THE BIRDS OF NIUE ISLAND, SOUTH PACIFIC: AN ANNOTATED CHECKLIST

By KAZIMIERZ WODZICKI
Department of Scientific & Industrial Research

ABSTRACT

The checklist of the birds in Niue Island, South Pacific (19° S. 169° W.), consists of 19 species (5 sea birds, 3 shore birds, and 11 land birds). Niuean and English vernacular names have been added. Five new bird species are now recorded from Niue Island for the first time. Of the five sea bird species two (Common Noddy and White Tern) are known to breed on the island and a third (White-tailed Tropic Bird) possibly breeds and three species (White-tailed Tropic Bird, Common Noddy and White Tern) are common. All three shore birds species are migrants but only one (Pacific Golden Plover) is common. Among the land birds the presence of the migratory Long-tailed Cuckoo is recorded for the first time and all the remaining ten species are resident and breeding. However, only four species (Banded Rail, White-rumped Swiftlet, Polynesian Triller and Polynesian Starling) are common.

The affinities of this restricted avifauna with those of the neighbouring archipelagos of Samoa, Tonga and the Cook Islands are briefly discussed as are the abundance and the status of the birds breeding on Niue. Finally some research problems and the conservation of species that are at present endangered are briefly presented and some tentative recommendations are made.

Relatively little has been published on the avifauna of Niue Island, and no qualified ornithologist has ever visited Niue for the purpose of studying birds. The two American expeditions — the Whitney South Sea Expedition in the nineteen-thirties and the recent Central Pacific Survey of the Smithsonian Institution both missed Niue Island; and although the excellent manual of King (1967) includes Niiue Island in the area covered by that publication no mention has been made of the sea birds of the island. Since the 1968 hurricane that devastated Niue and the looper caterpillar plague that appeared in its wake there has been an increased interest in the birds of Niue (as shown by a recent issue of stamps) and the part they may play in controlling insect populations.

The present paper briefly reviews information published on the birds of Niue, provides an annotated checklist and concludes with recommendations for further study and bird preservation.

LOCATION, TOPOGRAPHY AND ENVIRONMENT OF NIUE ISLAND

Niue Island (19°S., 169°W.) does not form part of any island group, lying 480 km east of Tonga, 500 km south-east of Samoa and about 1,040 km west of the Southern Cook Islands.

The island (Fig. 1) is an elevated coral outcrop with two terraces: the lower terrace being at about 28 m and the upper terrace at about 69 m above sea level. Apart from the rise from the lower to the upper terrace, there are no hills and there are no streams or surface water. The coastline is broken and precipitous with a fringing coral reef and without good harbours. The island's area is over 295 sq.km (about 100 sq. miles); it is about 21 km long and 18 km wide; the main road which roughly follows the coastline is about 64 km in length.

The climate is oceanic and sub-tropical with a mean annual temperature of 76.4°F and a mean annual rainfall of 80.6 in. with occasional droughts. East-south-east winds prevail though variable winds, particularly during the summer months, from west, north and

FIGURE 1 — Map of Niue Island from a N.Z. Department of Lands and Survey aerial mosiac, 20 chains to 1 inch, compiled from aerial photographs taken in August, 1965. Vegetation from Frost and Berryman, 1966.

north-west may occur. Niue is on the edge of the hurricane belt and winds of high velocity sometimes prevail such as the severe hurricane that struck the island on 9th February, 1968, and had a profound effect on the island's biota.

The vegetation of Niue Island comprises 629 taxa of vascular plants (Sykes, 1970). The main habitats of importance to bird life are (Fig. 1): (i) the remnants of the original tropical rain forest of tall trees with a relatively dense canopy and the coastal forest below the second terrace; (ii) large expanses of secondary forest in various stages of regeneration; (iii) large patches of scrub more modified by man and dominated by *fou (Hibiscus tiliaceus)* and " fernlands " with *Nephrolepis hirsutula,* the dominating fern species, and finally (iv) the three Government farms, the areas with fruit crops and the coconut palm groves with the legume *Seratro,* all form different plant communities.

Among terrestrial insects indigenous and adventive abound: (Eyles, 1965 and 1968, Given, 1968) recorded 376 species of insects belonging to fifteen orders. Several of them such as flies or the moth *Cleora samoana* are of considerable ecological importance together with numerous lizards belonging to four species (Whitaker, 1969). Among mammals of importance to wildlife of Niue the Polynesian rat or *kuma (Rattus exulans),* the roof or ship rat *(R. rattus)* and feral cats should be mentioned (Wodzicki, 1969).

PREVIOUS OBSERVATIONS OF THE BIRDS OF NIUE

Hood (1863) considered that " the natural history of Niue possesses no particular interest " but stated that " doves and pigeons abound." Brenchley (1873) observed: " With the exception of fowls, which are reared everywhere, there are but few birds; among them are pigeons or doves of a green colour, parrots, a pretty little green bird with white feathers under the tail, a small martin or swallow, the tropic bird or the boatswain . . ." Ramsay (1878) describing the collection made by the Rev. Mr Whitmee mentions " a Ptilinopus sp." which he named " *P. whitmeei,* in honour of its discoverer " and " an Aplonis ": presumably the Polynesian Starling or Miti, *Aplonis tabuensis.*

Smith (1902) supplied the most comprehensive list of Niue Island birds with notes on their biology: it includes 13 land and shore birds and 5 species of sea birds. He also notes that the *kiu* plover is known to exist on the island in four varieties: *kiu-ulu-fua, kiu-valuvalu, kiu-hakumani* and *kiu-uta.*

The Earl of Ranfurly, while Governor-General of New Zealand, procured 14 specimens of birds from Niue Island. This collection was deposited at the British Museum (Natural History) and has been identified by Ogilvie-Grant (1905). It contains the following: Sooty Rail *Porzana tabuensis,* Crimson-crowned Fruit Dove *Ptilinopus porphyraceus,* Blue-crowned Lory *Vini australis,* Long-tailed New Zealand Cuckoo *Eudynamis taitensis,* White-rumped Swiftlet *Collocalia spodiopygia,* Polynesian Triller *Lalage maculosa* and Polynesian Starling *Aplonis tabuensis.*

We owe to Loeb (1926) an account of the old methods used for catching birds such as nets, bow and arrow, and snares. However, already in the early twenties, the old men assembled in *fono* " insisted

that the former methods have passed entirely from the recollections of the people." Loeb also recorded the birds that still formed articles of diet during his stay in Niue. They were: *lupe (Ducula pacifica), tuaki (Phaeton lepturus), taketake (Gygis alba), Kulukulu (Ptilinopus perphyraceus), henga (Vini australis), misi (Aplonis tabuensis), kale (Porphyrio porphyrio),* and *ngongo (Anous stolidus).* The following bird species were said never to have been used as food: *lulu (Tyto alba), kalue (Eudynamis taitensis), heahea (Lalage maculosa), peka-peka (Collocalia spodiopygia), kalangi (Puffinus pacificus), kiu (Pluvialis dominica),* and the curlew *(Numenius tahitiensis).* Finally, Loeb gave an account of bird lore of Niue and of various omens connected with certain species.

Mr. Edwin J. Bryan, Manager, Scientific Information Centre, Bishop Museum, Honolulu, Hawaii, kindly provided copies of bird paintings by Niuean school children of the following twelve bird species: *kulukulu, henga, tuaki, misi, heahea, kalue, kiu, motuku, ngongo, lupe, pekapeka* and *kale.* The above species must have been common, if they were well known to children. It is of interest to note that the *veka,* nowadays so common, is not included in the paintings.

Mayr (1945) recorded eight out of ten species of shore and land birds known to Ogilvie-Grant (1905) and others.

A preliminary account of the present survey (Wodzicki, 1969) listed 19 species and a full account of these birds is given below.

MATERIAL AND METHODS

A survey of rodents of Niue Island conducted in November 1968 and July-August 1969 provided an opportunity to carry out bird observations throughout the island. Birds that could be easily seen from a vehicle were noted and Fig. 1 shows the roads on which road counts have been carried out and the localities where some of the less common birds were noted. In addition it has been the writer's privilege to be assisted by Messrs. Luka Tauelima and Samuel Tohilima, Department of Agriculture, Government of Niue, both experienced field naturalists. The observations provided by these two gentlemen have been included into the accounts of the species found on the pages below.

A questionnaire embracing the birds of Niue Island divided into sea and land birds and their present status was distributed in November, 1968, among the thirteen Assemblymen of Niue: it provided important, initial basic information.

Captain J. A. F. Jenkins made a small collection of birds in Niue Island during 1963 which is deposited at the Auckland Institute and Museum. This collection has been examined and details and measurements are itemised in the species synopses, where applicable, in the following order: Auckland Institute and Museum (AM) number, locality, date, sex, bill, tarsus, toe, wing and tail length (mm.) and weight (gm) if available. All measurements were taken from study skins. Four additional study skins from Niue Island, deposited at the Dominion Museum (DM) have also been examined.

The nomenclature and systematic arrangement of the birds listed in the present account follow Kinsky (1970).

The orthography of the Niuean bird names follows the spelling adopted by Mr. J. M. McEwen in his dictionary of the Niuean Language (1970): thus the previous " gogo " is now, as in the Maori language rendered by " ng "; also the " t " in " miti " becomes " misi."

RESULTS

Introductory

The list below shows the scientific and vernacular names (English and Niuean), also information on the status of the birds *(manu-lele)*, the dates of the observations, and information on the specimens collected. The birds listed are broadly classified as sea birds, shore birds and land birds. Subspecific names have been given wherever sufficient taxonomic information is available.

Annotated Checklist

Order Procellariiformes

Family Procellariidae

1. *Puffinus pacificus* (Gmelin, 1789). Wedge-tailed Shearwater. *Kalangi.* Non-resident, uncommon. One specimen in the Jenkins collection, AM 131.17., at sea, —, 40, 46, 60.5, 308, 165 and 425. Another specimen was photographed by Matron H. Gray in February 1971. Known to nest on Tonga, Fiji, Samoa and the Kermadecs (King 1967), very seldom reported and not observed by the author.

Order Pelecaniformes

Family Phaethontidae

2. *Phaethon lepturus* Daudin, 1802. White-tailed Tropic Bird. *Tuaki.* Resident, fairly common. Noted by Brenchley (1873) and Smith (1902). Three specimens in the Jenkins collection: AM 1207.6, Mutalau, 30/11/63, —, 43, 22, 37.5, 275, 483 and 250. AM 1207.8, Hikutavake, (" Fau Etama "), 26/10/63, —, 43, 25, 39, 266, —, and 283.

Frequently seen flying inland towards the central part of the island in November, 1968, and July-August, 1969, where it apparently nests on trees. Brenchley (1873) reported that the " tail feathers are used to make elegant fly-brushes, the handles of which are neatly bound with plaited human hair."

Family Fregatidae

3. *Fregata minor* (Gmelin, 1788). Pacific Man-o'-War or Greater Frigate Bird. *Kota* or *Manu Folau.* Visitor. Uncommon. An immature specimen in the Jenkins Collection: AM 111.23, Tuapa, 4/11/63, 114, 32, 74, 630, 311 and 1930. Not mentioned by previous authors nor seen by the writer in 1968 and 1969.

Order Gruiformes

Family Rallidae

4. *Rallus philippensis* Linnaeus, 1776. Banded Rail, *Veka.* Resident, very common. One specimen in the Jenkins collection: AM 5777, Vaipapahi, 10/10/63, female, 28.5, 50, 60, 141, 61.5 and —. Five specimens were accidentally collected during rat control experiments in coconut groves with *Serato* ground cover on Vaiea experimental farm (Fig. 1). These specimens were deposited at the Dominion Museum and details of their measurements are: DM 16,232, Vaiea Farm, August, 69, male, 32.5, 55.8, 51.5, 138, 60.7 and 232; DM 16,233,

Niue Island, 8/5/69, male, 31.9, 54.7, 52.8, 154.5, 64.6 and 315; DM 15,512, Vaiea Farm, 7/8/69, male, 30.2, 53.8, 51.5, 153.5 and 55.5; DM 16,185, Vaiea Farm, 12/8/69, chick, 85 g and DM 16,184, Vaiea Farm, 12/8/69, chick, 60 g.

The presence of two unfledged chicks of 85 and 60 g respectively would indicate a 1969 nesting season in about mid-winter, shortly after solstice.

The changing status of this species during about three-quarters of a century deserves comment. Smith (1902) reported its status as "extinct." Mr. Barry Good (pers. comm. 1968) has stated that when he first visited Niue in the early nineteen-fifties, few, if any *vekas* could be seen on the roads. About that time a pair of *vekas* were captured in the southern part of the island and later kept as a great rarity and bred at Fenuakula Farm (J. M. McEwen pers. comm. 1969). In 1953 *veka* were still very scarce; when a cat killed a young *veka* at Tapeu, the body was taken to a village to show a bird which to most villagers was at that time only known by its name. However, by 1956 the *veka* was already making a recovery as it was being observed on roads.

In 1968 and 1969 *veka* were very common and widely distributed. They were seen on all roads, singly or in pairs, occasionally in company of *kale*.

At present villagers consider the *veka* as a noxious bird: in five out of six questionnaires the *veka* is referred to as a "bad bird" to crops, particularly kumara.

5. *Porzana tabuensis tabuensis* (Gmelin, 1789). Sooty Rail. *Moho.* Resident, uncommon. An immature specimen was collected on 17 April, 1902, by the Earl of Ranfurly and Ogilvie-Grant (1905) recorded this specimen. Amadon (1942) listed another specimen and Mayr (1945) included Niue together with Fiji and Tonga as islands inhabited by this rail. According to J. M. McEwen (pers. comm. 1969) *moho* were seen in the mid-fifties. It was not observed by the writer in 1968 nor in 1969 but a rail smaller than the *veka* was reported by Niuean observers. It may therefore be still present in the interior of the island and it is being tentatively included in the present check-list.

6. *Porphyrio porphyrio* (Linnaeus, 1758) (ssp. *vitiensis* ?). Purple Swamphen. *Kale.* Reported by Smith (1902). J. M. McEwen stated (pers. comm. 1969) that *kale* was common round 1956 and was at that time considered as a nuisance to crops. It was seen by the writer from time to time in 1968 and 1969 but significantly less frequently than the *veka.*

Order Charadriiformes

Family Charadriidae

7. *Pluvialis dominica fulva* Gmelin, 1789. Pacific Golden Plover. *Kiu.* Non-resident, migrant, very common. Three specimens in the Jenkins Collection: AM 6944, Vaipapahi, 10/10/63, female (winter plumage), 22.5, 44, 31.5, 148, 72, —; AM 6945, Vaipapahi, 11/10/63 (winter plumage), 23.5, 46.5, 34, 162, 75, —; AM 6946, Toi, 1963, female (breeding plumage), 23, 43, 35.5, 160, 76, —.

One of the most common birds seen on roads, gardens and other open spaces. It may be keeping loose territories as similar

numbers of kiu were observed in the gardens of Tapeu, during July and August, 1969. It would also appear that a substantial part of the *kiu* population migrating to Niue remains on Niue during the northern summer (see road counts below).

8. *Numenius tahitiensis* (Gmelin, 1789). Bristle-thighed Curlew. *Motuku.* Non-resident, migrant. Not common. One specimen in Jenkins collection. AM, 334.4, reef, Alofi Bay, 30/11/63, —, 91.5, 60, 52, 130(?), 109 and 360. Not seen by the writer in November, 1968, and July-August, 1969.

9. *Tringa incana* (Gmelin, 1789). Wandering Tattler. *Kiu-tahi.* Non-resident, migrant, uncommon. Two adult specimens collected by the Earl of Ranfurly, one in the summer and one in winter plumage (Ogilvie-Grant, 1905). Another specimen in the Jenkins collection, AM 1208.7, Hikutavake, male, 11/10/63, —, 36, 38.5, 32, 174.5, 88 and —. Not observed by author.

Suborder Lari
Family Sternidae

10. *Anous stolidus* (Linnaeus, 1758) (ssp. *pileatus* ?). Common or Brown Noddy. *Ngongo.* Resident, common. Single birds or pairs flying inland were seen daily and nesting has been reported in the forest of the interior.

11. *Gygis alba* (Sparrman, 1786). White or Fairy Tern. *Taketake.* Resident, common. Reported by Smith (1902). Single birds or pairs flying inland seen daily, particularly in the mornings, and nesting has been reported in the tall forest of the interior.

Order Columbiformes
Family Columbidae

12. *Ptilinopus porphyraceus porphyraceus* (Temminck, 1821). Purple-capped Fruit Dove (sometimes called " Crimson-crowned Fruit Dove "). *Kulukulu.* One specimen in Dominion Museum: DM 15,827, Vaiea, male, May 1970, 12.6, 28.5, 27.0, 131.2 and 90.0. The author following Goodwin (1967) regards this specimen as falling into the nominate race of this species.

This beautiful dove was first recorded from Niue by Ramsay (1878) as *P. whitmeei.* It was known to Smith (1902) and was identified by Ogilvie-Grant (1905) on one adult example collected on 17 June 1902. In those days according to Smith the " sweet 'coo' was constantly heard in the woods " and, its yellow feathers were " much prized for purposes of ornamentation."

The writer has found *kulukulu* common in places but definitely less common than in Smith's days. For instance in the dense but narrow belt of coastal forest between the lower and the higher terraces, behind the Hospital at Alofi, one could often hear two or three *kulukulu* cooing at a time. It is absent from most of the upper terrace land, except localities where either there is still standing tall, primeval forest or the land is in an advanced stage of regeneration.

13. *Ducula pacifica* (Gmelin, 1789). Pacific Pigeon. *Lupe.* Resident, not common. In the Jenkins collection there is an immature specimen: as described by Amadon (1943) it lacks the horny knob, the grey of the hind part of neck is darker and the plumage of the underparts is tinged with brownish and dusky when compared with the clear vinaceous tinge of the adults. Details of this specimen are: AM 2164, Niue Island, 7/1/64, —, 23, 44, 178.5, — and —.

In pre-European days this widely distributed pigeon used to be very common and kept in captivity. It has been also claimed that *lupe* was the only animal domesticated. It was noted by Brenchley (1873). According to Smith (1902) *lupe* were caught by the use of decoy birds and nets and the catching of pigeons was an " amusement of the chiefs, as it was in Samoa." Loeb (1926) described the importance of *lupe* in the diet of Niueans and the use of sling, bow and arrow and bird net for catching pigeons. Prayers to Huanaki, the god of the pigeon, preceded hunting.

The few *lupe* seen on the wing by the author were all in or in the vicinity of the tall forest. It was reported to the author that the hunting pressure is severe and this was confirmed by seeing *lupe* served at the *fia-fia* banquets attended by the writer. This, with the gradual decrease of the primeval forest area on the island, has largely contributed to the present drastic reduction of the pigeon's numbers.

Order Psittaciformes

Family Psittacidae

14. *Vini australis* (Gmelin, 1788). Blue-crowned Lory. *Henga.* Resident, not uncommon. This small lory is also found in Samoa and Fiji (Mayr, 1945). Recorded by Smith (1902) and by Ogilvie-Grant (1905, 2 adult specimens). Three specimens were seen during November 1968: one was observed in the coastal forest between Taumakautoga and Alofi South, another between Tutakolu and Hakupu; and a *henga* was captured at Liatau, near Lakepa. During July and August, 1969, a pair of *henga* was frequently observed near Vaiea on the border of fernlands and second growth forest. Other birds were occasionally seen on the edge of second-growth forest and fernland.

Order Cuculiformes

Family Cuculidae

15. *Eurodynamis taitensis* (Sparrman, 1787). Long-tailed New Zealand Cuckoo. *Kalue.* Migrant, uncommon. Not known to Smith (1902) but an adult bird has been recorded by Ogilvie-Grant (1905). J. M. McEwen (pers. comm. 1969) recalls that during his period of residence at Tapeu (1953-1956) he used to observe *kalue* every March in the Residence gardens. Not seen in July-August, 1969, when *kalue* should be present on Niue. The Assemblymen from Avatele, Liku and Tuapa villages recorded *kalue* as rare or very rare.

Order Strigiformes

Family Strigidae

16. *Tyto alba lulu* (Peale, 1848). Barn Owl. *Lulu.* Resident, not common. Two specimens in the Jenkins collection: AM 687.12, Niue Island, 7/1/63, —, 22.5, 23, 74.5, 26, 280, 123 and —; and AM 687.13, Makefu, 29/10/63, 25.5, 75, 29, 284, 121 and 247.

The only predatory bird on Niue Island. Smith (1902) thought that "this bird is semi-sacred, the natives seem to fear it " and "object to catching it ,though one was brought to me by a boy."

It appears local: one or two owls were seen at night in the vicinity of the Airport Farm in 1968 and 1969; and another owl has been observed hunting in bright daylight on Vaiea Farm.

Order Apodiformes

Family Apodidae

17. *Collocalia spodiopygia* (Peale, 1848). White-rumped Swiftlet. *Peka-peka.* Resident and one of the most common birds of Niue. Recorded by Smith (1902) who rightly thought that this was the same species as the swiftlets found in Tonga and Samoa. It has been recorded in all the major habitats of Niue but is usually seen in small flocks flying along roads, presumably hunting insects disturbed by vehicles. As in Tonga, the *peka-peka* nests in caves. The largest nesting place reported to the writer is in the caves south of Mutalau. According to local residents the *peka-peka* population has been seriously affected by hurricanes which drastically reduce the flocks.

Order Passeriformes

Family Campephagidae

18. *Lalage maculosa whitmeei* (Sharpe, 1879). Polynesian Triller. *Heahea.* Resident, very common. Sixteen subspecies of this cuckoo-shrike have been described and it is found in Tonga, Fiji and adjacent islands. The Niue Island subspecies was described by Sharpe (1879) and this identification has been confirmed by Ogilvie-Grant (1905) on an adult and an immature specimen from Niue. Three specimens in the Jenkins collection: AM 163/65.1, Toi, 11/10/63, male, 13.5, 31.5, 15.99, 78 and —; AM 163/65.2, Vaipapahi, 11/10/63, —, 14.5, 32, 18, 98, 73 and —; AM 163/65.3, Toi, 11/10/63, male, 14, 33, 19, 101, 78 and —.

This arboreal and insectivorous species was found to be very common by Smith (1903) and by the writer in 1968 and 1969. It was conspicuous in tall and second-growth indigenous forest, fernlands, gardens and round homes, usually moving in small parties of three to four birds but sometimes coming down to the ground. In November, 1968, the *heahea* was occasionally seen perched on trees and making its characteristic call upon which its Niuean name is based.

Family Sturnidae.

19. *Aplonis tabuensis brunnescens* (Sharpe 1879)). Polynesian Starling. *Misi.* This small bird with dark grey-brown upperparts and pale grey underparts with whitish streaks is known to exist in seven subspecies in Tonga, Futuna and the entire Fiji Group (Mayr, 1945). The Niuean subspecies has been described by Sharpe (1879). Four adult specimens were recorded by Ogilvie-Grant (1905) and a specimen is in the Jenkins collection: AM 103/63, Amanau, 1963, —, 17.5, 38, 21, 103, 65 and 52. This arboreal species can be seen very commonly feeding on insects and fruit in most Niue Island habitats.

Relative Abundance of Some of the Birds of Niue

Road counts from a Landrover, driven by Luka Tauelima and carried out by the auothor covered 670 miles during daylight in July and August, 1969. A total of 1175 birds were noted in the following decreasing order of abundance: *pekapeka* (916), *heahea* (84), *veka* (77), *misi* (48), *kulukulu* (17), *kiu* (16), *henga* (10), *ngongo* (4), *lupe* (2) and *tuaki* (1). It is proposed to publish a fuller account elsewhere of the road counts in relation to various habitats.

DISCUSSION

The Niue Island Bird List

Although some birds from Niue Island were described nearly a century ago (Ramsay, 1878), no proper bird list was available prior to the present survey. Smith (1902) listed 13 species but his list is of little help because only Niuean names were given and from his description it is sometimes difficult to identify to species level birds that the present author has not seen in the field. Ogilvie-Grant's (1905) list is based on newly collected specimens which he identified to eight species and these eight were included in Mayr's (1945) field guide.

The present list is the most comprehensive as it shows a total of 19 bird species. These 19 species include 5 sea birds, 3 shore birds and 11 land birds. In the present list we find five bird species that have not been previously reported from Niue: three sea birds (*kalangi, kota* and *ngongo*) and two shore birds (*kiu-tahi* and *motuku*). As there are Niuean bird names of other birds, not included in our checklist, it is likely that future investigations will add more sea or shore birds to the list.

Relationships with other islands of the South-east Pacific

The Samoan, Tongan and Cook Islands are the three nearest island groups to the north, west and east respectively of Niue Island that would be expected to share many species of Niue's avifauna. There is, unfortunately little information published on the birds of the southern Cook Islands; but all the 11 species of Niue land birds are found both in Tonga and Samoa (Finsch and Hartlaub, 1867, and Graffe, 1870).

It is of interest to compare the birds of Niue — a raised atoll with those from the Tokelau Islands — true Pacific atolls (Wodzicki and Laird, 1970). Fig. 2 compares the areas and the avifaunas of Niue Island with those of the Tokelau Islands and illustrates the relative wealth of shore and sea birds in the Tokelau atolls; it also shows that Niue with its rocky and precipitous shores is an unfavourable habitat for most waders, except those like *kiu* that can also utilise inland habitats. The relatively small number of sea bird species reported from Niue is perhaps also due to the fact that there are far fewer people sailing round Niue than in the Tokelaus; and it is possible that in future more sea bird species will be added to the Niuean list. The Reef Heron *Egretta sacra* is a notable absentee among the shore birds. Finally, Niue, with a so much larger land area than the Tokelaus, has a relatively poorer land bird fauna than one might expect. As Edwin H. Bryan, Jr., observed (*in litt.* 4 March, 1968) it is hard to believe that "such birds as kingfishers, warblers, honeyeaters or white-eyes are missing from Niue Island."

Abundance of some Bird Species

Road counts are sometimes the only means to assess the abundance, or changes in the course of time in the abundance, of certain bird species provided that certain assumptions such as the conspicuousness of the birds, their habits of using roads as flyways, etc., are taken into account. The order of abundance of Niuean birds arising from road counts given above and led by *pekapeka*

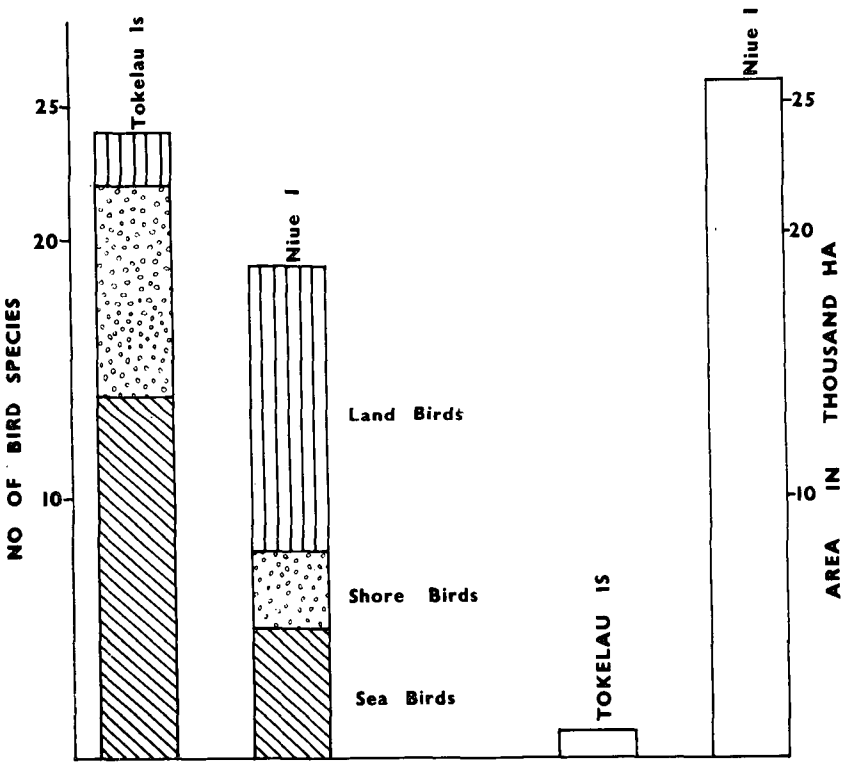

FIGURE 2 — Diagram comparing the areas and avifaunas of the Tokelau Islands and Niue Island.

seems to be generally correct; except that birds prefering other open spaces in preference to roads like *kiu,* or birds not easily observed from a moving vehicle such as *ngongo* or *taketake* may appear less abundant than they actually are. It is proposed to present a detailed analysis of the road counts elsewhere.

Past and Present Status of Birds on Niue Island

A comparison of the past and present status of various birds from Niue is of interest. We note that the first visitors to Niue Island during the last century were impressed with the abundance of *lupe* and *kulukulu* (Hood, 1863, and Brenchley, 1873). This is striking in comparison with the present low numbers of these birds, particularly of *lupe* and the fact that the present population of Niue Island (5,258 as at 1st March, 1968) is not significantly larger than that in the third quarter of the last century.

The changes in status of the three Niue Island rails (*veka, moho* and *kale*) reported above are more difficult to explain, particularly the drop in numbers of the *veka* earlier in this century and its apparent recovery during the last fifteen years.

In the writer's opinion several factors may have contributed to the present precarious status of some land birds, such as *lupe, henga, ngongo* and probably *kulukulu, kale, tuaki* and *taketake.* The introduction of the roof or ship rat *(Rattus rattus)* to Niue during the first quarter of the present century and its successful spread to practically all habitats (Wodzicki, 1969) could have had a profound effect, particularly on all tree-nesting birds. It is very likely that an adjustment between the small bird species and the only other predatory animal, the *lulu,* already exists. The relatively small numbers of the barn owl and the presence of large numbers of an alternative prey in the form of Polynesian rats *(Rattus exulans)* and roof rats would suggest that *lulu's* effect in controlling bird numbers is probably small.

During the last century the shifting system of agriculture with repeated burning of second-growth forest has led to the establishment of large "fern-land areas" (Sykes, 1970) and to a considerable reduction of the primeval, tropical forest that once covered the whole island (Fig. 1). This must have significantly affected all species that solely or partly depend on the fruit or seeds of forest trees or require tall forest community with a high canopy for nesting, such as *tuaki, taketake* or *ngongo.*

Finally, the present policy of granting firearm licences and the weakness of the present regulations regarding wildlife management that are difficult to enforce are among the factors that contribute to the present precarious status of some of the Niuean birds. The writer has been reliably informed by the Administration that anybody over 16 years of age may apply and obtain a shotgun licence. Lines of a dozen or more shooters standing along the roads between the villages and shooting at any bird or flying fox that may fly over are a common sight as are roasted *lupe* or *kulukulu* at official banquets in contravention of the legislation.

While it may be difficult to arrest or slow down the disappearance of the primeval forest it may be possible to have the existing policy of granting firearm licences changed and new ordinances promulgated and adhered to. A bill conservation of natural resources recently introduced in the Assembly of Niue may promise a brighter future for these bird species whose numbers are at present on the decline.

SUGGESTIONS FOR FUTURE RESEARCH

The present survey has merely scratched the surface and, if the avifauna of Niue Island has to be preserved for the enjoyment of future generations of Niueans, some problems require urgent attention.

1. *Taxonomy of Niuean Birds*

We require to know a good deal more about the birds of Niue. The taxonomy of several South-West Pacific bird species also found in Niue has been fairly recently reviewed. This applies for instance to the fruit doves of the *Ptilinopus purpuratus* group (Ripley and Birkhead, 1942, Amadon, 1943, and Goodwin, 1969), the Pacific Pigeon (*Ducula pacifica,* Amadon, 1943), the genus *Aplonis* (Mayr, 1942) and the Polynesian Triller, genus *Lalage* (Mayr and Ripley,

1941). The Jenkins collection in the Auckland Institute and Museum is too small and incomplete for a taxonomic study. It would be of considerable interest to examine a series of examples of the above and other common birds of Niue to see how the birds of this island fit into the geographical variations of these species in the South-West Pacific.

2. *Further Studies into the Ecology of Niuean Birds*

One of the results of the 1968 hurricane in Niue was a population explosion of the moth *Cleora samoana* Butler which defoliated large tracts of the forest and according to beekeepers led to a significant decline in honey production. This in turn led to strong recommendations to the Administration to introduce exotic bird species in order to combat future insect plagues. It should be emphasized that Niue is one of the few islands in the world totally without introduced birds. A further study of the ecology of the Niuean birds is recommended before any liberation of exotic bird species is seriously considered. Such a study would help an understanding of the role played by birds in the Niuean ecosystem, particularly regarding the various insect pests.

ACKNOWLEDGEMENTS

The work described in the preceding pages is a part of a research programme into the ecology of the New Zealand territories in the tropical Pacific sponsored by the Departments of Maori and Island Affairs and of Scientific and Industrial Research. The continuous support of Mr. John R. Springford (Senior Administration Officer, Islands, Maori and Island Affairs Department) and of Mr. Ian L. Baumgart (Assistant Director-General, Department of Scientific and Industrial Research) is gratefully acknowledged. Also I would like to thank Mr. J. M. McEwen, Secretary for Maori and Island Affairs Department and authority on Niuean language and culture, for his continuous interest and assistance, particularly with regard to Niuean names of birds and other important information.

My sincere thanks are due to Mr. Selwyn D. Wilson, the Resident Commissioner, Niue Island, for the invitation to carry out the survey in November 1968 and July and August 1969, and his continuous interest; also to Mr. and Mrs. Selwyn D. Wilson for their kind hospitality. I thank also Mr. C. N. Lund, Director of Agriculture, and Dr. Charles H. Thomson, Director of Health, for organizing the survey and after the author's departure for supervising the follow-up. Dr. and Mrs. Charles H. Thomson also kindly provided hospitality for the writer in November 1968 and for a part of his stay in 1969. My particular thanks are due to Luka Tauelima, Rat Control Officer, and his brother Samuel Tohilima, both from the Department of Agriculture, who have put at the writer's disposal their extensive knowledge of plants and animals. I would also like to thank the Hon. Robert Rex, Leader of Government Business, and the Hon. M. Y. Vivian Jr. and all Assemblymen for their interest and help in obtaining the questionnaire information and in other ways.

Mr. E. G. Turbott, Director, Auckland Institute and Museum, kindly allowed me to examine the Jenkins collection of birds from Niue Island. The permission of the Director, Dominion Museum (Dr. Richard Dell) to measure some skins is also acknowledged. Mr. Edwin H. Bryan, Jr., Manager, Scientific Information Centre, Bernice P. Bishop Museum, Honolulu, once again supplied important, otherwise not readily available, information on the birds of Niue.

Last but not least, I would like to record my gratitude to Dr. John Yaldwyn, Assistant Director, Dominion Museum, for critically reading the text and for providing important comments and advice.

REFERENCES

* Departmental reports or unpublished information.

AMADON, D., 1942: Notes on some non-passerine genera, 1. Amer. Mus. Novitates No. 1175, 11 pp.
1943: Notes on some non-passerine genera, 34. Amer. Mus. Novitates, No. 1237, 22 pp.

BRENCHLEY, J. L., 1873: Jottings during the cruise of H.M.S. Curacao among the South Sea Islands in 1865. London, Longmans, Green & Co. xxviii + 487 pp.

*EYLES, A. C., 1965: First Interim Report on the Insects of Niue Island. D.S.I.R., Nelson. 6 pp.
* 1968: Second Interim Report on the Insects of Niue Island. D.S.I.R., Nelson. 6 pp.

FINSCH, O., and G. HARTLAUB, 1867: Zur Ornithologie der Tonga-Inseln. J. f. Ornithol. 18: 119-140.

*FROST, I. A., and N. R. BERRYMAN, 1966: The Timber Resources of Niue Island, N.Z. Forest Service, 25 pp. + 8 Appendices.

GIVEN, B. B., 1968: List of insects collected on Niue Island during February and March 1959. N.Z. Entomologist 4 (1): 40-42.

GOODWIN, D., 1967: Pigeons and Doves of the World. British Museum (Natural History), London. vi + 446 pp.

GRAFFE, E., 1870: Die Vogelwelt der Tonga Inseln. J. f. Ornithol. 18: 401-420.

HOOD, T. H., 1863: Notes of a cruise in H.M.S. "Fawn" in the Western Pacific in the year 1862. Edinburgh. ix + 250 pp. and Appendix.

KING, W. B., 1967: Preliminary Smithsonian Identification Manual of Seabirds of the Tropical Pacific Ocean. Smithsonian Institution, Washington, D.C. xxxi + 126 pp.

KINSKY, F. C. (Convener), 1970: Annotated Checklist of the Birds of New Zealand. A. H. and A. W. Reed, Wellington, 96 pp.

LOEB, E. M., 1926: History and Traditions of Niue. Bishop Mus. Bull. 32, 116 pp.

MAYR, E., 1937: Notes on New Guinea Birds, 1. Amer. Mus. Novitates No. 915, 19 pp.
1941: Notes on the Polynesian Species **Aplonis**. Amer. Mus. Novitates No. 1166, 6 pp.
1945: Birds of the South West Pacific. MacMillan, New York, xix + 316 pp.
and D. RIPLEY, 1941: Notes on **Lalage** Poole. Amer. Mus. Novitates No. 1116, 18 pp.

McEWEN, J. M., 1970: Niue Dictionary, Department of Maori and Island Affairs. Wellington, New Zealand, viii + xxiv + 386 pp.

OGILVIE-GRANT, W. R., 1905: On the birds procured by the Earl of Ranfurly in New Zealand and the adjacent islands. Ibis 5: 543-602.

RAMSAY, E. P., 1878: Notes on some birds from Savage Island, Tutuila etc. in the collection of the Rev. Mr. Whitmee, F.R.G.S. etc. Proc. Linn. Soc. N.S.W. 11: 139-142.

RIPLEY, S. D., and H. BIRCKHEAD, 1942: On the Fruit Pigeons of the **Ptilinopus purpuratus** group. Amer. Mus. Novitates No. 1192, 14 pp.

SHARPE, R. B., 1879: Catalogue of Birds in the British Museum. 4 xvi + 494 pp.

SMITH, S. PERCY, 1902: Niue Island and its people. J. Polyn. Soc. 11: 81-106, 63-178 and 195-218 and 12: 1-31, later published as: Niue - fekai (or Savage) Island and its People. Whitcombe & Tombs Ltd., Wellington, 133 pp.

SYKES, W. R., 1970: Contributions to the Flora of Niue. D.S.I.R. Bull. No. 200, Wellington, 321 pp.

*WHITAKER, A. H., 1969: Lizards, collected on Niue Island, 15 Nov. - 4 Dec., 1968, in Wodzicki, K., 1969: A preliminary survey of rat and other land vertebrates of Niue Island, South Pacific, Wellington, N.Z., June, 1969, 31 pp. and V Appendices.

*WODZICKI, K., 1969: A preliminary survey of rats and other land vertebrates of Niue Island, South Pacific, Wellington, 33 pp. and V Appendices.

WODZICKI, K., and M. LAIRD, 1970: Birds and Bird Lore in the Tokelau Islands. Notornis 17 (4): 247-276.