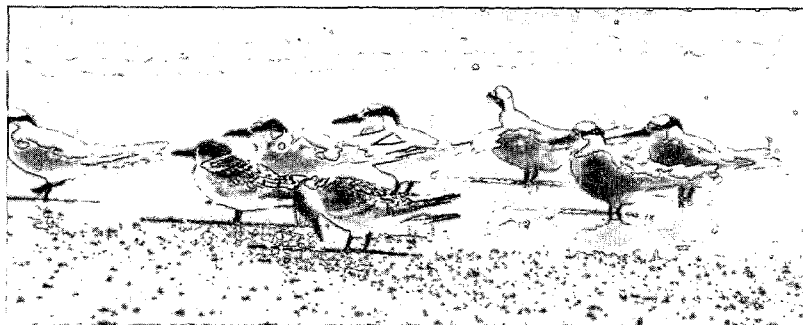
Members were advised to take light nylon tents proofed against mosquitoes, tent flies, sleeping bags and inflatable mattresses, and a cooking utensil; also a light raincoat or parka, as Taveuni has a mean annual rainfall of 212 inches! There was therefore no bulk baggage or equipment to be carried, apart from stores which were available from Morris Hedstrom's widespread chain at suitable points, such as Somosomo on Taveuni, and at Nandi Village en route to the Nausori Highlands.



It may be of interest at this point to mention the matter of cost. All travel from Auckland and return, including bus, boat, and plane charters, and the necessary accommodation at Nandi Airport, and at Suva when parties were changing over from one area to another, cost each member the sum of \$241. An amount of \$24 in Fijian currency was contributed by each member to meet the cost of stores and incidentals for the three weeks, and this proved more than sufficient by \$8 a head.

### ITINERARIES

The party left Auckland at 9.30 p.m. on 23/8/70 and arrived at Nandi Airport at 12.20 next morning. Later in the morning, after a spell at the Melanesian Hotel, 'A' party collected their stores, and departed by chartered bus for the Nausori Highlands in hot sunny weather. Unfortunately they failed to locate the selected camping area, which was on a side road, and after travelling some 20 miles past Fletcher's Mill, returned to a site a mile beyond the mill. Here continued strong wind and heat made conditions somewhat unpleasant, and birdlife in the area was restricted in variety and numbers. The mongoose was common in this modified habitat. On 28/8/70 the party travelled the 160 miles to Suva, en route for Kadavu; but adverse weather conditions prevented the chartered catamaran 'Longships' from sailing the following day. They set sail early in the morning of 30/8/70 for Kadavu; but after battling with southeast winds and rain squalls beyond the reef, they returned to Suva and set off for Nukulau, a two hours' sail inside the reef. Nukulau is a low coral cay of about 15 acres, off the mouth of the Rewa River, with highly modified vegetation. On 2/9/70 they left Nukulau to negotiate the river system of the Rewa Delta, and then made for Leleuvia Island, another coral cay of about 10 acres off the eastern coast of Viti Levu, and south of Ovalau. Leleuvia contrasts markedly with Nukulau, being little modified by man, and having a close canopy of coconut palms and tall broadleaved trees, with a dense



IC. Challies

FIGURE 1 — Black-naped Terns *Sterna sumatrana* adults and young on Leleuvia Island.

understorey. On 4/9/70 they returned to Suva, and on 6/9/70 flew to Taveuni, and camped on the excellent site previously occupied by 'B' party, some 1500 feet above the Wairiki Mission at Somosomo. Here they experienced continually cloudy weather with occasional showers; and an expedition by some members to Tagimaucia crater lake at 2700 feet was marred by heavy cloud. After very heavy rain on the morning of 10/9/70, the party moved down to the Mission for the night, and next day set out on the return to Suva and Nandi Airport.

'B' party proceeded by bus to Suva on 24/8/70, and next morning flew to Taveuni. Four-wheeled drive transport was needed to convey the party to the high altitude rain forest, and this was readily made available at no cost by Morris Hedstrom Ltd. and by Brother Kevin of Wairiki Mission. Except for patches of warm misty drizzle, the weather remained perfect until the night of the 30th, when very heavy rain fell, and continued next morning while packing up for return to Suva. Consequently departure for the Nausori Highlands was delayed one day to allow for drying out of gear, and shopping in Suva. On arrival in the Highlands on 1/9/70, 'B' party also failed to find the selected area, but camped within a mile of it, in an area which proved equally rewarding in its birdlife. Returning to Suva on 4/9/70, there was again a delay of a day, this time because the catamaran 'Longships' had not obtained the necessary clearance certificate for rhinoceros beetle. On the 6th the 50 mile sail to Kadavu, skirting l'Astrolabe Reef en route, was made under perfect conditions. Sailing westward along the northern coast of Kadavu, the tiny village of Gasele attracted us with its palm-fringed sweep of beach and background of heavy forest, and here the party found an exceptionally interesting bird fauna, and came to appreciate to the full the delightful character and hospitality of the rural Fijian. The weather remained perfect for the return trip to Suva on 11/9/70, en route for Nandi.

'C' party sailed from Suva before 6 a.m. on 25/8/70, and headed for Vunisea, the Government station on Kadavu, having a fine 9 hours run. They returned to Suva on 28/8/70, a day earlier than planned owing to threatening weather, and had a rough but exhilarating trip, with an east wind strong on the beam. The next day John Smart, a Suva member of the Society, took some of the party to the Rewa Delta and Lauthala Island to look at waders. On 30/8/70 'C' party flew to Taveuni, and with the help of Mr. Reg Douglas of Qacavulo Estate in the matter of transport, set up camp on the edge of heavy forest at 1800 feet, some 5 miles south of Somosomo. Returning to Suva on 6/9/70, they proceeded to the Nausori Highlands next day, and were the only party to find the selected area, which proved ideal for camping and bird-observing. They returned to Nandi on 12/9/70 for departure for Auckland at 5 a.m. next day.

A brief comment on camping conditions in Fiji may not be out of place. In each of the three selected areas pure water from mountain streams was at hand, and likewise wood for cooking fires. Mosquitoes were not troublesome, but could have been so at some points if the tents had not been proofed against them; and the weather on Taveuni justified the inclusion of tent flies.

## ECOLOGICAL

The mongoose *Herpestes griseus* was introduced to the main islands, Viti Levu and Vanua Levu, in the early years of white colonisation, to deal with introduced rats, which were causing extensive damage to the sugar plantations. This rat, probably *Rattus rattus* or *R. norvegicus*, is reported to have displaced a native species, probably *R. exulans* which was said to have caused little damage. The mongoose appears to have exterminated snakes on the main islands, and to have had a considerable impact on ground-dwelling birds; or perhaps the damage was done by the introduced rat prior to the introduction of the mongoose. The latter has also practically exterminated the various lizards which are said to have been a feature of Fijian wildlife.

Of avian predators there are few: a Goshawk *Accipiter rufitorques*, the Swamp Harrier *Circus approximans*, a rare Peregrine Falcon *Falco peregrinus*, and the Barn Owl *Tyto alba*; and their impact on birdlife is natural and slight. All are indigenous.

The mongoose was not introduced to Taveuni or Kadavu, nor were rats in evidence at any of our camp sites or elsewhere, although probably present; and the effect of the small and scattered native population of these islands on the birdlife is slight, being restricted to the shooting of two large species of pigeon, both fairly common. In consequence, the avian fauna of these two large islands remains much the same in variety and numbers as it was when described by Finsch and Hartlaub 1867 (1) and by Layard 1875 (2) and 1876 (3). From a careful study of the papers written by Layard, and by Wood and Wetmore 1925 (4) and by Wood 1926 (5), it would appear that there has been no extermination of species on Taveuni and Kadavu, and little diminution in numbers.

Two species of snake, both harmless, are found on Taveuni, but we recorded only two sightings, of an attractively marked constrictor type, about 4 feet long. A large and somnolent introduced toad is not uncommon.

On Viti Levu, in the cleared areas of settlement and in gardens about Suva, the birdlife consists mostly of introduced species, viz. Malay Turtle Dove *Streptopelia chinensis*, Red-vented Bulbul *Pycnonotus cafer*, two kinds of Myna *Acridotheres tristis* and *A. fuscus*, the Strawberry Finch *Estrilda amandava*, and the Java Sparrow *Padda oryzivora*; but several native species are also common, viz. the Many-coloured Fruit Dove *Ptilinopus perousii*, depending on food supply, White-rumped Swiftlet *Collocalia spodiopygia*, Pacific Swallow *Hirundo tahitica* in the dry zone only, White-breasted Wood-Swallow *Artamus leucorhynchus*, Polynesian Triller *Lalage maculosa*, Vanikoro Broadbill *Myiagra vanikorensis*, Orange-breasted Honeyeater *Myzomela jugularis*, Wattled Honeyeater *Foulehaio carunculata*, Red-headed Parrot-Finch *Erythrura cyanovirens*, and the Grey-backed White-eye *Zosterops lateralis*. The introduction of many species, mostly Australian and several European, seems to have been attempted, including the Kookaburra, Magpie Lark, Brolga, Brown Quail, Red Grouse, Partidge, and Blackbird (Wood 1926 (6)); but all of these except the Brown Quail *Synoicus ypsilophorus*, after surviving for a time, and in some cases breeding, have disappeared. The Brown Quail survives on Viti Levu and Vanua Levu, and seems unaffected by the mongoose (Mercer 1966 (7)).

Species on Viti Levu which have been either exterminated or greatly reduced in numbers either by mongoose or rats, are as follows:

WHISTLING TREE DUCK *Dendrocygna arcuata*. This Australian duck, which has been recorded as a straggler to New Zealand, was recorded by Layard 1875 (2) in some abundance at Nandi during the rainy season, whither it had come down from the mountains. It was apparently of local occurrence.

GREY DUCK *Anas superciliosa pelewensis*. From being widespread and very abundant in all suitable habitat, its numbers have been greatly diminished.

FIJIAN MEGAPODE *Megapodius* sp. Although no reference to this bird appears in earlier literature, Wood 1926 (8) produces circumstantial evidence that a mound-builder similar to the Niuafoou Incubator Bird *Megapodius pritchardi* existed on Viti Levu before the introduction of the mongoose, and on Kadavu, where some of the natives thought a few still survived.

BANDED RAIL *Rallus philippensis*. Once a widespread and common bird, it has apparently disappeared, but survives on Taveuni and Kadavu, and on many small and waterless off-shore islands.

BARRED-WING RAIL *Nesoclopeus poecilopterus*. Layard reported this large rail as generally distributed in 1875, but according to Mayr 1945 (9) it has not been observed since the 1880's. Although recorded only from Viti Levu and Ovalau, the species could still survive in the fastnesses of Taveuni.

SOOTY RAIL *Porzana tabuensis*. A closely related subspecies of the Spotless Crake of Australia and New Zealand, it is so elusive that it may still be found to survive on Viti Levu. It survives on Taveuni and Kadavu.

WHITE-BROWED RAIL *Porzana cinerea*. Like the former, this is an Australian species, the White-browed Crake. According to Mercer 1966 (7) it is only known to survive on Viti Levu in one small swampy area where the mongoose has not penetrated. B. and J. Morgan 1965 (10) recorded two birds on a large swampy area of about 100 acres some 10 miles north of Suva.

Three rare species only recorded from Viti Levu are listed by Mayr 1945 (9), but are not referred to in the writings of Layard or Wood and Wetmore. They are the Grass Owl *Tyto longimembris*, the Pink-billed Parrot-Finch *Erythrura kleinschmidti*, both of which were apparently collected by Finsch and Hartlaub in 1864, and the Long-legged Warbler *Trichocichla rufa*, apparently collected or at least described by Reichenow prior to 1870. No subsequent references can be found; but Mr. Fergus Clunie, Assistant Director of the Fiji Museum (*in litt.*), made a positive sighting of the Pink-billed Parrot-Finch on 7/3/71 at a very low altitude in fairly dense bush near Joske's Thumb, an old volcanic plug on the far side of Suva Harbour. According to Mercer 1966 (7), the species has only been recorded with certainty on the Nadrau Plateau at 3000 ft., and Mr. Clunie states that the only other sighting in recent years was from the Nadarivatu area, i.e. the area mentioned by Mercer. It is possible that the other two species may yet be rediscovered by the opening up by milling of the Nausori Highlands, and the consequent easier access.

## LAND BIRDS

There is a generally held impression that the avian fauna of the Fiji Group is much impoverished, with many of the native land birds exterminated by settlement and the introduction of the mongoose; but during three weeks of intensive observation in three rather remote areas, the birdlife impressed us as comparatively rich and abundant for an island fauna so distant from the nearest land mass, i.e. Australia. As one would expect, there is a strong Australian influence, and some species have varied little from the original colonising stock, whilst some vary to a marked degree; others again have no apparent affinity with any existing Australian species, and no doubt have a different origin.

A striking feature is the strong sub-speciation of many species in the three different areas visited, divergences in plumage, song, and behaviour being so marked in some cases that they have probably developed into valid species. It will be seen from the following notes that remarkably few of the birds recorded by early writers were not observed in the course of this survey. One species not previously known from Fiji is recorded; another unrecorded bird was almost certainly seen; and a third will probably prove to be a new subspecies. Unfortunately the records of Finsch and Hartlaub 1867 (1) resulting from their extensive survey in 1864, which give a basic knowledge of the early birdlife, are published in German, and are not yet available.

For convenience, the order and naming used below follows Mayr 1945 (9), and for a like reason, the herons are included in this section instead of under 'Seabirds and Waders.'

**REEF HERON** *Demigretta s. sacra*. This bird was commonly seen on all the reef-lined coasts, in white, dark, and intermediate phases. No actual count was made of these phases; but on Nukulau and Leluvia Islands, where the bird was particularly numerous, it was estimated that white and dark phases were about equal in number. Dark phase birds are apt to escape notice on the reef. Mayr 1945 (9) p. 125 gives the following proportions for the S.W. Pacific generally: dark phase 65 per cent, white 20, and mottled or intermediate 15. Counts on three days during May 1965 on Nukulau Island by R.B.S. and party gave the relative percentages of dark and white phases as 73 and 27. Intermediate plumage was noted in several instances: white with a few grey feathers, grey with a few white feathers, greyish-blue with white throat. There was also a variation in the dark phase from slate-grey to dark blue-grey, with variable iridescence. A dark phase bird was observed in a coastal creek on Taveuni to have a remarkable iridescence on the head and neck. Mayr states that it is occasionally found up to 5 or 6 miles inland on *lowland* streams; but birds were seen in a mountain creek on Taveuni at an elevation of 1500 feet.

**LITTLE MANGROVE HERON** *Butorides striatus*. A geographic race of the Australian Mangrove Heron, this bird is so secretive in habit and cryptic in plumage that it is not often seen. One was watched at Namalata, near Vunisea, at dusk at the mouth of a creek, fringed and overhung with mangroves. It may have come down to the shore

to feed. Showing very rounded wings, it flew and settled in a tangle of mangrove roots, where it was most effectively camouflaged so long as it remained still.

GREY DUCK *Anas superciliosa pelawensis*. The only sightings were of two birds in flight near Nausori Village in the Highlands, and a flock of 30 in the Rewa Estuary.

FIJI GOSHAWK *Accipiter rufitorques*. This fine goshawk is widespread throughout, and fairly common, being frequently seen in the coastal plantations and on the forest fringes at all altitudes. It is often seen dashing across clearings or along forest tracks, or playing above the forest in dives and abrupt upward swoops, and sometimes investigating coconut crowns with a winnowing flight. A pair was frequently seen at a nesting site near 'B' party's camp on Taveuni; but as both parent birds normally defend the nest fiercely, it was apparent that it contained neither eggs nor young. Nesting was in progress in the Nausori Highlands, a bird being seen on the nest, and another in rapid level flight carrying prey, either a Golden Dove or a Golden Whistler. Earlier examination of stomach contents by Layard and by Wood showed that birds do not form a major part of the Goshawk's diet, which consists mainly of insects and lizards; but it will attack even large pigeons, one being seen to knock feathers from a Peale's Pigeon; and on a forest track in the Nausori Highlands, W.F.C. picked up 8 pairs of wings of the Grey-rumped Swiftlet. This Goshawk appears to be closely related to the Australian Brown Goshawk *A. fasciatus* but is considerably more colourful, is much smaller, and lacks the barring on underparts and tail. An immature bird was seen to advantage prospecting a coconut crown in the native gardens of Gasele village, Kadavu, and its distinctive plumage, with broad brown streaking on the throat and wide brown bars on breast and abdomen, all on a white background, was indistinguishable from that of the immature Brown Goshawk.

SWAMP HARRIER *Circus a. approximans*. This bird is generally distributed, and was seen in open country, and more frequently cruising above the forest canopy. At Vunisea one was actually flying among the coconut palms and scaring the Collared Lories.

PEREGRINE FALCON *Falco peregrinus nesiotes*. Mayr states that this dark falcon has only been recorded with certainty from Viti Levu and Taveuni. It was seen by us in the Nausori Highlands on at least two occasions, and 'C' party observed a bird high above the cliffs at the eastern end of Vunisea Bay which was probably of this species. It differs from *F. peregrinus* of Australia only in being darker on the back, blackish in fact, and a deeper rufous on the breast. Mr. Fergus Clunie (*in litt.*) reports the Peregrine as fairly numerous around the cliffs in the Joske's Thumb area.

[FIJIAN MEGAPODE *Megapodius* sp. On 10/9/70, two members of 'B' party (L.E.H. and G.P.R.) were seated in a creek bed inland from Gasele on Kadavu when a large all brown bird planed down from the forested side of the creek with the apparent intention of landing in its bed. Preparation for landing seemed awkward, with long legs dangling, and broad rounded wings held back and up as it endeavoured to reduce momentum. It saw the party, gave a surprised squawk, and landed in a patch of cane grass. A megapode

has never been recorded from the Fiji Group, and is only reported by Wood 1926 (8) from a belief by European settlers of the late 19th century that such a bird existed on Viti Levu and had been exterminated by the mongoose. It was said to be "like the Niuafou bird," and Wood quotes considerable native lore about the bird, including the fact that it could not fly well, and moved by 'great leaps and bounds,' no doubt using a planing flight on occasions. As stated earlier, some natives thought it still survived on Kadavu. Our observers estimated the length of the bird at 14 inches, and recorded the short tail and slender head and neck, which they likened to the head and neck of a game cock. This last feature is most noticeable in two fine mounted specimens of the Niuafou Incubator Bird in the Auckland Museum, and after examining these it seems reasonable to believe that a megapode exists in the forests of Kadavu.]

**DOMESTIC FOWL** *Gallus gallus*. Fowls were enumerated amongst the presents left in Fiji by Captain Cook, and from these, or perhaps earlier stock, feral fowls became widespread and common on all the larger islands. According to Wood and Wetmore 1925 (4) p. 823 they have reverted to the plumage of wild-taken Jungle Fowl of the Philippines, Celebes, Lower Siam, etc. They are extremely shy and difficult to observe, but a number were seen on Taveuni, and B.B. of 'C' party saw a hen with 8 striped chicks. Several cocks could be heard crowing in the forest before dawn, and sometimes during the day.

**BANDED RAIL** *Rallus philippensis sethsmithi*. This bird is present in some numbers on Nukulau Island, 'A' party seeing as many as 5 at one time feeding in the gardens and lawns round the caretaker's cottage, and others were seen on the beach. On Taveuni birds were noted along the track after rain at 1500 feet; one was prospecting the rubbish pit at Tutu School on the coast. This race differs from our Banded Rail in that the chestnut breastband is absent or reduced. Colour slides of a bird mist-netted on Nukulau show the absence of this band, and also a reduction in white spots on the upper parts.

**BARRED-WING RAIL** *Nesoclopeus poicilopterus*. On 31/8/70 a large dark-brown rail-like bird was seen on Taveuni (B.B.). The Banded Rail is the only large rail recorded from Taveuni, and the only other large rail recorded in Fiji is this species, which Mayr states was restricted to Viti Levu and Ovalau, and has been unrecorded since the 1880's. Layard 1875 describes it as generally distributed without defining the islands, and says the natives stated it was flightless. Mayr describes the bird as 'large . . . upper parts plain walnut brown, underparts dark ash grey.' It is possible that the species still survives on Taveuni.

**PURPLE SWAMPHEN** *Porphyrio porphyrio vitiensis*. Previously widespread and common, it has been exterminated by the mongoose on the larger islands. The only sightings were on Taveuni, one bird at 1500 feet in panic flight, and another in a swamp at Waijevo under coconut palms. The subspecies is characterised by a bright blue breast shield and larger size.

**MANY-COLOURED FRUIT DOVE** *Ptilinopus perousii mariae*. This beautiful species was found to be fairly common in the Nausori Highlands, where it was frequently seen and more often heard calling in dense foliage. At Vunisea it was found to be relatively common,



[L. Rowe

FIGURE 2 — Banded Rail *Rallus philippensis sethsmithi* on Nukulau Island.



[K. Rowe

FIGURE 2 (a) — Banded Rail *Rallus philippensis sethsmithi* on Nukulau Island.

but only one sighting was made in the Gasele area. Mayr states that it is found throughout the Fiji Islands; but neither Layard nor Wood record any specimens or sightings from Taveuni. None of our parties sighted it there, nor was its distinctive call heard. It inhabits the lowlands of Viti Levu, the favourite food of the flock in the Suva gardens being the fruit of the weeping fig (Mercer 1966 (7)).

*Ptilinopus luteovirens* group. The following three *luteovirens* doves are each restricted in range, the Orange to Taveuni, Vanua Levu and two off-shore islands, the Velvet to Kadavu, and the Golden to Viti Levu and some off-shore islands:

Taveuni: ORANGE DOVE *Ptilinopus victor*. Casey A. Wood 1926 (5) p. 114 states "The doves of the genus *Chrysoena* (*Luteovirens*), peculiar to the Group, are the chief glory of the Fijian avifauna, and of these the most wonderful in point of plumage is the Orange Dove"; and again Layard 1876 (3) p. 151 "This gorgeous dove is the glory of the forest of Taveuni." Our own opinion was that the doves in this group must rank amongst the world's most beautiful birds. We found the Orange Dove not uncommon, but the vivid green females and juveniles with peagreen bills seemed to outnumber the more retiring clear orange males by about 6 to 1, the females and immatures often perching in the open on dead trees on the edges of clearings, up to 7 being counted in one tree. A male coming into its first adult plumage presented an unusual mottled pattern of bright green and clear orange feathering. The call is a clicking 'tok.'

Nausori Highlands: GOLDEN DOVE *Ptilinopus luteovirens*. This species we recorded as fairly common, again the green females and immature birds being much more frequently seen than the golden males. Its puppy-like bark, an accelerating 'uh-uh-uh-uh' was often heard.

Kadavu: VELVET DOVE *Ptilinopus layardi*. This dove was not recorded by 'C' party in the Vunisea area, where the Many-coloured was found in good numbers. In the Gasele area 'B' party found the Many-coloured rare, but the Velvet Dove very common, frequently occurring in parties of 7 or 8. The bright green plumage of the male, with yellow head and undertail coverts and vivid green bill, make it an unusually beautiful bird. Its peculiar call, a double whistle, was heard in all parts of the forest throughout the daylight hours.

PACIFIC PIGEON *Ducula p. pacifica*. This large fruit pigeon is only mentioned in the available earlier literature as being rather uncommon, and difficult to distinguish from the other two large pigeons at any distance. It was doubtfully sighted by 'C' party at Qacavulo on Taveuni; but 'B' party had a definite sighting of 4 birds in company with Peale's Pigeons on the edge of a forest clearing above their camp site on Taveuni, with other records in this locality, as well as two birds at a lower altitude. Also they had a probable sighting of one bird from the bus on the way out from the Nausori Highlands, the dark green back and vinaceous underparts being noted. Mercer 1966 (7) states that this pigeon is found in the Lau Group, well east of the main islands; but Mayr includes all Fiji in its wide Pacific range.

PEALE'S PIGEON *Ducula latrans*. A common bird in all situations and at all levels. Its hound-like 'woof-woof,' achieved by inflating the breast, then depressing the head and expelling the air, was a feature of the forest noises throughout the day, and much of the night. Other calls were a parrot-like squawk, and a noise like the coughing of a croupy sheep. Often seen singly in the understorey, it was more frequently observed sitting in the canopy in small groups. Layard records its gastronomic powers, two seeds taken from one crop measuring respectively 4" with circumference 3.6", and 5" with circumference 3"; and from these the outside pulp had been digested! Mounds of feathers of Peale's Pigeon were found throughout the forest on Taveuni, and were particularly numerous along a track to a clearing above the camp site of 'A' and 'B' parties; but shooting by the Fijians seems to have no effect on numbers.

WHITE-THROATED PIGEON *Columba vitiensis*. Usually seen as singles or in pairs, many were noted in flight over the camp site on Taveuni in the late afternoon. On Kadavu only one sighting was made in the Vunisea area, but at Gasele several pairs were seen to advantage, the glossy green, almost black, of the head, and white throat being noticeable features. In the Nausori Highlands a few were seen in flight near 'A' party's camp, and 'C' party noted them usually as a dark bird in rapid flight among the trees.

FRIENDLY GROUND DOVE *Gallicolumba stairi vitiensis*. 'Friendly' is a misnomer, for the bird is very wary and shy, and was thus rarely seen by our parties. On Taveuni there were three or four observations, one of which was detailed; but the light was not right for the brilliant copper sheen on the otherwise brown back and wing coverts to be recorded. There were two records in the Nausori Highlands, where its extreme wariness and rapid take-off has evidently allowed it to survive the ravages of the mongoose, for it is entirely a ground feeder. In one of these, only the characteristic loud clapping of the wings was heard in thick vegetation; and in the other, R.B.S. disturbed a bird, which took off in rapid low flight through the undergrowth.

MALAY TURTLE DOVE *Streptopelia chinensis*. A bird of the lowlands, this introduced species is common about gardens and settlements, where it is destructive of crops, especially rice. It was common on Nukulau Island; and well established coastally on Taveuni.

RED-THROATED LORIKEET *Vini amabilis*. This small lorikeet is restricted to Taveuni and Viti Levu, Wood in 1926 considering it extinct on Ovalau, where it was previously found. It is a bird of the outer canopy of the mountain forest, and so is difficult to see. We failed to find it on Taveuni, and our only record is of two birds seen by P.C. in the Nausori Highlands. It is all green, except for red cheeks, throat and thighs, and tail tipped yellow.

COLLARED LORY *Phigys solitarius*. This beautiful little multi-coloured bird was called *solitarius* by Latham 'because it is never seen alone'! We found it abundant in all three areas; in Taveuni from the coconut palms of the coast to the forest at 2000 feet; in the Nausori Highlands in clearings, forest, and the cultivated areas near Nausori Village; on Kadavu among the coconut palms and usually in small flocks among the scarlet flowers of *Erythrina indica*.

It was regularly seen in small groups in the crowns of coconut palms on Nukulau and Leleuvia Is. Small flocks in flight were commonly seen, particularly towards dusk.

**RED-BREASTED MUSK PARROT** *Prosopiea tabuensis*. There are four geographical races of this fine parrot in Fiji, and the two we recorded are quite distinctive in plumage, calls and size. They are called 'kaka' by the Fijians.

**Taveuni:** *P. t. taviunensis*. This race has maroon head and underparts, and is noticeably smaller than the others; also it lacks a blue collar. We found it numerous throughout the rain forest, usually single birds or in pairs, and it, and the Kadavu subspecies, were remarkably conspicuous when perched below the canopy.

**Kadavu:** *P. t. splendens*. The head and underparts are crimson and there is a conspicuous blue collar. In the Gasele forest it was numerous, and its raucous call, of higher pitch than the Taveuni bird, was constantly heard. In the Vunisea area it was noted from the mangroves to the high hills. A number frequented the village, and one periodically visited the local store for its ration of biscuit. Early observers spoke of large flocks of this and the succeeding species doing considerable damage to maize and other crops, and they were destroyed in numbers. *Splendens* is not restricted to Kadavu, but is also found on Viti Levu. 'C' party recorded birds seen and heard about their camp in the Highlands, and K.R. observed one near Nausori Village. Mayr states that *splendens* was introduced to Viti Levu, although Layard collected it there in 1874. However there is a trade, probably of ancient origin, in Kadavu parrots, which are favourite cage parrots in Fiji because of their intelligence, affection, and conversational powers (Wood and Wetmore 1926 (5) p. 123), and the introduction could be accounted for in this way.

**YELLOW-BREASTED MUSK PARROT** *Prosopiea personata*. This species is restricted to Viti Levu, and in the Nausori Highlands we heard and saw it very frequently. In the vicinity of Nausori Village 'A' party found it common in the forest, and in the native gardens where it fed on the flowers of banana palms.

**FAN-TAILED CUCKOO** *Cacomantis pyrrhophanus simus*. In the forest of Gasele on Kadavu, its rapid trill with a downward inflection was heard frequently, and at Vunisea a young bird sitting along a bough and petulently begging for food was probably of this species. It was heard on occasions on Taveuni, and there was one good observation in the Nausori Highlands, the barring of the underparts being most noticeable. It is an Australian species with races extending into some islands of the South-west Pacific.

**LONG-TAILED CUCKOO** *Eudynamis taitensis*. There were no sightings, but on Taveuni it was reported to be common in the vicinity of native villages on the coast; and on Kadavu its call was heard in the hills of the isthmus at Vunisea. Mayr records it as being generally silent in its winter quarters.

**BARN OWL** *Tyto alba*. This cosmopolitan species is apparently common throughout the lowlands and inhabited areas, although we only had one sighting, in a coconut plantation on Taveuni. The subspecies *lulu* is found throughout Polynesia. Wood states that he

saw at least two species of owl on Kadavu, but the second is not mentioned in the literature. Also Layard speaks of having seen on occasions a large brown owl on Viti Levu, which does not seem to tally with the Grass Owl *Tyto longimembris* listed by Mayr. There appear to be owls still awaiting identification in Fiji.

**WHITE-RUMPED SWIFTLET** *Collocalia spodiopygia*. This is possibly the commonest bird in Fiji, to be seen in numbers hawking over clearings, cane grass areas, creeks, forest verges, etc. There is an audible snap as it takes an insect, but otherwise it makes no sound, except for a twittering in the nesting caves. Members of 'A' party found it the only bird at Tagimaucia crater lake at 2700 feet on Taveuni; and on Nukulau Island it was one of the commonest birds.

[**WHISKERED TREE SWIFT** *Hemiprocne mystacea*. R.B.S. writes as follows: "As I was strolling back to camp at about 5.30 on the evening of 11/9/70, I saw an unfamiliar bird flying about 100 feet overhead. In size and shape it was quite unlike any bird I know — long and narrow. The flight appeared to be straight and level, as if the bird was going directly from the top of one tall tree to another across a clearing. It was, I suppose, in view for about 20 yards. I judged the bird to be about 9 inches long; the wings were not markedly long; across the chest the bird seemed to be very narrow, say about 1½ inches. I compared it in shape with a much reduced and attenuated Long-tailed Cuckoo. The body was small and the tail very long in proportion; but if forked, the streamers were held closed. In the fading evening light, no true colours or clear markings were discernible. No call was heard. All this is rather nebulous. By now I was reasonably familiar with most Fijian land birds; but this sighting puzzled me very much, and I did not know what to think. However, while turning the pages of Mayr's 'Birds of the S.W.P.' I was agreeably surprised to find a bird which seemed to offer a possible solution, although no such bird is as yet known from Fiji. The Whiskered Tree Swift *Hemiprocne mystacea* occurs throughout the Solomons, coming nearest to Fiji at San Cristobal. According to Mayr, dawn and dusk are their periods of greatest activity (vide p. 78). A bird such as this could easily have existed unnoticed in the mountain forests of Fiji." The bird may be well established in the Nausori Highlands, and if so, may in due course prove to be a new subspecies, although only one race has been recorded in the S.W. Pacific.]

**WHITE-COLLARED KINGFISHER** *Halcyon chloris*. This is a very common bird, seen in a wide variety of situations, such as along the coastline, on coastal and mountain streams, in coconut plantations, forest clearings, and within the forest. A considerable variation in breast plumage was noted, from clear white through buff to a rich smoky orange. The bar across the nape varied from prominence to almost complete absence, and there was much variation in the blue of the back.

**PACIFIC SWALLOW** *Hirundo tahitica*. Apparently this swallow seldom ranges far from the coast, although one was seen in the Nausori Highlands. One over the beach at Gasele, a pair over the beach at Vunisea, and a few near the Wairiki Mission on Taveuni,

hawking flies over drying copra, completed our scanty records; whereas in May 1966, R.B.S. found them in a number of localities on Taveuni. The bird is commonest in the dry western zone of Viti Levu.

**POLYNESIAN TRILLER** *Lalage maculosa*. There are five recognised subspecies in Fiji, of which we recorded three as follows:

Taveuni: *L. m. woodi*. This bird was seen in fair numbers from sea level to 2000 feet. In the forest it habitually perches high in the canopy, usually choosing the tops of the taller trees, either in parties or pairs. Many were seen, however, at moderate height on the verges of the clearing above the camp site of 'A' and 'B' parties, and here the U-shaped barring on the sides of the neck and on the flanks which distinguishes the race was clearly seen. It was only here that the trilling song was heard, which is a fine, long-sustained trill, like that of a canary. Otherwise it is a noisy bird, calling a rasping 'zzit' and 'si-si-tsi.'

Nausori Highlands: *L. m. pumila*. Many birds were seen to have a pale, almost white breast, with little marking, and were probably immatures; but the majority were heavily barred, denoting the subspecies. Working in different areas, 'C' party recorded it as not uncommon, 'B' party as the most common bird in the Highlands, and 'A' party had many sightings. Some breeding was in progress, as a pair was seen carrying food.

Kadavu: *L. m. soror*. This race was found to be very common in the Gasele area, and subspecific differences were noted in the somewhat darker breast with fainter barring. In the Vunisea area it was recorded as noisy and conspicuous, and as one of the few native passerines that will perch in the open. No variation in voice in the three races was noted. Here breeding was also taking place, a nest being found at 60 feet in a mango tree, and changeover at the nest observed.

**RED-VENTED BULBUL** *Pycnonotus cafer*. Introduced from India about 1903, it is widespread and extremely common on Viti Levu and some of its off-shore islands. It is reported as doing serious damage to fruit. In the Highlands it was in numbers in clearings, forest verges, and the gardens of Nausori Village, but it does not invade the forest to any extent. It was rare on Nukulau Island, with only one record, and on Leleuvia, where two were seen.

**ISLAND THRUSH** *Turdus poliocephalus*. There are 5 very distinct races, each restricted to particular islands, and of these we recorded three. All are extremely wary, and are difficult to observe, except by sitting still and watching for a period. The species is closely related to the European Blackbird and the American Robin.

Taveuni: *T. p. tempesti*. Well distributed in the forest, its behaviour when disturbed resembles that of the Blackbird in the New Zealand bush, with similar alarm notes and rapid low flight. Both the male and female *tempesti* are black, except for grey head and throat in the male, and streaky greyish-black head and throat in the female. The song is also Blackbird-like, except that some cadences are repeated three or more times. It contributes fine song to the dawn chorus from the canopy, and is vocal again towards evening.

Nausori Highlands: *T. p. layardi*. The plumage is quite different, being dark brown above, light grey throat, and chestnut flanks and abdomen. In the area surveyed by 'B' party it appeared to be the most common bird after the Swiftlet and White-eye, and several of both sexes were seen to advantage. Some birds, having streaked grey and whitish underparts, were presumed to be females.

Kadavu: *T. p. ruficeps*. It was seen, and heard singing strongly from cover in patches of forest, in the Vunisea area, and several were briefly seen in the native gardens behind Gasele, especially along the banks of a stream; but everywhere it was so elusive that the distinctive plumage of this race, black with ochre head and throat, was not recorded.

**SILKTAIL** *Lamprolia victoriae*. On Taveuni we found this beautiful little bird (5") to be fairly common and apparently well distributed in the forest from 1500 feet upwards. It is a bird of the fairly open understorey, and not seen higher than about 20 feet, but more often on the ground, or within a few feet of it. In fine weather it is easy to find and approach, and in shape and plumage reminds one of the Riflebirds of Queensland in miniature. It was always found in pairs at least, and sometimes in groups up to four; not restricted to three as Layard found in 1874; but his visit followed close upon the fledging of the first clutch, and only one large egg, 1" x .9", is laid by this small bird (Layard 1876 (3) p. 149). A description of the plumage is merited: velvety black head, back, wings, and tip of tail, all with a remarkable iridescence of blue and green; snow-white tail and upper tail coverts; glossy blue spangles at the throat. The Fijians call the bird 'wali-na-kole,' meaning 'the dog cannot catch it,' in allusion to its habit of running along the ground, and then flying up just out of the dog's reach (Layard 1875 (2) p. 438).



[V. T. Davis

FIGURE 3 — The Silktail *Lamprolia victoriae* on Taveuni.

FIJI WARBLER *Vitia ruficapilla*. There are four races, of which we only recorded two, failing to find the Taveuni subspecies *V. r. funebris*.

Taveuni: *V. r. funebris*. With nothing in the available literature to indicate habits or song, but only that it is found in thick undergrowth, none of the parties recorded the Warbler on Taveuni, although it is doubtless present in suitable habitat.

Nausori Highlands: *V. r. badiceps*. On the day prior to 'B' party's return from the Highlands the first sighting was made by L.E.H. Shortly after daybreak the following morning, it was suddenly realised that song coming from many points in dense tangled undergrowth close to the camp was from this bird. Any attempt to enter the tangle meant immediate silence from all birds in the vicinity, and in any case light in the jungle was too dim for observation. Later two birds crossed the forest road to an open glade, and came under close observation, up to 10 feet at times, by all members of the party. Its flight is somewhat uncertain with small undulations, reminiscent of our Fernbird *Bowdleria punctata*, and even more Fernbird-like are its actions on the ground, as it creeps rapidly in and out of cover. The tail is jerked as it warbles, and is held cocked in open situations. Contrary to descriptions in the literature, taken no doubt from museum specimens, long legs and bill did not strike us as a characteristic of the bird in the field. The white eye-stripe, rufous crown, and other features distinguishing the race were clearly observed. Later 'C' party, in an area about a mile distant, had three sightings, including one close observation as the bird worked rapidly down a tree trunk from about 20 feet to ground level. Song heard frequently from the campsite and elsewhere was uncertainly, but correctly, ascribed to the Warbler. It was described by B.B. as plaintive, of flute like quality, and consisting of one prolonged deep note followed by five or six ascending notes. Listed by Mercer as uncommon on Viti Levu, we would assess it as common, at least locally, in the high forest.

Kadavu: *V. r. ruficapilla*. Only one bird was seen, the locality being inland from Gasele village, and song was heard. Observation was not close enough to record the subspecific features.

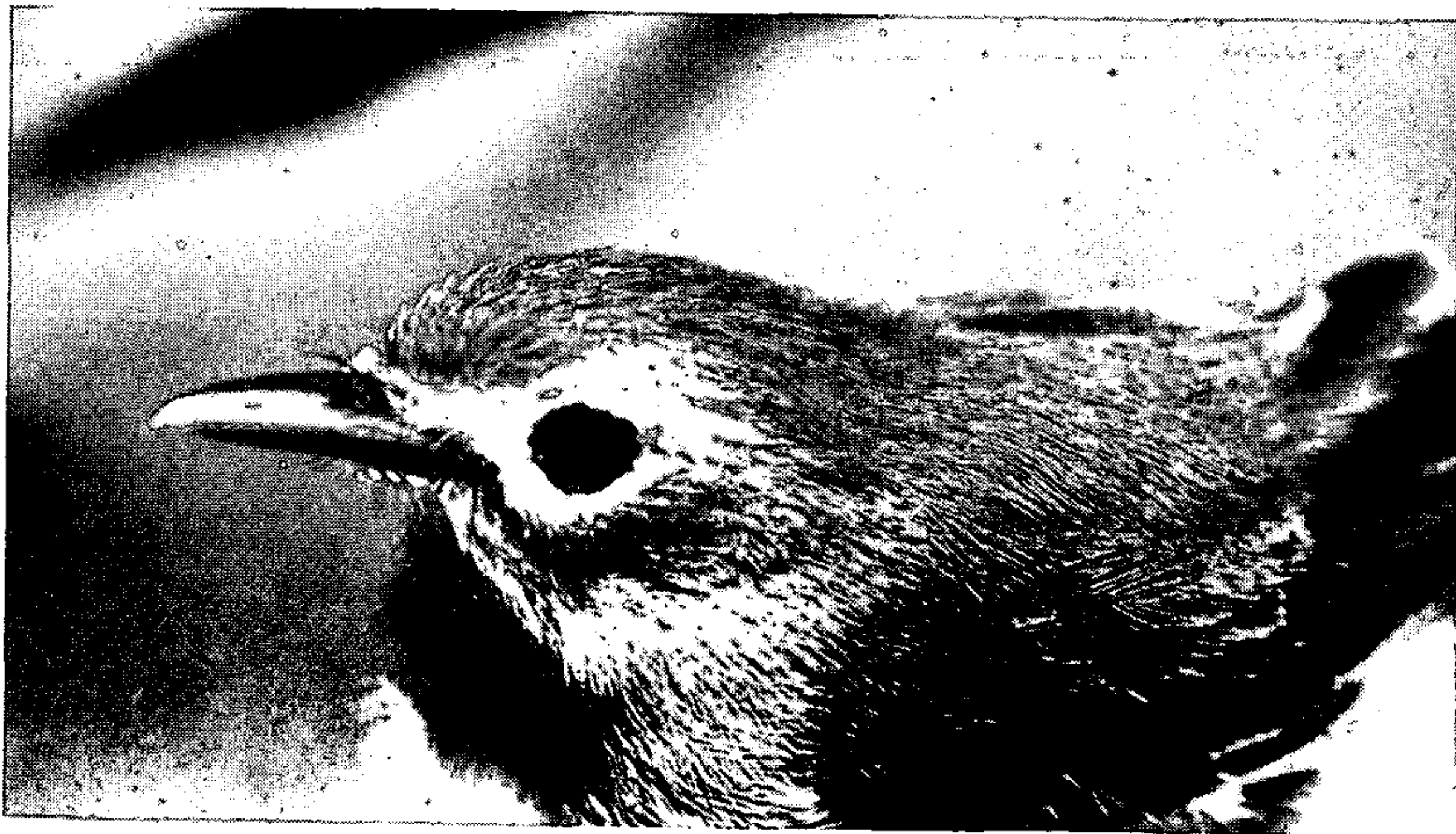
KADAVU FANTAIL *Rhipidura personata*. The striking feature is a black crescentic band across the upper breast, with an inverted V of black joining this band. The tail is all black except for a narrow white edging to the two outer feathers. It was elusive in the Vunisea area, with only two sightings; but in the forest at Gasele, 4 or 5 would usually be seen up one of the steep bouldery creek beds which provided the only reasonable access into the forest. Extremely active, it has a variety of song, frequently a musical succession of single notes in one key, followed by a succession in a lower key, and then back to the first key. When in groups, a high 'plonking' chorus would be heard, with very loud cadences rising and falling. The species is probably well distributed.

SPOTTED FANTAIL *Rhipidura spilodera*. Of three subspecies in Fiji, those of Taveuni and Viti Levu are recorded.

Taveuni: *R. s. rufilateralis*. It is well distributed and fairly common at all levels in the forest, but apparently rare in the cleared coastal areas. Several noisy parties of 5 and 6 birds were recorded, plus at least two family parties containing lately fledged young. Probably the other groups were family parties, judging from the variation in intensity of spotting on the breast.

Nausori Highlands: *R. s. layardi*. The race is characterised by very strong streaking on the breast, and it is generally a much darker bird. It was not uncommon, but not particularly noticeable. If we sat quietly in the forest, a bird would usually come into view. The call is usually a 'chip, chip.'

SLATY FLYCATCHER *Mayrornis lessoni*. Essentially "a bird of the substage in lowland and mountain forest" (Mayr 1945), on Taveuni 'A' and 'B' parties recorded it as fairly common in the forest, and it was often seen, sometimes at eye level, on the track below the camp. Strangely, 'C' party, who worked an area some miles to the south-west, found the bird rather scarce, or elusive. Again, in the Nausori Highlands, 'B' party found it common, and not shy; but 'C' party found it elusive and seldom recorded it. On Kadavu it was rare in the Vunisea area, with only two records, whereas at Gasele it was a very common bird. 'A' party found it one of the three most common species on Leleuvia Island, where several were mist-netted. It is an attractive bird, clothed in quiet grey, with dark eye and whitish eye-ring, and black tail, and betrays its presence by a noisy scolding chatter, and grating, rasping notes. In this it reminded one of the Whitehead of New Zealand.



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FIGURE 4 — The Slaty Flycatcher *Mayrornis lessoni* on Leleuvia Island.

**FIJI SHRIKEBILL** *Clytorhynchus vitiensis*. Mayr 1945 says that this species is "found in the substage of the darkest parts of the forest, gleaning insects from vines and branches," and it was in this type of habitat that most observations of three races were made.

Taveuni: *C. v. layardi*. Many were recorded by 'A' and 'B' parties, all in the substage in heavy forest; but 'C' party's only sighting was in a tangled hollow open to sunlight. White edging along both mandibles is diagnostic of the species, and ochreous underparts indicate the race. They were usually seen in pairs, searching the trunks and lianes.

Nausori Highlands: *C. v. vitiensis*. Again 'B' party saw many of this race, at first thought to be juveniles from their smaller size and paler grey of the underparts. One bird was mist-netted in the forest of Leleuvia Island.

Kadavu: *C. v. compressirostris*. There was a somewhat doubtful record of two birds in a dense acacia thicket near Vunisea Hospital, for probably Layard 1875 is right in saying "this bird frequents the forest, never coming near the haunts of men." It was far from uncommon in the forest of Gasele, frequently in pairs, and coming close to the observer. The warm olive-brown colour, heavy bill, and prominent white on the mandibles was noted. A usual call is a harsh 'trrt'; but by following up a very long drawn out mournful call which had been puzzling us, it was discovered to be made by this bird. L.E.H., an excellent mimic, imitated the call with startling results, for the bird immediately moved in close and displayed continuously and brilliantly. The vibrations in the call increased as wings were vibrated and tail spread. The call consisted of simple variations easy to imitate (according to L.E.H.). One declining note was followed by one ascending, and then with all appearance of anger, the bird gave several guttural 'clucks.' This was again followed by more melodious vibrating notes accompanied by much display.

**BLACK-FACED SHRIKEBILL** *Clytorhynchus nigrogularis*. This species was recorded on Taveuni only by 'B' party, the first observation being of a female collecting nest material on the forest floor, then creeping on tree trunks in search of food. Later several were seen. The male is a handsome bird, with his black face and throat and white ear patches. In the Nausori Highlands it was met with not infrequently, and the calls were noted to be similar to those of the previous species, but louder and more varied. We found later on Kadavu that it also gives the long mournful call in a descending quavering whistle. There were further sightings in the Gasele area, about one of which L.E.H. has this comment: "Calling brought us to a nest, but despite our provocative imitations, display was modified to energetic wing spreading and vibration, and spreading of the tail. This we feel was due to our close proximity to the nest. The female came off the nest." The rich brown colouring of the female was noted, some having a grey-black diffusion on the head; and the heavy ivory grey-green bill of the male was recorded. Both sexes sing and display.

**VANIKORO BROADBILL** *Myiagra vanikorensis*. Four subspecies are recognised, of which we probably noted three.

Taveuni: *M. v. rufiventris*. This is the common small passerine of the coastal trees, and still present in small numbers at 200 feet.



I.K. Rowe

FIGURE 5 — Vanikoro Broadbill *Myiagra vanikorensis dorsalis* on Leleuvia Island.

Both sexes have a sparrow-like chirp, and the male a persistent and resonant 'pee-pee-pee-pee,' also a double whistle 'toet, to-eet.' It sometimes calls at night.

Nausori Highlands: *M. v. dorsalis*. Much less common than in the lowlands, but 'A' party found it in numbers in the shrubbery and gardens about Nausori Village. No racial differences were noted, and the race may be referable to *rufiventris*. 'A' party found it common in the forest of Leleuvia Island, but did not record it on Nukulau. The race here would be *dorsalis*.

Kadavu: *M. v. kandavensis*. It was not common in the Vunisea area, where a distinct difference in the song was noted: a long drawn-out rather plaintive 'pe-eep,' instead of the sustained ringing call of *rufiventris*. This swarthy race, with more black, and a deeper orange breast, was abundant in the native gardens in the wide valley behind Gasele village.

BLUE-CRESTED BROADBILL *Myiagra azureocapilla*. There are three races of this beautiful little bird listed by Mayr, being restricted to Viti Levu, Vanua Levu, and Taveuni. No specimens are recorded in the available literature as coming from Kadavu, so the birds seen there by us could prove to be a new subspecies.

Taveuni: *M. a. azureocapilla*. The male is a very striking bird, with a vivid orange bill against a sky-blue crest and rich chestnut throat. Many sightings were made, frequently in the canopy, and three birds were mistnetted by 'A' party.

Nausori Highlands: *M. a. whitneyi*. A number of sightings were made, and here it was found to be not so much a bird of the canopy, but of the understorey at 10 to 50 feet, sometimes perching still on a bare bough in full view. The golden-brown of the throat was noted. A pair was seen in a feeding association with two Slaty Flycatchers, a Fiji Shrikebill, and a Spotted Fantail. Rather a silent bird, and no calls were recorded.

Kadavu: subsp. nov.? On 7/9/70 a female was seen in the Gasele area, with a further sighting two days later. Insufficient details of plumage were noted to give a detailed description.

SCARLET ROBIN *Petroica multicolor kleinschmidti*. This attractive little bird is a miniature of the Scarlet Robin *P. multicolor* of Australia, for no differences in plumage were obvious; but we estimated its size at  $3\frac{1}{2}$  inches, and certainly one of the tiniest Fijian birds. Quite a number were seen in the forest of Taveuni, one pair having a nest with young. In an open situation on a thin branch at 16 feet, the nest was nicely placed under the shelter of a large leaf. A soft 'plink, plink' was all that was heard at the nest; but it has a sweet whistle, running down the scale in quick succession. It was fairly common in the Nausori Highlands, with nesting in full swing, for pairs could always be found in the same places, and several nests were found. 'A' party observed a pair in one of Fletchers' pine plantations. Mayr lists a race *becki* for Kadavu, but we did not see it there, and from earlier literature it is apparently rare.

GOLDEN WHISTLER *Pachycephala pectoralis*. There are no less than 80 recognised races in the South-west Pacific, of which Fiji has its full share of 10. We observed three very distinct subspecies in the areas surveyed.

Taveuni: *P. p. torquata*. Fairly common in the forest and probably well distributed, but it is a bird mostly of the high canopy, and so not easy to locate. At times, however, it would be seen to advantage, and the male's fine plumage admired, with his yellow throat, black breastband, and yellow abdomen. Singing in the canopy, it is more easily heard than seen, for it has a loud clear song, which frequently ends with an upward whip-crack note. Its song was always a feature of the early morning chorus. The female is a plain bird, very rufous.

Nausori Highlands: *P. p. graeffi*. We found this bird not uncommon, but again usually high in the canopy. It begins singing very early in the morning, in concert with honeyeaters, but is a poor songster compared with *torquata*, its song consisting of few notes, and quite unremarkable. Its plumage differs widely from the foregoing, for there is no breastband, but a black bib with the underparts all golden yellow; and its mate is a rather drab bird, with a vermiculated grey breast.

Kadavu: *P. p. kandavensis*. This was not recorded in the more settled area of Vunisea, but we recorded it as very common in the coastal bush of Gasele, and met with it less frequently in the higher forest, where it was rather a bird of the understorey. A great songster, but endless repetition of the same cadences tended towards monotony. In plumage it was the nearest of all three races to its Australian congener, having a white throat surrounded by a narrow black collar, with lemon yellow breast and abdomen.

**WHITE-BREASTED WOOD-SWALLOW** *Artamus leucorhynchus*. This is a common lowland bird, to be seen on telephone lines and roadside vegetation. None was recorded in the higher levels of Taveuni; but in the Highlands a few were seen in clearings, and greater numbers about Nausori Village. Nesting was in progress at the Douglas homestead on Taveuni, and elsewhere courtship feeding was seen. It is absent from Kadavu.

**POLYNESIAN STARLING** *Aplonis tabuensis*. Essentially a bird of the forest, it was recorded in small numbers on Taveuni, mostly in pairs. A flock of 10 visited trees near 'C' party's camp in the early mornings, then broke off into pairs. In flight like the European Starling, it is a plain bird, with dark grey-brown upper parts, pale streaked grey under, but with a coppery sheen in some lights. It was present on Kadavu, where some nesting was noted; and in the Nausori Highlands nesting was well advanced. Five nests were found, all in dead trees at 25 to 70 feet. In at least one nest young were being fed. Nests were in holes or rotten wood, in sites typical of *S. vulgaris*. J.A.B. noted a pair bringing food at 3 and 4 minute intervals; and R.B.S. watched a Starling feeding at the flowers of the Fijian mistletoe (*Amelotheca insularum*).

**INDIAN MYNA** *Acridotheres tristis*. An extremely common bird of the lowlands, and frequenting the coastal villages of Taveuni, it is apparently, and fortunately, absent from Kadavu.

**JUNGLE MYNA** *A. fuscus*. Glossy plumage, an erectile crest at the base of the bill and vivid yellow eye characterise this species, which is common in the cultivated areas of Viti Levu and in Suva gardens, and very common on Nukulau Island, to the exclusion of *A. tristis*.

**ORANGE-BREASTED HONEYEATER** *Myzomela jugularis*. This attractive little honeyeater (4") is common in most situations and at all altitudes, at least up to 2000 feet, except that we found it rare in the Gasele area. It was one of the most common birds on Leleuvia Island, but absent from Nukulau. Variations in plumage were noticeable amongst small groups feeding in lantana, the crowns of coconut palms, flowers of the flamboyant tree, and so on, due no doubt to age and sex. There was no song, other than a monotonous 'tzit,' punctuated by a higher 'tchee,' and a loud demanding 'sweet sweet.'

**WATTLED HONEYEATER** *Foulehaio carunculata*. There are three subspecies, of which two occur in the areas visited by us, *taviunensis* on Taveuni and *procerior* on Viti Levu. Mayr 1945 queries the presence of the latter race on Kadavu, although Mercer 1966 quotes the species as being found throughout the Group. It was certainly collected by Wood on Kadavu (one specimen only) in 1923, and Wilesworth 1891 (11) recognised its occurrence there; but neither 'B' nor 'C' parties saw it on Kadavu, and we would have been surprised to have found it sympatric with the very similar Kadavu Honeyeater, an extremely common bird.

Taveuni: *F. c. taviunensis*. Very numerous and very vocal at daybreak in the forest, particularly along the margins, it was not common coastally or in cleared country. Its endlessly repetitive three note call became rather monotonous. The yellow wattle is small and variable, probably according to age, in many birds appearing as just a small patch of bare skin below the gape.

Nausori Highlands: *F. c. procerior*. This darker race was much less conspicuous in the Highlands than in the lowlands, where it is common in all situations, especially in gardens, and is usually the first Fijian bird to come to the notice of a visitor. 'C' party found it common in the scrubby part of Nukulau Island, where *Myzomela jugularis* does not occur.

KADAVU HONEYEATER *Xanthotis provocator*. We found this bird to be very common. Layard 1876 records it as one of several Fijian passerines which lay only one egg, and says "it accounts for the paucity of individuals one sees in the forest"; but to us one egg clutches seemed more probably due to the population being at saturation point in all favoured habitat.

GIANT FOREST HONEYEATER *Gymnomyza viridis*. This fine large honeyeater (10½") with a long curved bill is restricted to the tall forest, and is not seen at lower altitudes. It does not occur on Kadavu.

Taveuni: *G. v. viridis*. One was seen at 1500 feet feeding on wild banana flower in the forest, several more at altitudes above 1800 feet, and others near the top of the rim of Tagimaucia crater at 2700 feet. Its call was not heard from either camp site, and it seemed to be a less noisy bird than the other race; but three pairs were closely observed by B.B. feeding in a pandanus resembling our kiekie, with courtship feeding by two of the pairs. In addition to 'keetoo, kee-too,' they "produced a remarkable volume of sound, loud melodious whistling gurgles with rapid mellow notes."

Nausori Highlands: *G. v. brunneirostris*. The race is distinguishable by blackish bill and legs, in place of the bright yellow of *viridis*. Although considered by Wood 1926 to be rare, we found it to be fairly common, and certainly by far the noisiest bird of the rain forest. Its ringing 'keetoo keetoo' would begin at 2.15 each morning, and usually continue until long after dark, and birds calling in one area would set off birds in other areas. It also produced small noises like a Tui *Prosthemadera novaeseelandiae*, and its method of bathing after rain was the same as that of the Tui, diving into thick canopy until thoroughly soaked. Frequently it ran about dead branches conspicuously, and was seen to display when calling, bending forward with tail raised and fanned out. It was noticeably aggressive towards some other species, e.g. the Collared Lory.

LAYARD'S WHITE-EYE *Zosterops explorator*. Distinguished from *lateralis* mainly by its yellow underparts and plumper build, it was by no means common on Taveuni. 'B' party found it abundant in their partly cut-over area in the Nausori Highlands, while 'C' party had only one probable sighting, and 'A' party thought it the only White-eye in the vicinity of Nausori Village. There was a tentative record of three birds in the Gasele area on Kadavu.

GREY-BACKED WHITE-EYE *Z. lateralis flaviceps*. This race is much more yellow about the head than *lateralis* in New Zealand. Many were seen in small flocks on Taveuni, particularly along the coast, in cleared country, and along the forest verges. In the Nausori Highlands and on Kadavu it was very common, and was still in small flocks, although some nesting was in progress. The race *flaviceps* is restricted to the Fiji Group, but apparently does not extend into the Lau Archipelago to the east (Mees 1969 (11)).

**RED-HEADED PARROT FINCH** *Erythrura cyanovirens*. A beautiful little finch which we found to be fairly common on Taveuni, frequently in parties of 3 to 6. Mainly a bird of the clearings, it was sometimes seen inside the forest. It was quite common in the Nausori Highlands, in the grassy clearings along with Strawberry Finches, but we did not record it on Kadavu.

**STRAWBERRY FINCH** *Estrilda amandava*. In lowland open parts of Taveuni, this introduced bird was seen in small flocks, and in the cultivated parts of Viti Levu, including cleared areas in the Highlands, flocks were numerous.

**JAVA SPARROW** *Padda oryzivora*. 'A' party recorded small flocks in the grasslands and old gardens in the vicinity of Nausori Village, and also in the lowland areas of Taveuni. Large flocks are not uncommon in the wetter eastern parts of Viti Levu.

**BLACK-BACKED MAGPIE** *Gymnorhyna tibicen*. This undesirable introduction appears to have become widely established in the lowlands along the north-west side of Taveuni.

To complete the records of land birds, it only remains to list some observations by competent observers of birds which were not identified. These were as follows:

1. On Taveuni there were at least four records of a sparrow-sized bird with a blue crown, marked eye-ring, white markings on the face beginning at the gape, narrow below the eye, and widening into a large patch; length  $5\frac{1}{2}$  inches; sparrow-like plumage on back and tail; strong dark bill, distinctly orange at base; a brightish dark rufous patch on throat, and greyish-white underparts. A bird of the undergrowth, with a warbling song akin to that of the Grey Warbler of New Zealand.
2. Each day at dawn on Taveuni a bird was heard to give a deep, steady 'tong, tong, tong' like the ringing of a bronze temple bell. It was never heard after 6.15 a.m., and its identity remained a mystery.
3. Also on Taveuni, a small bird of about 4 inches; black head, back, wings and tail; light grey underparts, and a short red flycatcher type bill. A party of three was seen by a creek at the edge of the forest.

#### SEABIRDS AND WADERS

The object in visiting Fiji was to study the land birds, but as adverse weather caused some changes in scheduled sailings between Kadavu Island and Suva, and the abandonment of this trip by 'A' party, opportunities were taken to observe seabirds and migratory waders. There is a marked absence of seabirds round the coastline of the larger islands, but 'A' party in particular made some interesting sightings in the course of their visits to Nukulau and Leleuvia Islands.

**BROWN BOOBY** *Sula leucogaster*. Several on beacons off Somosomo on Taveuni, and 15 to 20 on beacons north of the Rewa Delta. Several in flight en route to Leleuvia Island.

**RED-FOOTED BOOBY** *Sula sula*. In fair numbers between Suva and Kadavu, and recorded in the vicinity of Nukulau Passage.

LESSER FRIGATE BIRD *Fregata ariel*. Up to 4 harrying Crested Terns at Vunisea. Several over Matei airfield, Taveuni. Two at Rewa Estuary. Several in flight south of Leleuvia Island.

PACIFIC GOLDEN PLOVER *Pluvialis dominica*. Rewa Estuary 60; Leleuvia Island 20; on reef at Gasele 4; Nukulau Island 4.

DOTTEREL sp. *Charadrius mongolus* or *C. leschenaulti*. Rewa Estuary 4. Strong wind made viewing very difficult.

LONG-BILLED CURLEW *Numenius madagascariensis*. Rewa Estuary 1.

WHIMBREL *Numenius phaeopus* subsp. Rewa Estuary 25+; Taveuni 1 under forest canopy.

BAR-TAILED GODWIT *Limosa lapponica*. Rewa Estuary 80; Nukulau 1.

WANDERING TATTLER *Tringa incana*. Nukulau 30+; Leleuvia 15 to 20; scattered along Taveuni coastline; common on reef at Gasele, with much trilling; Rewa Estuary 100+.

SIBERIAN TATTLER *Tringa brevipes*. Rewa Estuary 2.

TURNSTONE *Arenaria interpres*. Nukulau 20+; Leleuvia 10; Rewa Estuary 25.

CRESTED TERN *Sterna bergii*. Nukulau 30; Leleuvia 15, and commonly seen in flight en route; several off Somosomo; reef at Gasele 12; Vunisea Bay up to 15, including young not long fledged; Rewa Estuary 150+.

BLACK-NAPED TERN *Sterna sumatrana*. Around Leleuvia Island and in the southern channel to the Rewa Delta, many mixed feeding flocks of this species and noddies were seen. Flocks varying from 10 to 200 passed in flight close to the catamaran. A small group, including juveniles, regularly rested on a sand bar on Leleuvia.

NODDY *Anous* sp. Large flocks, some exceeding 500, were seen feeding with the preceding species, but they could not positively be identified as Common or White-capped.

No petrels were recorded, but John Smart (in pers. comm.) quotes information supplied by Fijians to the effect that petrels breed near the summit of Mt. Washington at the western end of Kadavu, and also of Mt. Challenger to the east. Those at Mt. Washington are said to be in their burrows by day, and the latter which are taken by the villagers for food, by night. Information on plumage is unreliable, and at variance with some gleaned by 'C' party at Vunisea.

## DISCUSSION

The Fiji project was intended to provide an introduction for New Zealand ornithologists to the avifauna, in the hope that it will lead to a wider study there, with an eventual extension to the avifauna of the whole of the South-West Pacific area. Fiji is recognised as having the richest birdlife in this area, but Samoa, Tonga, and other island groups also have much of interest in their land birds. It will be seen from the foregoing survey that the variety of species is not so great as to confuse the amateur, with the result that in any area one quickly comes to recognise the main species, and study is simplified.

There has been no extensive survey of any part of the Fiji Group since 1924, so that further work is now overdue, particularly with a view to recommending to the Fiji authorities the provision of adequate faunal reserves, for the development of forest resources is proceeding apace.

Literature on the Fijian avifauna is somewhat scanty, and much of it difficult of access. However Mayr 1945 (9) summarises and briefly describes all the recorded species and races; but from our short survey, it will be seen that there are still species unrecorded as yet.

The British Museum has an extensive range of study skins, and collections are held in several American museums; but if New Zealand is to take its place as the centre of the South-West Pacific in ornithology, as it is expected to do in other directions, then the establishment of a small, but representative, collection of study skins in one of our main museums would appear to be essential.

#### ACKNOWLEDGEMENTS

Many contributed materially to the success and enjoyment of the survey, and to them our grateful thanks are extended. In the planning stages, the advice and assistance given by Mr. M. C. Brittenden, Overseas Travel Representative of N.A.C., Gisborne, was invaluable, especially as to internal travel in Fiji. Mr. John Smart, a Suva member of the Society, gave sound advice on the most suitable areas for us to work, and made a preliminary reconnaissance of Kadavu for us. Later he placed his car at our disposal in Suva when making final arrangements, and took members of 'C' party to the Rewa Estuary. Mr. G. B. Piper of Melbourne provided the writer with a number of letters of introduction which proved most valuable; and Mr. J. C. Fletcher and Mr. A. T. Jewell arranged with the Company's managers in the Nausori Highlands and at Vunisea, Messrs. Walsh and Bensley, to co-operate, and 'C' party in particular enjoyed their ready help. The Rt. Hon. C. Stinson, Minister of Works and Tourism, kindly offered valuable assistance; and at all times when parties were in Suva, Mr. Bruce Palmer, Director of the Fiji Museum, was consulted for advice and information.

On Taveuni, Morris Hedstrom Ltd. and the Wairiki Mission gave invaluable help in providing Landrover transport to take 'A' and 'B' parties to the high altitude forest, and Bro. Kevin of the Mission was unfailing in his daily trips with fresh bread and tropical fruit. Mr. Reg Douglas, of Qacavulo Estate, provided the same help to 'C' party, and extended the greatest hospitality to them.

On Kadavu, 'C' party had the use of the Government school buildings through the courtesy of the Hon. Minister of Education, and enjoyed the kindness and co-operation of the two schoolmasters, Mr. Wame Salabogi and Mr. and Mrs. Ieli Irawa. 'B' party appreciated the ready consent of Chief Levi to camp by the village of Gasele, and Mr. Semisi Bulivou, Deputy Chief, could not have been more assiduous and kindly in his help in many ways.

I am indebted to Mr. F. C. Kinsky and the Dominion Museum for providing photo-copies of some of the early papers on Fijian birds; to Mr. Chris Challies for drawing the accompanying map; and to him, Messrs. K. and L. Rowe, and Mr. V. T. Davis for providing the photographs.

## APPENDIX 'A'

*Bird Measurements:*

All measurements were taken from live birds with vernier callipers accurate to .01 cm.

	Culmen	Tarsus	Wing	Total Length
<i>Banded Rail:</i>				
Nukulau Is.	34.6	48.1	150.0	294.0 mm.
<i>Red-vented Bulbul:</i>				
Nausori Hld.	17.3	28.8	96.0	222.0
Nukulau Is.	17.2	25.2	72.0	206.0
<i>Island Thrush:</i>				
Taveuni Is.	23.0	37.1	114.0	216.0
<i>Jungle Myna:</i>				
Nukulau Is.	22.5	38.6	126.0	218.0
"	22.0	39.2	117.0	226.0
"	21.8	38.0	118.0	220.0
<i>Silktaill:</i>				
Taveuni Is.	13.7	25.4	79.5	142.0
"	13.9	24.9	81.0	146.0
"	12.9	23.6	86.0	149.0
"	12.5	24.5	80.0	136.0
"	13.5	24.8	80.5	137.0
<i>Slaty Flycatcher:</i>				
Leleuvia Is.	11.4	18.1	66.0	142.0
"	10.7	19.3	68.0	145.0
<i>Fiji Shrikebill:</i>				
Leleuvia Is.	18.0	24.0	88.5	186.0
Taveuni Is.	21.7	22.7	84.0	191.0
"	20.5	23.0	86.0	190.0
<i>Vanikoro Broadbill:</i>				
Leleuvia Is.	12.7	17.8	73.5	150.0
	Bill width — 9.0; Bill depth — 4.5			
"	13.4	18.5	69.5	140.0
	Bill width — 9.6; Bill depth — 4.5			
<i>Blue-crested Broadbill:</i>				
Taveuni Is.	12.0	21.8	78.0	157.5
"	13.5	21.9	80.0	164.0
"	13.1	22.0	81.0	161.0

	Culmen	Tarsus	Wing	Total Length
<i>Golden Whistler:</i>				
Taveuni Is.	16.7	28.9	90.0	171.0
<i>Orange-breasted Honeyeater:</i>				
Nausori Hld.	14.5	16.8	56.0	107.0
"	15.4	17.7	61.0	108.0
Leleuvia Is.	13.9	16.5	55.0	104.0
"	15.7	17.8	56.5	108.0
"	15.3	17.0	57.5	112.0
<i>Wattled Honeyeater:</i>				
Nukulau Is.	18.2	28.7	88.0	186.0
"	17.8	27.9	89.0	187.0
"	19.2	28.1	91.0	185.0
"	21.6	31.6	102.0	204.0
"	21.9	31.4	104.0	211.0
"	23.1	30.3	96.0	199.0
<i>Layard's White-eye:</i>				
Nausori Hld.	11.7	19.1	60.3	128.0
"	12.0	19.0	56.0	—
<i>Red-headed Parrot Finch:</i>				
Nausori Hld.	9.2	18.0	53.7	102.0

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