BIRDS AND BIRD LORE IN THE TOKELAU ISLANDS[1]

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ABSTRACT

The avifauna of the Tokelau Islands and the surrounding ocean consists of at least 26 species (15 sea birds, eight shore birds and three land birds). Seven of the species are now recorded from the Group for the first time. Of the 15 sea birds, seven are known to breed in the Tokelaus or to have done so until recently. At least three of the others may do so, the remainder probably being random visitors. All but one of the shore birds are migrants, as are two of the land birds. The affinities of this avifauna with those of other Central Pacific islands are briefly described, as is the status of birds breeding in the Group. Conservation issues are touched upon, and some notes on Tokelauan bird lore are presented.

INTRODUCTION

The findings reported herein resulted from five extended visits to New Zealand's northernmost dependency — 1958 and 1960 (M.L.) and 1966/67, 1968 and 1970 (K.W.). These successive expeditions had the primary purposes of research towards mosquito control (Laird, 1963, 1967, 1969) and rat control (Wodzicki, 1968a, 1968b, 1969, 1970), but during them long canoe trips and field work on most islets of Atafu, Fakaofo, and Nukunonu[4] provided excellent opportunities for bird watching. Additionally, information on the past and present status of the avifauna, also on relevant island lore, was gathered from many Tokelauans. The resultant material substantially augments that published by Thompson and Hackman (1968) on the basis of a seven-day stay in the three atolls in 1965. It is submitted that we now have a reasonably complete picture of the avifauna of the Tokelaus, and of its relationships with that of other Central Pacific islands.

MATERIALS AND METHODS

The geography and history of the Tokelau Islands were briefly described by Thompson and Hackman (1968). Further details may be found in the Annual Reports of the New Zealand Island Territories Department for the years 1966/67 and 1967/68, and in Macgregor (1937) and Huntsman (1969).

Research into the ecology and integrated control of mosquitoes carried out in 1958 and 1960 (Laird, 1967) necessitated extensive visits to many islets — " motus " — of all three Tokelau atolls (all those of Atafu and Nukunonu: a selection of those of Fakaofo) and provided excellent opportunities for bird observations. Work on rat ecology and control in 1966/67 at Nukunonu and Atafu, in 1968 at Nukunonu only, and in 1970 at Fakaofo (Wodzicki, 1968a, 1968b, 1969, 1970) was similarly conducive to observations of bird ecology. Figs. 1 - 3 show the three atolls and the place names mentioned in the text.

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4 Cartographers (e.g. " The Times Atlas of the World " 1968 Edition) generally accept Nukunon**o**, which is a misspelling by early European voyagers of the true name " Nukunon**u** " (" Nuku," island; " nonu," a shrubby tree, **Morinda citrifolia** Linn., commoner here than elsewhere in the Tokelau Islands). The New Zealand Statutes have adopted the spelling Nukunon**u** (see the Tokelau Islands Amendment Act 1969, s. 2), and this spelling is being used throughout this paper.

Ten birds representing eight species were collected during the 1960 visit to confirm subspecific identifications, and deposited (as alcohol-preserved specimens) at the American Museum of Natural History, New York. Measurements of these birds taken by Dr. Charles E. O'Brien are given hereunder in the species descriptions in the following order: American Museum of Natural History (AMNH) number, locality, date, bill, tarsus, wing and tail-length (cm.). Thirty-seven bird skins were obtained during the 1966/67 visit. These are deposited at the Dominion Museum, Wellington. Relevant data are itemized in our species synopses, where applicable, in the following order: Dominion Museum (DM) number, locality, date, sex, bill, tarsus, toe, wing and tail-length (cm.) and weight (gm.) if available.

Thompson and Hackman (1968) collected and sexed 99 bird specimens belonging to 20 species during their seven-day visit to the Tokelau Islands in 1965. Unfortunately, the lack of standardization of their evaluation of the size and condition of the gonads, and of

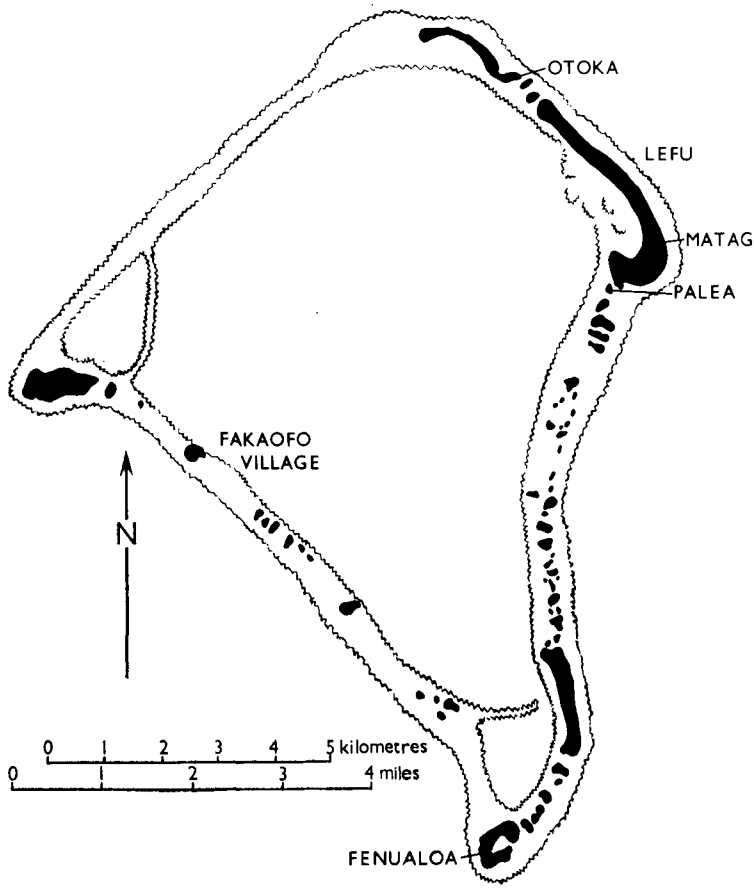


FIGURE 1 — Fakaofo Atoll

the amount of body fat, reduced the value of their results for an assessment of breeding condition.

The nomenclature and systematic arrangement of the birds enumerated in the present paper follow Kinsky (1970). An accurate knowledge of Tokelauan bird names is of basic importance to local folklore and ethno-avian studies. These vernacular names have been variously spelt between their first mention by Edwin H. Bryan, Jr. (1924) and the most recent publication (Thompson and Hackman, 1968). During the latter part of these studies, the presence in the

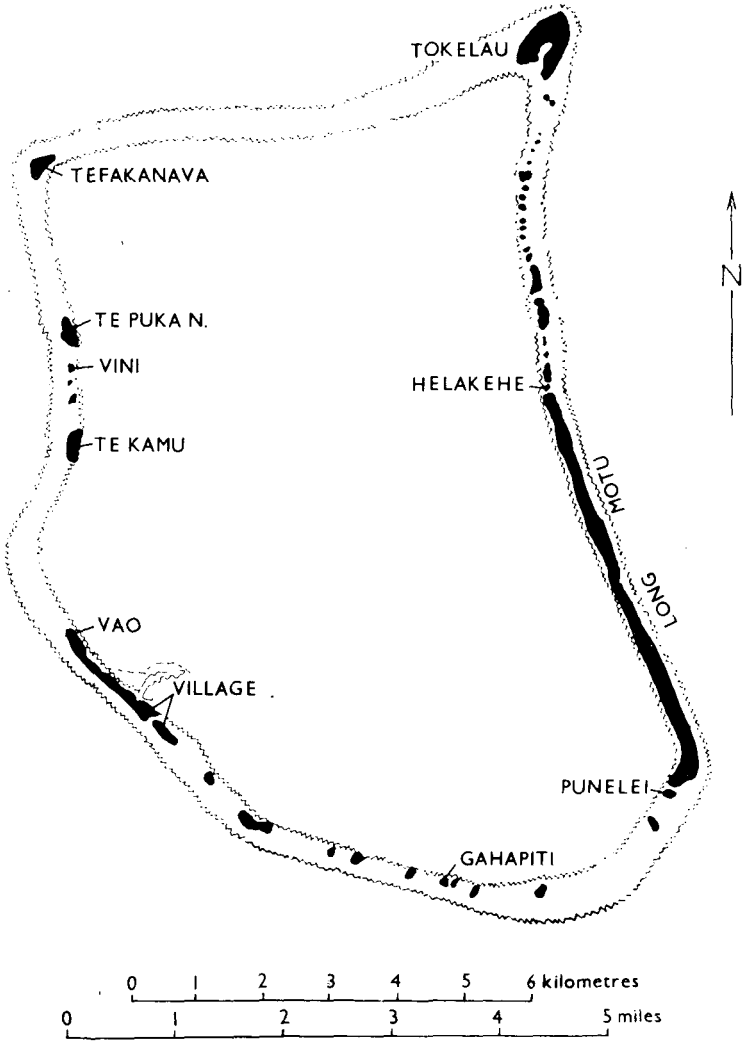


FIGURE 2 — Nukunonu Atoll

Tokelaus of two social anthropologists (Dr Antony Hooper, University of Auckland, and Dr Judith W. Huntsman, Bryn Mawr College, Pennsylvania)), made it possible to draw up the revised list presented herein.

The following brief note furnished by Dr Hooper explains the orthography adopted for the Tokelau names of birds in the present paper. " There is no ' official ' orthography of Tokelauan, but linguistic analysis of the language is under way at the University at Auckland. The orthography used here is that agreed upon by linguists at Auckland, and used by Dr Hooper and Dr Huntsman in their ethnographic studies of the Tokelau group.

In Tokelauan, as in other Polynesian languages, vowel length is phonemic. The phonemically distinct long vowels are written as double vowels, *f* is a voiceless bilabial fricative and *h* is a glottal fricative which occurs palatalised before back vowels." According to Dr Hooper " the whole question of the *wh* versus the *f* is simple. True, it sounds like *'wh'* but the *f* is simpler to write and neater." Similarly, as in Samoan, the sound *"ng"* is rendered by *"g"* to avoid confusion.

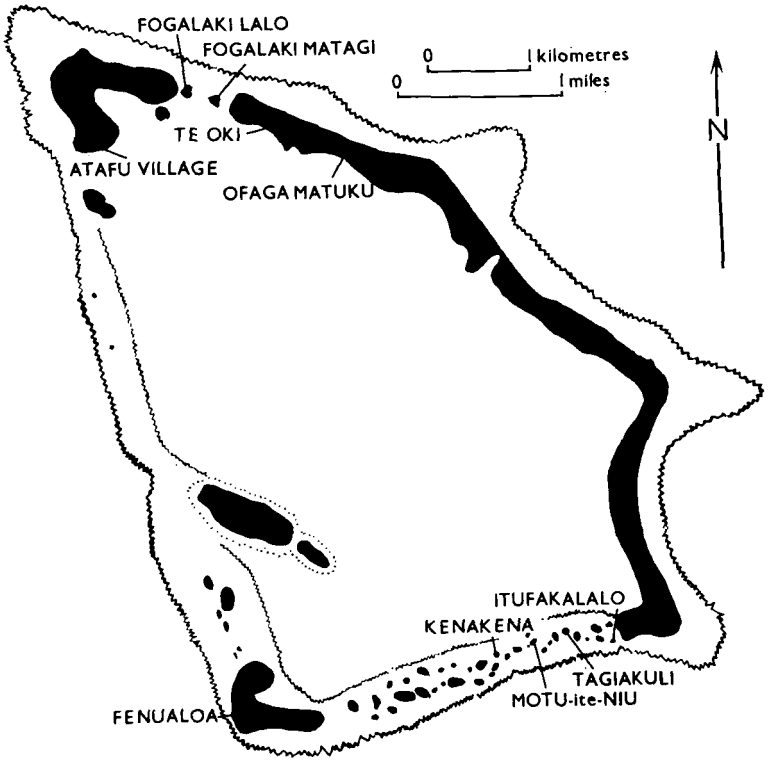


FIGURE 3 — Atafu Atoll

RESULTS

Introductory

The following account provides the scientific and vernacular (English and Tokelauan) names; the status of the birds (" na manu "); the dates of our observations, and information on specimens collected. The birds listed are broadly classified as sea birds, shore birds and land birds. Those not previously recorded from the Tokelau Islands are marked with an asterisk.

Disagreeing with Thompson and Hackman (1968) that subspecific names should await taxonomic revision, we have given subspecific names wherever sufficient taxonomic information is available.

Annotated Checklist

Order Procellariiformes

Family Procellariidae

*1. *Puffinus pacificus* (Gmelin, 1789 (subsp. *chlororhynchus* Lesson?). Wedge-tailed Shearwater, Takatai[5]. Non-resident. At 07.00 on 29/4/60, seven shearwaters were sighted (M.L.) some 300 metres from the M.S. " Aoniu," 170 km south of Fakaofo while bound for Apia, Western Samoa. A Tokelauan aboard declared these to be a bird we had often heard of, but never seen, in the Group — the Takatai (" wanderer of the sea "; " taka " wander, " tai " sea). One soon cut close to the ship, the binoculars then clearly revealing a longish wedge-shaped tail, dark-brown upperparts (black in the case of the rather similar *P. carneipes*), a brownish-grey face and throat, and brown underparts [white in the case of a smaller representative of the genus well-known from adjacent water, *P. lherminieri dichrous* (the Samoan Taio or Taiko, Armstrong, 1932)]. The strongly hooked tip of the bluish-black bill (pale flesh in *P. carneipes*) was clearly evident.

We had earlier been told at Nukunonu that the Takatai, while rare in the Tokelaus, is occasionally seen from fishing canoes on the open sea. The hooked bill was then mentioned as an identifying feature, and the size was stated to be somewhat larger than that of the Gogo or Common Noddy *Anous stolidus*. A petrel of some sort was thus indicated. Lastly, the feet were light-coloured, eliminating the black-footed Christmas Shearwater *P. nativitatis* from consideration. The wide range of this subspecies — which breeds on many islands in the tropical Pacific, including the Phoenix Group and Tonga (Baker, 1951, and King, 1967) — also supports our contention that the birds sighted were indeed Wedge-tailed Shearwaters, the most likely subspecies being *P. p. chlororhynchus* Lesson.

Order Pelecaniformes

Family Phaethontidae

2. *Phaethon rubricauda* Boddaert, 1783. Red-tailed Tropic Bird. Tavake-ulu-gahu. Resident. Well-known to the islanders, who said that it occasionally breeds on all three atolls of the Tokelaus. Its single egg is laid on the ground, beneath gasu *Scaevola frutescens*, a shrubby saltbush. According to our informants, the rarity of this

5 According to Dr Judith W. Huntsman [pers. comm., 22/4/1969], the Takatai is also known as Manutagilua [lit. ' bird with the double cry '] and so the saying goes — if one hears the cry of the Manutagilua during a storm, it indicates that the storm is almost over.

species in the Tokelaus contrasts with its abundance at Hull Island (some four degrees north of Atafu) and several other of the Phoenix and Line Islands (Child, 1960). A bird in flight was recorded off the coast of Fenualoa islet, Atafu, on 8/4/60. Thompson and Hackman (1968) reported another (1/3/65). A group of six *rubricauda* flying on the lagoon side of Fenualoa islet, Fakaofo, were seen on 22/8/70 (K.W.). David Gravatt (pers. comm., Feb. 1967) stated that in some years they nest on Atafu.

3. *Phaethon lepturus* Daudin, 1802. White-tailed Tropic Bird. Tavake-ulu-puka. Non-resident. Two White-tailed Tropic Birds were seen at 11.00 on 29 April 1960, 136 miles south of Fakaofo and approximately half way back to Apia. Thompson and Hackman quoted P. W. Woodward for a sighting at Fakaofo on 27/2/65. Isaia, a Nukunonu elder, declared that the Tavake-ulu-puka used to nest at this atoll in his father's time. Mitchell (1909) gave Tava'e as the Samoan name for both Red- and White-tailed Tropic Birds, Armstrong (1932) following Pratt (extensively quoted throughout his book) in applying this name to the latter species and *P. aethereus* too, and using both Tava'e'ula and Tava'etoto for the former.

Family Sulidae

*4. *Sula dactylatra* (Gould, 1846). Masked or Blue-faced Booby. Hakea. Non-resident. Included here because several Tokelauans volunteered a good description of the species to each of us individually, claiming that this third Booby, " larger than the Talaga or Takupu," visits the Group rather rarely.

5. *Sula sula sula* (Linnaeus, 1766). Red-footed Booby. Talaga (young), Takupu (mature). Resident. There were numerous occupied nests in a grove of pukakakai *Pisonia grandis* at Palea islet, Fakaofo, on 27/4/60. A fledgling from this colony was being kept as a pet by the head teacher at the village on Fakaofo islet, who stated that eggs are laid in February, hatching taking place in March. The subspecific identification was confirmed by Drs. Charles O'Brien and Robert C. Murphy, from a colour slide of this young bird. Two adults had already been seen off the coast of the village islet of Atafu in October 1958, an islander (with M.L. at the time) remarking that although large flights sometimes visit the atoll breeding never takes place there. The same apparently holds good for Nukunonu. Such flights could originate equally well from Fakaofo or the Phoenix Group, most islands of which have colonies (Child 1960). This species was reported by Thompson and Hackman (1968) near Matagi islet, Fakaofo, on 28/2/65, but was not observed by the senior author in 1966/67 and 1968. Single birds and pairs of Takupu were seen diving from a low altitude in the Fakaofo lagoon in August-September 1970 (K.W.).

" Takupu " is given by Child (1960) as the Ellice name for this species, with " Talaga " as a queried alternative. The Tokelau name is close to the Maori " Takapu," which applies to the Australian Gannet *(Sula bassana serrator* Gray, 1843) (see Kinsky, 1970).

6. *Sula leucogaster* (Boddaert, 1783). Brown Booby. Fuakoo[6]. Probably resident. Sighted by both authors on several occasions; for

6 Interestingly enough, a name very close to this (Fua'o) is applied to a very different bird, the Common Noddy, **Anous s. stolidus**, in Samoa (Armstrong, 1932; Mitchell, 1909), where according to the former author the Brown Booby is termed Ta'i'o.

example, two close inshore near Tefakanava, Nukunonu, at midday, 6 September 1958; another resting on a metal drum topping a metal tripod marker in the lagoon off Vao islet, Nukunonu, 18.00 hrs. same afternoon. D. Gravatt reported that the Brown Booby is only occasionally observed and is not known to breed on Atafu. On the other hand Vaopuka (pers. comm. to K.W., 19/9/70) stated that a few pairs of these boobies nest on Palea motu, but do not have a definite nesting season. These and other field records were supplemented by observations on captive birds. Thus an immature example, with a broken wing, was examined on the Village islet, Atafu, on 30 September 1958. The plumage of this was dark chocolate-brown, the line of demarcation between the dark breast and white abdomen being sharply drawn. The face and gular pouch were yellowish, as were the feet and legs, the bill being pale bluish. Another captive Brown Booby was seen at Atafu on 12/6/68. This bird (Plate XXX) had been

[The Late D. Robinson

Plate XXX — **Sula leucogaster** (Boddaert, 1783). Atafu, 12/6/68.

banded (No. 757-67076). The band proved to have been placed upon a Brown Booby at Jarvis Island by members of the Pacific Programme, Smithsonian Institution, in November 1964. According to the owner, a Brown Booby wearing this band was caught and kept as a pet for some time. On its death, the band was removed and placed on the bird actually seen.

Family Fregatidae

*7. *Fregata minor* Gmelin, 1788. Greater Frigate-Bird. Katafa Gogo or Katafa-ua-Leuleu (the Samoan name is Atafa — Armstrong, 1932; Mitchell, 1909). Resident. Uncommon, not noted by Thompson and Hackman (1968). A large black frigate bird was observed over the lagoon at Nukunonu at 11.15 on 6/9/58. Just after midday, two more were seen (off the islet of Tefakanava) harassing a White-capped Noddy *Anous minutus* which made its escape by flying off

landwards just above the water. The junior author's identification was based on the evident size and general blackness of colouring of these birds, none of which had white flank patches. Tokelauans in the canoe volunteered the information that this was the larger kind of Katafa seen in the Group, and that at times it exhibits an inflated red throat pouch — the designation Ua-Leuleu then being applied to it.

It is interesting to note that similarly distinctive but quite different names are applied to males in this state in the Ellice Islands — Talakula or Katokula (Child 1960).

On Atafu David Gravatt reported that katafas were " quite often seen soaring over the lagoon. Twelve and twenty were observed on two occasions." They were " gliding in circles using very few wingbeats " and " they were issuing their characteristic rather plaintive cry and occasionally swooping on an *Anous* or other small bird."

During the 1968 survey (end of April to mid-June), six Greater Frigate Birds were seen on the morning of 6 May and three on the following day circling at a considerable altitude. They also roost in places on very windy nights and are being collected.

Vaopuka reported that Katafa-ua-Leuleu nests regularly on Fakaofo atoll, the Palea islet being its only nesting place. As this islet is communal property a permission from the Elders is necessary for collecting the birds: about 20 - 40 birds are annually taken.

8. *Fregata ariel* (G. R. Gray, 1845). Lesser Frigate Bird. Katafa-koti. Possibly resident. Most of the frigate birds observed in 1958 and 1960 had an extension of the white breast (females) or a distinct white patch (males) on the lower flank beneath each wing, and were thus considered referable to this species. Recorded at Nukunonu on three occasions in 1960; Tokelau islet, 8 September; Vao or Village islet, 14 April; over lagoon, evening, 22 April (two groups numbering eight and 23, forming ascending spirals mounting to some 200 metres). At Fakaofo large numbers were circling above Palea islet on 25/9/58 and 27/4/60. Sibley and Clapp (1967) reported Lesser Frigate Birds as common visitors to all three atolls. Thompson and Hackman (1968) collected eight specimens at Fakaofo and Atafu between 27 February and 4 March 1965. They also recorded large flocks roosting at Fakaofo, and flocks flying northwards at Nukunonu. The eight specimens collected were all males with testes from 11 by 5 mm. to 17 by 8 mm. Fat condition was recorded in six specimens, one with medium and five with heavy fat (including one bird showing a substantial body moult).

Palea islet (Fakaofo), noted as " a nesting place for frigates " by E. H. Bryan, Jr. (1924), is the outstanding bird island of the Tokelaus. Red-footed Boobies, White-capped and Common Noddies and White Terns breed there. According to some islanders, Lesser Frigate Birds nest, or at all events, nested at Palea. Others reported that these birds simply roost in the islet's grove of pukakakai *Pisonia grandis*. The guano-spattered brownish-black humus beneath the *Pisonia* is characteristic of the heavily phosphatic Jemo series (Wiens, 1962). One very obvious consequence of the organic richness of Palea's soil is the darker green colour of the crowns of palms there by comparison with those of the adjacent sandy islet of Olokalaga.

On very dark and windy nights, visits are sometimes made to Palea islet for the purpose of clubbing Katafa. Climbing into the

pukakakai trees, men strike them down with long poles, hitting them across the base of the beak to fell them without disturbing others roosting nearby. At Nukunonu, too, we were told (in 1958, 1960, and 1968) that frigate birds are similarly taken on dark nights following westerly gales, when the fronds of coconut palms on certain western reef islets from Te Kamu to Vini (especially the latter) may be black with them. Under these circumstances one man has been known to kill as many as 50 Katafa. In 1968, however, Isaia declared that no more than 20 - 30 birds are nowadays caught annually at Nukunonu.

Order Ciconiiformes

Family Ardeidae

9. *Egretta sacra sacra* (Gmelin, 1789). Reef Heron. Matuku [the name used in the Marquesas according to Jardine, quoted by Finsch and Hartlaub, 1867. Matuku-moana is the Maori name for the Blue Reef Heron (Oliver, 1955). Armstrong (1932) and Mitchell (1909) give Matu'u as the Samoan name]. Resident.

[J. Morgan Williams

Plate XXXI — **Egretta s. sacra** (Gmelin 1789) dark morph. Nukunonu, 1966.

DM 15,342, Viliage islet, Nukunonu, 19/12/66, 75.1, 72.4, 66.2, 280 and 93 (in moult, two control tail feathers short and in sheath). DM 15,341, Vaitupu, Long islet, Nukunonu, 6/2/67, female, 88.8, 70.9, 66.2, 277, 93 (six small fish in stomach). DM 15,340, Vao, Nukunonu, non-flying chick; Tepuka N., Nukunonu on 12/1/67, male, 82.8, 78.8, 67.6, 290 and 100.

Common throughout the Group, and the only wader breeding there. According to Mayr and Amadon (1941), Reef Herons from the Tokelaus are referable to *D. s. sacra.* There are three colour phases, grey-blue (Plate XXXI), pure white and mottled. These morphs are well-known to the islanders: grey phase (Matuku uliuli), white phase (Matuku hina or paepae) and mottled phase (Matuku tavai).

Thompson and Hackman (1968) recorded " white, intermediate and dark morphs." David Gravatt found in February 1967 (Atafu atoll) that the grey and white phases were common and present in roughly equal numbers. Intermediate birds were also observed, but less commonly. Of ten birds observed at Nukunonu in September 1958, six were grey, two were white and two were mottled (M.L.). During the 1966/67 and 1968 visits to Nukunonu and the 1970 visit to Fakaofo, every bird seen was noted, together with its colour phase (Table 1). It is of course realized that the numbers reported simply represent birds seen. Clearly, some of them could have been recorded more than once.

According to Mayr and Amadon (1941), the North-west and Central Pacific (including the Marshall Islands, Fiji and the Solomons) is inhabited by Matuku populations with mottled adults. Intermediate morphs have neither been reported from the Northern Cook Islands (Suwarrow), nor from Tonga and Samoa. Table 1 shows that Mayr and Amadon's range should be extended by including the Tokelau Islands. It is proposed (K.W.) to publish a fuller account elsewhere of the distribution of the three colour morphs and their genetic basis in *Egretta s. sacra.*

Thompson and Hackman (1968) collected 10 specimens between 26 February and 5 March 1965. The three males all had large testes. Three of the seven females exhibited granular, minute and small

TABLE 1 — Numbers and Percentages of the 3 Colour Phases of *Egretta sacra*

ISLAND OR GROUP OF ISLANDS	COLOUR PHASE GRAY No.	GRAY %	WHITE No.	WHITE %	MOTTLED No.	MOTTLED %	NO. OF BIRDS IN SAMPLE	AUTHORITY
TOKELAU IS.: NUKUNONU	6		2		2		10	M.L. This paper, September 1958
NUKUNONU	50		10		4		64	K.W. This paper, November 1966 - February 1967
NUKUNONU	16		8		4		28	K.W. This paper, April-June 1968
FAKAOFO	10		16		2		28	K.W. This paper, August-September 1968
TOTAL TOKELAU IS	82	63.1	36	27.7	12	9.2	130	
FIJI	24	62	9	23	6	15	39	Mayr & Amadon (1941)
SOLOMON IS.	36	69	13	25	2.1?	6	52	Mayr & Amadon (1941)
MARSHALL, CAROLINE, MARIANNE AND PALAU IS.	27	54	20	40	2.1?	6	50	Mayr & Amadon (1941)
TOTAL FIJI, SOLOMON, MARSHALL, MARIANNE AND PALAU IS.	87	61.7	42	29.8	12	3.5	141	

ovaries, the remainder having large ovaries. From this evidence, Thompson and Hackman thought that " breeding occurs on the islands in February, March and possibly April." Fledglings were observed by us at Nukunonu in the last week of November 1966 and early in May 1968. Vaopuka found a white-phase heron incubating eggs at Otoka, Fakaofo, on 3/9/70. This would extend the breeding season considerably — from late August to late April. According to Isaia and others at Nukunonu, Matuku nest in coconut palm crowns but prefer fala (*Pandanus* spp.) trees. They lay up to six eggs. A former major nesting place on the western arm of Te Oki islet, Atafu, is still known as Ofaga Matuku (ofaga, nest).

Usually one sees single birds but occasionally they were observed feeding in pairs. Some of the birds seem to stick to a territory: at Fakaofo during the August - September 1970 visit (K.W.) a matuku uliuli was frequently seen on the reef south of the falee; and a matuku hina frequented the tidal flats between the village and the hospital.

At Nukunonu Reef Herons appear to be the only birds not taken for food, their meat being unpalatable; but at Fakaofo, according to Vaopuka they are occasionally eaten. They are, however, occasionally kept as pets, to chase poultry out of the houses.

Order Anatiformes

Family Anatidae

10. Duck (sp?). Toloa. Occasional visitors. Although no specimens or confirmed identifications of ducks are available for the Tokelau Islands, and no sightings took place during our five visits, ducks are nevertheless well-known to inhabitants of Fakaofo and Nukunonu. The birds are easily caught when resting on the lagoon by islanders who swim out with upturned baskets over their heads; when they are close enough they dive deeply, head directly up to the birds and grab. Tokelauans assured us that flocks of up to about 100 may appear at Fakaofo in September or October, keeping together on the lagoon and leaving in November. Thompson and Hackman (1968) quoted Father Goldfinch for the information that ducks are seen " nearly every year " at Nukunonu in February and March, and that one of the Sisters had identified them as Grey Ducks. They are also reported to feed in the marshes of Fenualoa islet, Fakaofo (the only significant body of fresh water in the three atolls), putting their heads down and feeding in the mud. Opeta asserted that the bird concerned is the same one found on Upolu, Western Samoa. This is the Grey Duck *Anas superciliosa* Gmelin, the Samoan name for which is also Toloa, according to Armstrong (1932); Doloa, Finsch and Hartlaub (1867). Amadon (1943) records *A. superciliosa pelewensis* Hartlaub and Finsch from Samoa, but not from the Tokelaus.

Order Charadriiformes

Family Charadriidae

11. *Pluvialis dominica fulva* Gmelin 1789. Pacific Golden Plover. Tuli[7] [a name casually applied to waders in general, both in the Tokelaus and Samoa (Armstrong, 1932)]. Non-resident, migrant.

7 Thompson and Hackman gave " Kiakiao." This is very close to the Gilbertese name for the Black-naped Tern, " Kiakia " (Child, 1960).

AMNH 2248, Punelei, southern end of Long islet, Nukunonu, 20/4/60, 24, 42, 163, and 65. DM 15,352, Village islet, Nukunonu, 24/12/66, female, 21.8, 44.1, 29.4, 154 and 58. DM 15,332, Tokelau islet, Nukunonu, 12/1/67, 24.5, 44.9, 31.3, 172 and 63.

Plovers were among tame birds seen in the village of Atafu (formerly Duke of York's Island) on the occasion of the visit of USS 'Peacock" and "Flying Fish" on 25 January 1841 (Wilkes, 1845). However, the "York Island" from which Gray (1859) listed "*Charadrius fulvus*" was presumably Eimeo, Society Islands. Stickney (1943) published April records for Fakaofo and Nukunonu, estimating the total population on all three atolls at 70 birds. They were uncommon during the 1958 and 1960 visits.

This species was frequently observed during all four visits, usually along the shore but also in other places clear of tall vegetation, e.g. the cemetery at Nukunonu. Up to four were seen at a time during spring and summer, markedly fewer birds being noticed during the southern autumn and winter. In this period, most Pacific Golden Plovers would of course be breeding in the Subarctic. This is supported by data from the 14 examples collected by Thompson and Hackman (1968), and those obtained by the Whitney Expedition in April 1924.

Family Scolopacidae

*12. *Numenius phaeopus variegatus* (Scopoli 1786). Asiatic Whimbrel. Non-resident, migrant.

DM 15,354, Avelau, Long islet, Nukunonu, 30/1/67, 82.8, 57.2, 36.8, 22 and 82 (tail moult observed).

New record for the Tokelau Islands, based on a specimen by K. W. Mitchell (1909), in mentioning that a "wimbrel" was shot in Samoa in 1902, noted that "Being so rare the Samoans have no native name for them."

13. *Numenius tahitiensis* (Gmelin 1789). Bristle-thighed Curlew. Tiafee. The alternative Tokelauan name for this species comes much nearer to the loud alarm cry "tee-ar-fay" than Mayr's (1945) "aweu-wit." Neither of the Samoan names quoted by Armstrong (1932), Tuliolovalu and Tuliisutele, resembles either of these. Non-resident, migrant.

AMNH 2250, lagoon side of northern arm, Tokelau islet, Nukunonu, 21/4/60, 82, 50, 239, 113.

Quite common (usually in pairs) on all three atolls, in 1958, 1960, 1968 and 1970. Thompson and Hackman (1968) reported that two female specimens had heavy fat, obviously in preparation for the (northern) spring migration.

The Tiafee proved more numerous between November 1966 and February 1967 than from April to June 1968, when only two birds were seen. Curlews fed both among the coral fragments of the ocean beach and on the lagoon shore but were more common on the latter. Interestingly enough, on the evening of sighting the first Tiafee on Nukunonu in 1958, the junior author sketched the bird from memory for a young man who'd never left the atoll; who said,

when the drawing was almost completed but before the downcurved bill was emphasized, " Kuaka ! " — the Maori name for the following bird, the Eastern Bar-tailed Godwit.

*14. *Limosa lapponica baueri* Naumann 1836. Eastern Bar-tailed Godwit. Tulipala. Non-resident, migrant. Stickney (1943) referred to Samoan records as the most easterly for this species, which she did not list from the Tokelaus. The only godwit we observed in the Group was at Itufakalalo, near the south-eastern extremity of Atafu, on the afternoon of 7/10/58 (M.L.). Presumably a recent arrival from the north (this species reaches the Gilbert and Ellice Group about mid-October according to Child, 1960), it was easily recognizable from a recollection of large numbers of Eastern Bar-tailed Godwits seen ten years previously at Parengarenga Harbour, North Auckland. The bird was digging its bill deeply into the coral sand, possibly in search of ghost-crabs as described by Child. At all events, just like the one he watched, it ran to the edge of the sea from time to time to clean its bill. No Tuli-pala were observed during the later visits, nor by Thompson and Hackman (1968). However, this species was evidently well-known to Isaia and other Tokelauans.

15. *Tringa incana* (Gmelin, 1789). Wandering Tattler. Kolili (Thompson and Hackman, 1968, wrongly applied this name to the Ruddy Turnstone). Non-resident, migrant. The Tokelauan name is not unlike the Gilbertese " Kiriri " (Child, 1960), and well describes the Wandering Tattler's alarm cry.

> AMNH 2243, Vao or Village islet, Nukunonu, 19/4/60, 42, 33, 171 and 79. AMNH 2244, same locality as last, 22/4/60, 40, 32, 167, 77. DM 15,333, Tepuka north islet, Nukunonu, 12/1/67, sex ?, 39.2, 34.1, 30.3, 171 and 74. DM 15,334, Tokelau islet, Nukunonu, 11/1/67, 39.2, 35.2, 30.6, 168 and 70 (primaries moulting).

Reported by Stickney (1943), this species was seen from time to time on each of the atolls during the 1958 and 1960 visits. Nine specimens were examined by Thompson and Hackman (1968). Two had enlarged gonads and heavy fat, the remainder having little to medium fat and small gonads. Although Thompson and Hackman considered the Wandering Tattler to be fairly common, it was not recorded during the April-June 1968 visit. We found this greyish wader, when motionless, very hard to distinguish among small fragments of coral along the shore. It often hurries along, skirting the foam line, head hunched down between the shoulders. Of special interest in view of Child's (1960) observation of an American Wandering Tattler perching on crowns of coconut palms, one was seen to fly up onto the roof of an Atafu hut, where it remained a minute or so, as the light was failing during the crescentic stage of the solar eclipse (approximately half-way between the beginning and totality) on the morning of 12 October 1958. Immediately after totality, it might be mentioned, the village cocks began to crow.

16. *Arenaria interpres* (Linnaeus, 1758). Ruddy Turnstone. Vaha-vaha (Thompson and Hackman, 1968, wrongly applied this name to the Wandering Tattler). Non-resident, migrant.

> AMNH 2245, Vao or Village islet, Nukunonu, 19/4/60 (as of March 1970 on loan to Dr. Michael K. Rylander, Texas Tech-

nological College, Lubbock, Texas 79409, who kindly supplied the following measurements, 19.8, 29.5, 130). DM 15,350, Vao islet, Nukunonu, 24/12/66, female, 23.7 24.4, 22.4, 159 and 63. DM 15,351, same locality as last, 9/2/67, female, 22.0, 26.1, 29.4, 154 and 66 (this bird was still in winter plumage).

First recorded at Fakaofo on April 3 and 4 by Whitney South Sea Expedition [Stickney (1943)]. Several were seen at the northern end of the Long islet, Lalo Land Division, Nukunonu, at 11.35 on 20/9/58, 12 at Fenua Fala, Fakaofa, on the late afternoon of 26/9/58. A flock of five at Te Vaipapa, a sand area with scattered shrubs and low coconut palms, just south of Tekamu (on the western side of Nukunonu reef) in the late afternoon of 16/4/60, two flocks of six and fourteen on Vao on the following morning. Scattered pairs and individuals were seen on all three atolls on various occasions in both 1958 and 1960.

Fifteen specimens were collected by the Whitney South Sea Expedition (Stickney 1943) and by Thompson and Hackman (1968). These were in various stages of moult. Among them, only one male had large testes, while three females had granular ovaries. The remaining 11 had underdeveloped gonads. With one exception, the remaining ten shot between 26/2/65 and 3/3/65 all had a heavy fat deposit. A bird collected in 1960 proved to have the rectum heavily infested by a fragellate protozoan that one of us (M.L.) had recorded from the same host in the spring of the previous year at a subarctic breeding site — False River, near Fort Chimo, Ungava Bay, Canada (58° 10′ N; 68° 15′ W).

Ruddy Turnstones were less numerous during the November 1966 - February 1967 visit, when they were only seen five times on the lagoon beaches of Nukunonu (single birds, pairs, and once a flock of eight). Pairs of Vahavaha were observed at Fakaofo in Aug. - Sept. 1970 (K.W.).

17. *Calidris alba* (Pallas 1764). Sanderling, Lefulefu. Non-resident, migrant. First recorded on 2/4/24 at Fakaofo by the Whitney Expedition (Stickney 1943) and later by Mayr (1945). This species was twice observed by us (M.L.). Both sightings were at Vao or Village islet, Nukunonu atoll. The first was made while swimming — it proved possible to approach to within a few metres, while the bird was feeding on a sandspit in the lagoon on the evening of 4/9/58. The second Sanderling was observed on the ocean shore on the morning of 17/4/60. Smallness (substantially smaller than any of the other waders discussed herein), very pale grey upperparts, the habit of running busily back and forth along the foam-line, and the conspicuous whitish wing stripe in flight, sufficiently substantiate the identification.

Two specimens with small gonads were collected by Thompson and Hackman (1968) at Fakaofo. These authors mention an observation from Fakaofo made by Huber, on 26/2/65. Not seen during the 1966/67 and 1968 visits, but well-known to the elders at Nukunonu.

*18. *Sterna bergii* (Stephens 1826). Crested Tern. Visitor. The single example seen (Village islet, Nukunonu, evening of 4/9/58)

was confidently identified by M.L. from its very large size (appreciably larger than the Common Noddy), generally white colour, black crown and crest and yellowish bill.

19. *Sterna sumatrana sumatrana* Raffles. Black-naped Tern. Tovivi. Resident.

AMNH 2251, off Vaitupu, Long islet, Nukunonu, 22/4/60, 39, 19.5, 227. 152. A non-flying chick (DM 15,349) was collected on the reef between the Village and Te Kamu islets, Nukunonu, on 18/12/66.

Recorded from the Tokelaus (Union Islands) by Mayr (1945). The Black-naped Tern was recorded from all three atolls on the 1958 and 1960 visits, being most plentiful on Atafu (M.L.). The one shot in the lagoon off Vaitupu perched on a branch protruding about a metre from the water, some 75 metres offshore. Another specimen, also from Nukunonu, was predominantly white, except for the pale greyish upper wings and mantle. It had a white-crowned head, a black nape, and a black band above the eyes. The white feathers of the underparts of the second specimen, when still fresh, were suffused with a very faint pinkish hue.

Thompson and Hackman (1968) shot 16 (all three atolls) in 1965. They considered "This tern . . . . fairly common in the Tokelau Islands," estimating that "the Black-naped Tern population on each atoll was about 40±." Observations made during the 1966/67, 1968 and 1970 visits confirmed the status of this species. It was reported to us (1958 and 1960) to nest in depressions in the sand over the greater part of the year. At Palea islet, Fakaofo, our attention was drawn to several large upended coral slabs, emerging two metres or more from the lagoon about 300 metres offshore. Relics of the disastrous 1914 hurricane, these are honeycombed with holes which, we were informed, are used as nesting sites by Tovivi. Of the 16 specimens shot by Thompson and Hackman (between 26 February and 4 March 1965) three were immature, one has small testes, while the remaining seven males and five females had large gonads. The presence of fledglings would indicate that the breeding season had been going on for some time. A very small chick, not yet fledged, was seen on 29 May 1968 at Punelei islet, Nukunonu (K.W.). All the above observations confirm Isaia's statement that the Tovivi nesting period at Nukunonuo extends from November to the end of April.

20. *Sterna fuscata* (Linn. 1766). Sooty Tern. Talagogo. Resident, probably breeding. Not seen in 1958 and 1960 (M.L.) nor in 1966/67 and 1968 (K.W.), but noted by David Gravatt at Atafu. Five specimens collected between 26 February and 4 March 1965 by Thompson and Hackman (1968) — on Fakaofo (one), Nukunonu (one), and Atafu (three). Uncommon around Nukunonu and Atafu, but several thousands seen near Atafu, where islanders were catching these birds for food at a rate of up to 60 per day with long nets from canoes. A specimen of this tern was captured on 25/1/67, by a hunter at Atafu. He took from it a United States Fish and Wildlife Service band (No. 893 - 16158), which was handed to David Gravatt (pers. comm. 1967). According to the Secretary, Pacific Project, Smithsonian Institution (*in litt.* 5/4/67) this band "was put on a Sooty Tern *Sterna fuscata* by our Pacific Project on Laysan in

August 1965 when the bird was immature." Apparently it is unusual for Sooty Terns to be captured south of the Equator when they have been banded as chicks north of the Equator.

*21. *Sterna lunata* Peale 1848. Spectacled Tern. Tala? Visitor? No evidence of nesting found, but apparently has bred in the Tokelaus (particularly at Atafu) in the past. Informants who had visited Hull Island (Phoenix Group, north of Atafu), assured the junior author that there is a large colony there (c.f. Child 1960, Clapp, 1968b). The species was seen in flight at Nukunonu (five examples, 22/5/60) and Atafu (three examples, 17/10/58), the white underparts, grey upperpart and black cap, also the distinctly larger size than that of the Black-naped Tern. all being evident. Perhaps it is worth mentioning that Tara is the Maori name for *Sterna striata.*

22. *Anous stolidus pileatus* Scopoli. Common or Brown Noddy. Gogo. Resident.

The Tokelau name is the same as that commonly used in the Ellice Islands (Child 1960). As already pointed out, though, the Samoan name resembles the one employed for boobies, especially the Brown Booby, in the Tokelaus.

A tame noddy was found among the few birds recorded from Atafu in the Narrative of the United States Exploring Expedition (Wilkes 1845). About a dozen tame Common and White-capped Noddies were observed at Atafu on 13 June 1968 (K.W.). This species and the White-capped Noddy *(q.v.)*, which it may outnumber at Atafu, but which outnumbers it at Nukunonu and Fakaofo, are the commonest birds of the Tokelaus; they have been found prevalent everywhere throughout the 1958, 1960, 1966/67, 1968 and 1970 expeditions.

Seven Common Noddies were collected by the authors, six of which were deposited in the American Museum of Natural History and Dominion Museum respectively. The measurements of these birds are found below.

AMNH 2246, Matautu, Long islet, Nukunonu, 20/4/60, 34, 22, 228 and 134. AMNH 2247, same locality and date as last, 38, 24, 260 and 152. DM 15,339, Tokelau islet, Nukunonu, 11/1/67, male. 42.4, 21.9, 41.5, 292 and 173. DM 15,348, north end of Long islet, Nukunonu, 26/1/67, sex female, 38.5, 24.9, 37.6, 283 and 164. DM 15,345, from nesting colony at Avelau, Long islet, 30/1/67, sex ?, 42.7, 26.3, 37.9, —, and 154 (moult on primaries of both wings). DM 15,346, same locality and date, sex ?, 42.7, 27.8, 41.5, —, and 164 (moult on primaries of both wings, No. 1 - 9 new, No. 10 new, ¾ grown, also strong body moult). DM 15,337, north end of Long islet, 26/1/67, sex ?, 40.5, 26.2, 36.9, 271 and 147 and Tokelau islet, Nukunonu, female, 43.4, 28.1, 40.6, 282 and 170.

Twenty-two Common Noddies were collected by Thompson and Hackman (1968) but data on size of gonads and presence of fat were recorded from 18 birds only. Four had enlarged testes (from 4 x 3 to 10 x 5 mm.) and six had enlarged ova (largest ovum from 1 to 5 mm.). Fat condition was recorded in nine birds only (one without fat, two showing light fat, four with medium fat, and two with heavy fat).

Nesting colonies were observed in *Pisonia grandis* trees and/or the crowns of coconut palms at Palea (Fakaofo), Fenualoa (Atafu) and Tokelau, Long and Tepuka islets (Nukunonu). It seems worth commenting that the old *Pisonia* trees to which the latter islet owes its name were destroyed in the 1914 hurricane, nesting there being in coconut palms (as is the case in some of the other Nukunonu islets, perhaps for a similar reason?). As indicated by Child (1960), the Common Noddy cries harshly from the nest when its nesting tree is approached. Unlike the White-capped Noddy, birds of this species have the habit of perching on driftwood near the shore, in small groups, usually facing into the wind. When seen in flight, the Common Noddy appears distinctly larger than its relative, which has a somewhat shorter tail and a whiter cap. In good light, its brownish (instead of blackish) colour is evident, too. It was often observed mobbing Matuku *(Egretta s. sacra)*. The senior author confirmed most of the above observations. The largest concentration observed were 40 Gogo roosting on sand, north of Helakehe, Nukunonu, on 16/12/66 but smaller groups of 10 - 20 birds were often noted at a time, sometimes roosting and sometimes fishing in the lagoon.

Collection of nesting material was observed in the last week of November and in December, 1966, and in late April, 1968. Also, large numbers of Gogo were observed flying in and out of the Long islet, Nukunonu, presumably still feeding chicks in nests, on 7/5/68. Isaia stated (pers. comm. to K.W., May 1968) that egg laying starts in January and goes on until June, the chicks hatching out between February and July. However, Isaia added, that October and November are the only months when no nesting takes place. In conclusion we may say that the above observations are in general agreement with the data on gonads and fat collected by Thompson and Hackman (1968).

According to Isaia, Gogos have always been used as food on Nukunonu. The taking of birds, particularly of adult ones demands great skill and a noose of coconut midrib on a long stick is used, the birds being whipped up by their necks. The Tokelauan name for this device is Tipa-manu-lele. Previously, and in areas least utilized by man, Gogo mainly used to nest on gagie trees *Pamphis acidula* but at present at Nukunonu Gogo nest on coconut palms between the stalks of two leaves. At Fakaofo, according to Vaopuka up to 800 birds are taken annually and as there are no restrictions, he and Isaia believe that the Gogo population has already significantly declined in consequence.

Seven examples were shot at Nukunonu for parasitological examination. The junior author was searching for life history stages of a heterophyiid trematode, eggs of which had been discovered during the examination of human faecal samples after the 1958 trip (Laird, 1961). Certain of these parasitic worms normally pass part of their life cycle in marine fish, part in piscivorous birds. None were recovered from these or any other of the birds dissected, and it now seems probable that the eggs earlier discovered in islanders were (as subsequently shown in Curacao) simple pseudoparasites derived from eating flying fish (Schouten *et al.*, 1968). The only recognizable remains of food organisms in the stomach contents were those of fish, including, in one instance, small halfbeaks. The latter (hemiramphids) are so common in the Nukunonu lagoon that night fishing

sorties are commonly made to capture large numbers of them as bait by means of an attractant petrol lantern and a long-handled flying fish net. They are now often referred to the Exocoetidae, the fish family most commonly found in the gut contents of *A. stolidus* on Christmas Island by Ashmole and Ashmole (1967). Two of these birds (from Tokelau islet, Nukunonu) yielded hippoboscid ectoparasitic flies duly identified by Dr. T. C. Maa of Taipei, Taiwan (*in litt.* to M.L. 15/4/63) as *Ornithoica pusilla* Schiner (not the *pusilla* Schin. misinterpreted by Bequaert and other authors) and *Alphersia senescens* Thomson. The latter fly is common in the tropics and was identified by Bequaert from this host from Rota, Mariana Islands (c.f. Baker, 1951, p. 168 — specifis name misspelt *aenescens)*. Dr. Maa pointed out that the former ectoparasite is very rare in collections. Previously he had only seen the type from Tonga and two examples from the Tuamotu Islands.

23. *Anous minutus minutus* Boie 1844. White-capped Noddy. Lakia. Resident. Seven specimens were collected. Their measurements follow:

> AMNH 2242, Matautu, Long islet, Nukunonu, 20/4/66, 47, 21, 217, and 125. DM 15,335, Tokelau islet, Nukunonu, 11/1/67, sex ?. 43, 23, 34.2, 223 and 120. DM 15,343, Avelau, Long islet, Nukunonu, 30/1/67, male from nesting colony, 40.8, 21.8, 33.4, 222 and 111. DM 15,344, same place and date, sex ?, from nesting colony, 46.3, 26.1, 25.8, 158 and 66. Tokelau islet, 11/1/67, sex ?, 41.5, 21.7, 33.3, 228 and 117. Same locality and date, male, 44.9, 22.0, 35.8, 232 and 125 and weight 133g. Same locality, 15/1/67, female, 42, 22, 34.1, 224 and 119.

Eight birds were shot for parasitological examination (by M.L.), all of them at Nukunonu. It was with respect to one of these that Dr. Charles O'Brien informed us (*in litt.* to M.L., 1 December 1960) " Your identifications are all correct with just one exception . . . which proves to be the White-capped Noddy *Anous minutus minutus.*" The interim field determination was in deference to Mayr (1945) and the Check-list of New Zealand Birds — Fleming's (1953) publication, a revised version of which will shortly appear (Kinsky, 1970). The top of the bird's head was white instead of greyish-white, the rest of the plumage being black, not sooty brown as in *A. tenuirostris.*

Sixteen specimens were obtained by Thompson and Hackman (1968), who also reported upon another 13 examples collected in April 1924 (15 were from Fakaofo, seven from Nukunonu, and seven from Atafu). Four of these birds had small testes, while in 10 the testes were large (4 x 3 mm. to 13 x 7 mm.). Similarly, 11 females had small ovaries and four had large ones.

Lakia were recorded as common at Fakaofo by Fry (1966) on 6/7/65, when both nesting adults and flying juveniles were observed. It was prevalent everywhere on all five of our trips. David Gravatt found Lakia very common at Atafu, nesting on crowns of coconut palms, *Pandanus* spp. and larger trees such as kanava *Cordia subcordata* or pukakakai *Pisonia grandis.* The senior author often observed 12 - 20 Lakia at a time in the Nukunonu lagoon between November, 1966, and February, 1967. Lakia is also very

common ot Fakaofo: on 31/8/70, within half-an-hour before sunset 47 Lakia were observed arriving into the lagoon to roost on several islets.

The following information was recorded on Lakia's nesting in the three atolls. Lakia were nesting in January - early February, 1967, at Atafu and occupied nests were found on Tokelau, Long (Vaitupu and Kavakava) and Tepuka North islets, Nukunonu (by K.W.). In 1970 rat control work was carried out on Fenualoa islet during the first three weeks of August (K.W.). Early in August only small numbers of Lakia were observed roosting during daylight but 14 nests were recorded on 14/8/70 on a pukavaka *Hernandia peltata* tree and since that time the numbers of roosting Lakia and nests seemed to increase. However, other observations seem to confuse the issue as collection of nesting material was observed during the last week of November 1966 and in late April, 1968; and on 9 May, 1968, a cluster of 20 nests was seen on Tefakanava motu. According to Isaia (pers. comm. May, 1968) White-capped and Common Noddies are well known to share nesting places.

According to Isaia Lakias have also been used as food on Nukunonu and have been taken in substantial numbers. Vaopuka estimates that about 1,000 birds are being taken a year at Fakaofo. In the past, some protection was afforded to Lakias and certain other birds in that the number of chicks to be taken each year was prescribed by the pulenuu who detailed boys to gather the victims. At present, with an increased human population, there are no restrictions. Isaia and other elders believe that the Lakia population has already significantly declined in consequence.

24. *Gygis alba candida* (Gmelin 1789). White or Fairy Tern. Akiaki[8]. Resident.

AMNH 2249, Matautu, Long islet of Nukunonu, 20/4/60, 44, 14, 245 and 126. DM 15,329, Village motu of Nukunonu, 30/11/66, sex ?, 40.4, 14.8, 26.7, 242.5, and 104. DM 15,330, Tokelau islet of Nukunonu, 28/12/66, sex ?, 39.3, 14.0, 25.9, 246 and 117. DM 15,331, same locality as last, 12/1/67.

The Akiaki follows the Noddies in order of prevalence throughout the Tokelaus. Twelve specimens were handled by Thompson and Hackman between 26 February and 4 March (1968) (four from Fakaofo, three from Nukunonu and five from Atafu). Four were males, the testes being small in one instance and measuring from 5 x 3 mm. to 7 x 5 mm. in the others. The eight females included four with granular ovaries. In two, the largest ovum measured 2 mm., one had a collapsed follicle and a brood patch, and the state of the other was unspecified.

Pairs of birds maintaining beautiful formation or hovering overhead — especially near *Pandanus* trees, as pointed out by Child (1960) — are one of the sights of the Tokelaus. The gracefulness of this species is such that we most strongly urge abandonment of the prosaic translation of the scientific name currently used (Baker 1951, King 1967, and Kinsky 1970), in favour of the more apt "Fairy Tern." This name was used by Mayr (1945) and is in common use among English-speaking residents in the South Pacific.

8 Oddly enough, "Akiaki" is applied to the Black-naped Tern in the Ellice Islands, where the Fairy Tern is called by a very different name, "Matapula" (Child, 1960).

Our subspecific identification is based on a specimen from Nukunonu examined by Dr. Charles O'Brien (*in litt.* to M.L. 1960) and the three birds deposited at the Dominion Museum, Wellington.

On occasion this Tern flies up to a considerable height, pairs of birds then being barely distinguishable as white pinpricks against the blue of the sky (as at Tagiakuli islet, Atafu, at 11.00 on 7/10/58 and on many other occasions). Its whiteness and more erratic flight than that of tropic birds combines with its numbers to make this species easily recognizable when glimpsed from flying boats landing on or taking off from Tokelauan lagoons — many were seen from approximately 300 m altitude during R.N.Z.A.F. " Sunderland " inter-island flights.

The Akiaki probably breeds on most reef islets of all three atolls. It does not build a nest, the single egg simply being deposited on a suitable site, e.g. the rough surface of a more-or-less horizontal *Pandanus* branch as at Kenakena islet, Atafu, 6/10/58 (M.L.). In this context, the observation of Thompson and Hackman (1968) that " Nests . . . were seen on all of the islands " is misleading. The egg is pale green, with brownish and purplish-grey mottling. Egg-laying was recorded at Nukunonu from the end of November 1966 to mid-February 1967, when small unfledged chicks were found. In May 1968 numbers of Akiaki were seen flying inland with fish. These observations indicate that breeding takes place at least from spring to late autumn. According to Isaia and other Tokelauans, most birds breed between September and February but eggs and young can always be found. Vaopuka stated that Akiaki has no regular nesting season on Fakaofo. This agrees with King's (1967) suggestion that breeding of this species takes places throughout the year.

According to elders of Nukunonu, there is no organized catching of this tern. However, children capture many unfledged chicks, some of which are killed. while others are kept as pets. In Fakaofo, according to Vaopuka, 100 - 200 birds are taken annually.

Order Columbiformes
Family Columbidae

25. *Ducula pacifica pacifica* Gmelin 1789. Pacific Pigeon. The Tokelauan name for this, the only resident land bird of the Group, is Lupe. This name is also the one used in Samoa (Armstrong, 1932; Mitchell, 1909) and the Ellice Islands (Child, 1960). Resident.

> DM 15,337, Tokelau islet of Nukunonu, 15/12/66, male, 32.1, 46.7, 224 and 132. DM 15,336, same locality as last, 28/12/66, female ?, 24.7, 31.0, 40.8, 228 and 130. DM 15,338, same locality and date as last, male, 27.1, 33.7, 41.8, 232.5 and 138.

" Tame oceanic pigeons " were reported from the Village islet, Atafu, by the United States Exploring Expedition (Wilkes 1845). Material collected by this Expedition was presumably the origin of Gray's (1859) record of " *Carpophaga (Globicera) microcera* " or " 'Lupi' of the natives of Samoan Islands " from Duke of York's Island (= Atafu). The Whitney South Sea Expedition (Amadon 1943) observed Lupe on Atafu and obtained specimens from Fakaofo (misspelt " Fakaafo "). This pigeon was also recorded by Mayr (1945) as present in the Tokelau Islands. Recently, Thompson and Hackman (1968) declared it to be " common on all of the atolls."

The black knob at the base of the bill, grey crown and upper back, bluish-green upperparts and pinkish-grey underparts served to identify several birds at close range.

The authors found Lupe decidedly less common than indicated by Thompson and Hackman. Thus, in a virtually complete coverage of all the islets of Atafu in October 1958, pigeons were only sighted on Gaga, Te Oki, Titi-o-Pua, Motu-ita-Niu, Tagiakulii, Hakea Losi (three birds) and Itufakalalo (two birds). In April 1960, pairs of pigeons were recorded from three additional localities — Atafu Village islet, Fenualoa and Fogalaki Lalo. The Pacific Pigeon is appreciably less plentiful than this at Nukunonu. David Gravatt found pigeons " not very common but, because of the difficulty in locating them, they may be more plentiful than is believed." On Nukunonu pigeons were only seen in September 1958 at Hologatautai, Lalo, Long islet and Gahapiti islet, and in April 1960 at Tokelau (twice) and Matautu. On the first visit every single islet was thoroughly searched (for mosquito larval habitats) by a line of men moving within talking distance of one another, and it is very unlikely that any significant number of pigeons escaped notice. The junior author failed to observe any pigeons during either visit to Fakaofo, which was not, however, covered by his ground surveys as exhaustively as the other two atolls were. The scarcity of Lupe on Fakaofo was confirmed ten years later in 1970, when most of the islets were visited (Wodzicki 1970): only a single Pacific Pigeon was seen by Vaopuka on Fenualoa islet. At Nukunou in 1966/67, Pigeons were observed three times, twice as small flocks of three to four birds on Tokelau islet. On the other occasion, a pair was seen on the small islets between Tokelau and the Long islet.

Fresh droppings of one of the Tokelau islet birds contained many seeds of gahu *Scaevola frutescens* and islanders with M.L. at the time told him that the berries of this tree and of puapua *Guettarda speciosa* constitute the usual food of Lupe. The latter species, *Scaevola* and *Ficus* are mentioned in this context by Child (1960). As in the Ellice Islands, nesting is said to take place in the crowns of tall coconut palms, at the bases of the petioles. The puapua was mentioned to us as an additional site, too.

There is little information regarding the breeding of Lupe in the Tokelaus. Among the four specimens collected and sexed by Thompson and Hackman (1968), two males had testes 14 x 7 mm., one female had an ovum of 3 mm., and all specimens had medium or heavy fat (although one had been producing crop milk between 26 February and 4 March 1965).

Order Cuculiformes

Family Cuculidae

26. *Urodynamis taitensis taitensis* (Sparrman 1787). Long-tailed New Zealand Cuckoo. Kaleva [wrongly reported as " Kaleua " by Thompson and Hackman (1968)]. Migrant. Recorded from Fakaofo in early April 1924 by the Whitney South Sea Expedition (Bogert 1937). Three specimens were recorded by Thompson and Hackman (1968) on 2-4 April 1964 and one in March 1965 — all with small gonads. Its characteristic screech was heard more often than we saw this species. Examples were glimpsed (by M.L.) flying

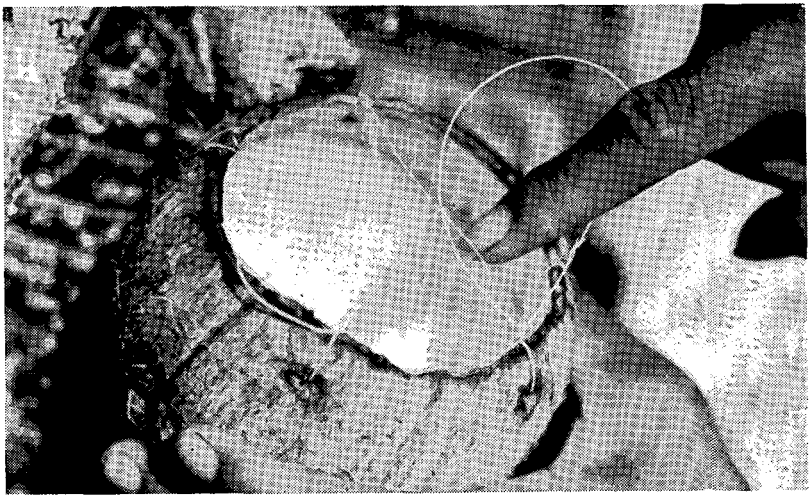
between the crowns of coconut palms at Te Puka north (16/4/60) and Matautu (20 April), Nukunonu. At least two were heard several times and seen on Fenualoa islet, Fakaofo, in the second and third weeks of August, 1970. Also heard but not seen in May 1968 at Vao and Long islet, Nukunonu. The name " Aleva " is employed in Samoa (Armstrong, 1932; Mitchell, 1909) and " Kaleva," as in the Tokelaus, is used in the Ellice Islands (Child, 1960). In New Zealand, though, this bird's Maori name is " Koekoea " (Oliver, 1955).

SOME OBSERVATIONS ON TOKELAUAN BIRD LORE

(i) *Bird Traps*

Although bird traps are known to have been used in many islands of the Pacific (Child 1960), they were not described by Macgregor (1937). The latter stated that seabird " are snared and netted " though with their eggs they " form a very small part of the food supply." Two such traps were demonstrated (to M.L.) by Opeta Faraimo of Fakaofo, and are described below.

The first of these (Plate XXXII) is called Mailei-Tuli (" Mailei," trap; " Tuli," Pacific Golden Plover). Consisting of a coconut with the husk removed and the top quarter or so of the shell sliced away, this has three vertically-orientated slip nooses of coconut fibre arranged just within the cavity and a larger slip noose standing up from the lip. A Tuli or another charadriiform bird trying to reach the undisturbed white meat would follow the route indicated by Opeta's finger in Plate XXXII, thus ensnaring itself. The coconut fibre loops are termed " mata-tipa," the shell and intact kernel being called " gai." This type of trap closely resembles the first of the two types of Gilbertese turnstone traps briefly described by Child (1960).



[Marshall Laird

Plate XXXII — Mailei-tuli, slip-noose trap for northern waders. Fakaofo Village islet, 28/4/69.

The second type, called Mailei-Fiti (Plates XXXIII & XXXIV), is somewhat more complex. In it, the cut-off end of a niumata-stage coconut is placed meatside uppermost as bait, with a vertical peg in the middle. The top of the latter abuts against a horizontal stock braced beneath a cross-piece, wedged beneath pieces of coral and holding open a slip noose depending from a gagie *Pamphis acidula* or puapua *Guettarda speciosa* upright termed the " hilaki." The taut cord at the far right of Plate XXXIII is leading up to this; although in the present case it happens to be made of nylon fishing line, the broadly spread noose is still called " mata-tipa." When a Tuli leans down into the trap as again indicated by the finger, the peg and horizontal brace are flung aside as the trap is sprung, the noose being jerked tight around the neck of the bird, which remains tethered to the top of the " hilaki " (Plate XXXIV). The name " mailei-fiti " (" fiti " spring) is applied to this device. Both types of traps, it should be noted, are carefully set with the lateral areas (shown open in the photographs) blocked up with coral fragments or wood, so that the victim approaches from the correct direction.

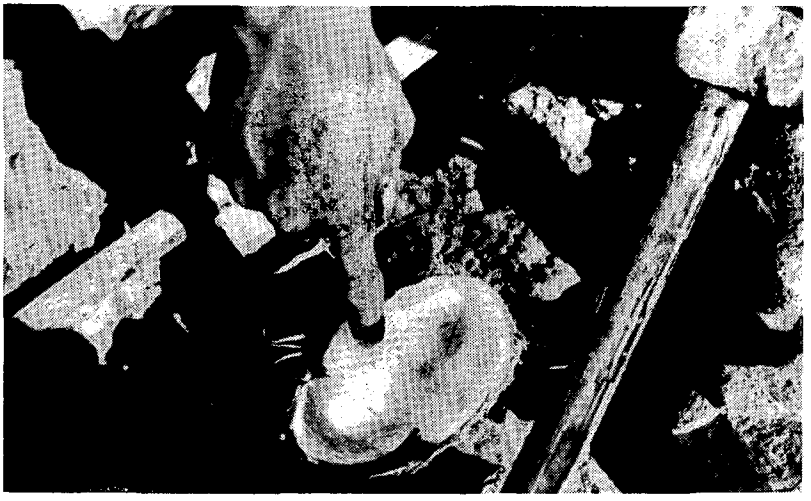
(ii) *Bird Tales*

On each of the atolls the same story of how the migratory birds reproduce was told (to M.L.) that Child (1960) relates with respect to the Gilbertese and Long-tailed Cuckoo (and also to other species including the Bristle-thighed Curlew). Namely, that these birds (and especially the Pacific Golden Plover, in the Tokelau version) fly far up into the sky before laying their eggs. As hatching takes place on the way down, and the duration of the fall further permits the chicks to become fully fledged before reaching the ground, the Tuli obviously has no need of a nest; which explains why nobody has ever discovered one in the Tokelaus.

[Marshall Laird

Plate XXXIII — Mailei-fiti, spring trap for northern waders. Set position. Fakaofo Village islet, 28/4/69.

Our second tale has strong Samoan overtones. It concerns a girl named Sina (" Hina " would be the Tokelauan version) and is probably simply put into a Tokelauan setting from a Samoan original. It seems that all the birds — and not only the common ones like Lakia, but Talagogo and Tavake, too — wanted to marry Sina. Her mother was against the idea from the start, though, saying " where would she sleep, for example ? On the sand ? In a tree ? " However, she was finally won over after Tavake had promised to provide a home in the hollow trunk of a puka tree. The marriage duly took place. Every morning Tavake would now fly off to catch fish for Sina (who had an excellent appetite) and himself. Resenting the increasing mortality, the fish declared their enmity to the union. Things came to a head one morning when Tavake was standing on a stone on the reef (to show that this is a true story, the teller can point out to this day the stone in question, " Fatu o te Tavake," on the seaward side of the Village islet, Nukunonu). Holding an emergency meeting, the fish decided that one of their number would knock Tavake into the water. Aseu (Mala-ovi in Samoan) promptly volunteered, saying that when the waves washed him up to the stone he would leap out and seize the bird. The other fish, though, felt that this plan would not work. Then a second volunteer, Gagale, said that as he somewhat resembled a leaf he would edge his way close, protected by his camouflage, and drag Tavake down. This was approved, so off he went and duly succeeded in grasping Tavake by the leg, calling out to his friends to come and help. They did, those first to arrive killing and eating the luckless bird. The ones that had been furthest away were able to eat only the feathers. To this day these species are still attracted to Tavake feathers when Tokelauans use them as fishing lures, but Gagale, sharks and others whose ancestors devoured the flesh and bones will not respond to



[Marshall Laird

Plate XXXIV — Mailei-fiti, spring trap for northern waders. Activated. Fakaofo Village islet, 28/4/69.

this lure. Poor Sina — and it is noted that the dainty Fairy Tern is called Manu Sina in Samoan (Armstrong, 1932; Mitchell, 1909) — was left alone and weeping.

DISCUSSION

Numbers and Relative Abundance of Tokelau Islands Birds

Thompson and Hackman (1968) attempted during their week-long visit to the entire Group to estimate the populations of nine species:— Matuku, Tuli, Tiafee, Vahavaha, Kolili, Tovivi, Gogo, Lakia and Akiaki. The total population of these nine species amounted to 14,094 birds for the three atolls. Unfortunately, they failed to provide information on the method they used for the assessment of the populations counted. In any case, personal experience indicates that such estimates made in so short a time are conjectures rather than evaluations of the populations present.

On the other hand, one of us (M.L.) listed the birds seen in order of abundance, by questioning various inhabitants of Atafu and Nukunonu on a number of separate occasions, often during canoe trips across the lagoon, these being made on most days of the two WHO Expeditions (Laird, 1967). Time precluded building up a similar list at Fakaofo. Table 2 presents these data in decreasing order of abundance for Atafu and Nukunonu and compares them with the population estimates of Thompson and Hackman (also set out therein in decreasing order of their population estimates for all three atolls).

Subjective though these lists are, they do serve to sum up the outstanding characteristics of the avifauna of the Tokelaus. Firstly, they show the difference in relative abundance between various seasons (the junior author's visits took place in September/October 1958 and April 1960). Secondly, they show:

the overall dominance of a few resident species of noddies and terns;

the frequency with which northern waders visit the Group;

that there are well-established resident populations of Reef Herons;

the relative scarcity of two land birds, the resident Pacific Pigeon and the migratory Long-tailed Cuckoo;

and the presence in this area of the usual South Pacific frigate birds, boobies, tropic birds and a shearwater.

Especially in view of the Tokelauans' capacities as observers, it was perhaps remarkable that we were never able to learn anything about either petrels or storm-petrels in these waters. Admittedly, the cessation of long inter-island trips many years ago must have certainly limited the opportunities for glimpsing such pelargic birds. Also, pelagic birds even in the past, seldom had the importance that nesting or roosting sea birds had as a welcome food variety in a monotonous diet of fish and coconut.

The Tokelau Islands Bird List

The Tokelau Islands are outside the main shipping lanes (Harrison 1962) and until the recent survey by Thompson and Hackman (1968), no checklist of their birds was available. King (1967)

indicated that three species (Sooty Tern, Black-naped Tern, and Brown Noddy) " may breed " and that two species (Black Noddy and White Tern) breed " all year ? " King also reported four species (Red-tailed Tropic bird, Brown Noddy, Great and Lesser Frigate birds) as visitors, and three more (White-tailed Tropic bird, Red-footed Booby and Blue-grey Noddy) as probable visitors.

The present paper provides a list of 26 species, comprising 15 sea birds, eight shore birds and three land birds (including a duck, probably the Grey Duck *Anas superciliosa,* an occasional visitor.) Five sea birds, *Puffinus pacificus, Sula dactylatra, Fregata minor, Sterna lunata* and *S. bergii,* and two shore birds, *Limosa lapponica* and *Numenius phaeopus,* are species not previously reported from the Tokelau Islands. We have not included Ramsay's (1878) almost century-old record of a Blue-grey Noddy *Procelsterna cerulea.* Neither have we attempted to guess at the identity of the Kuli, a whitish Tern, larger than the Fairy Tern, which sometimes lands in trees at Atafu but doesn't nest there (the name of Atafu's Tagiakulii islet means " the crying of the kuli "). It is likely that future investigations may add a few sea- or shore-birds to the present list.

TABLE 2 — Order of Abundance of Characteristic Tokelau Island Birds

DECREASING ORDER OF ABUNDANCE	NUKUNONU (M.L.) SPECIES	DECREASING ORDER OF ABUNDANCE	ATAFU (M.L.) SPECIES	DECREASING ORDER OF ABUNDANCE	TOKELAU IS. (Thompson and Hackman 1963)
1.	Anous minutus	1.	Anous stolidus	1.	Anous minutus
2.	Anous stolidus	2.	Anous minutus	2.	Anous stolidus
3.	Gygis alba	3.	Gygis alba	3.	Sterna fuscata
4.	)	4.	)	4.	Gygis alba
5.	)	5.	)	5.	Fregata ariel
6.	)	6.	)	6.	Arenaria interpres
7.	)CHARADRIIFORMES	7.	)CHARADRIIFORMES	7.	Sterna sumatrana
8.	)	8.	)	8.	Heteroscelus incanus
9.	)	9.	)	9.	Egretta sacra
10.	Egretta sacra	10.	Sterna sumatrana	10.	Pluvialis dominica fulva
11.	Sterna sumatrana	11.	Egretta sacra	11.	Numenius tahitiensis
12.	Fregata ariel	12.	Sterna fuscata	12.	Ducula pacifica
13.	Fregata minor	13.	Fregata ariel	13.	Phaethon rubricauda
14.	Sterna lunata	14.	Fregata minor	14.	Sula sula
15.	Ducula pacifica	15.	Ducula pacifica	15.	Phaethon lepturus
16.	Eudynamis taitensis	16.	Eudynamis taitensis	16.	Sula leucogaster
17.	Sula rubripes	17.	Phaethon rubricauda	17.	Urodynamis taitensis
18.	Sula leucogaster	18.	Phaethon lepturus	18.	Crocethia alba
19.	Phaethon rubricauda	19.	Sula leucogaster	19.	Anas spp.
20.	Phaethon lepturus	20.	Sula sula		
21.	Sterna bergii	21.	Sterna bergii		
22.	Sula dactylatra	22.	Sula dactylatra		
23.	Puffinus pacificus	23.	Puffinus pacificus		
24.	Anas spp.				

Affinities with Other Islands of the Central Pacific

Olosega or Swain's Island is the nearest neighbour, a densely forested atoll only 160 km. from the Tokelau Islands. Clapp (1968a) reported nine species of sea birds, six shore birds and one land bird (New Zealand Long-tailed Cuckoo, *Eudynamis taitensis*). The " vasavasa " referred to Clapp by the islanders is probably the Vahavaha (Ruddy Turnstone, *Arenaria interpres*).

By comparison with the birdlife of the Tokelaus, the most striking absentee from Olosega is the Pacific Pigeon *Ducula pacifica.* Also, the Reef Heron (erroneously described by Clapp, 1968a, as a migrant) appears to be much less common than in the Tokelau Islands. The same applies to the White-capped Noddy *Anous minutus.* The smaller size and the accessibility of all parts of Olosega, together with the presence of casual workers not concerned with bird preservation, help to explain the relative paucity of bird species and the apparently smaller populations present there.

The Phoenix and Line Islands are the two nearest island groups north and north-east of the Tokelau Islands. According to Clapp (1968b), of the 13 bird species recorded in these islands only four shore birds, *Egretta sacra, Numenius phaeopus, Limosa lapponica, Calidris alba,* and one land bird, *Eudynamis taitensis,* are also found in the Tokelau Islands. In the Gilbert Islands which are to the north-west of the Tokelaus, 14 sea birds were recorded (Amerson 1969), of which 12, *Phaethon rubricauda, P. lepturus, Sula dactylatra, S. leucogaster, Fregata minor, F. arial, Sterna sumatrana, S. fuscata, S. bergii, Anous stolidus, A. tenuirostris* and *Gygis alba,* are shared with the Tokelaus. Similarly, the Gilberts have 19 land and freshwater species of which 10, *Egretta sacra, Anas* sp., *Pluvialis dominica, Numenius phaeopus, N. tahitiensis, Limosa lapponica, Tringa incana, Calidris alba, Arenaria interpres* and *Urodynamis taitensis,* were recorded in the Tokelaus. The relationship between the Tokelaus and the Ellice Group is even closer, for of some 18 species of sea birds known from the Ellice Islands (Child 1960), 15 have now been recorded in the Tokelaus. Again, of the 14-odd land birds and waders, 12, *Arenaria interpres, Anas* sp., *Pluvialis dominica, Tringa incana, Numenius tahitiensis, Limosa lapponica, Sterna bergii, S. sumatrana, S. fuscata, Calidris alba, Ducula pacifica* and *Urodynamis taitensis,* are shared by the Tokelaus.

The Samoan Islands are the closest major land mass, lying just over 480 km. south of the Tokelaus. We find a considerable similarity between the avifauna of these two groups of islands. Armstrong (1932) recognized 63 bird species, including some 20 sea birds and eight shore birds in Samoa. However, more recently Ashmole (1963) claims that the Samoan avifauna consists of 53 species that include 13 sea birds and six shore birds. Twelve of these sea birds, *Puffinus pacificus, Phaethon rubricauda, P. lepturus, Fregata minor, Sula sula, S. leucogaster, Sterna fuscata, S. sumatrana, S. lunata, Anous stolidus, A. minutus* and *Gygis alba,* are also found in the Tokelaus. Of the eight shore birds observed in the Tokelaus, six, *Egretta sacra, Pluvialis dominica, Arenaria interpres, Numenius taitensis, Limosa lapponica* and *Tringa incana,* occur also in the Samoan archipelago, as do the three land birds, *Anas* sp., *Ducula pacifica* and *Urodynamis taitensis.*

Bird Movements and Dispersal

Little is known of bird movements, dispersal and even of seasonal distribution (King 1967). Also, no analysis of the recoveries made of the approximately two million birds banded by the personnel of the Pacific Biological Survey Programme, Smithsonian Institution (Amerson 1969) is yet available. However, the two records of a Sooty Tern and a Brown Booby recovered during the present work at the Tokelaus indicate displacements of at least 1,600 km. in some species.

Problems of Bird Conservation

Three species of mammals, besides man, occur in the Tokelau Islands (Kirkpatrick 1966; Wodzicki, 1968a, 1968b and 1969): pigs, cats, and one rodent *(Rattus exulans)*[10]. Pigs and cats are com-

[10] Occasional dogs have been brought in, and according to Macgregor (1967) the Spanish discoverers of Olosega (1606) reported that the long-vanished original inhabitants kept small dogs.

paratively recent introductions and have become feral in some islets of the three atolls. It is known that pigs have largely modified the invertebrate fauna of particular atolls, for example, in the Vao or Village islet of Nukunonuo. They also are potential predators on ground nesting birds, such as some terns. The discovery of Polynesian rat predation on Laysan Albatrosses (Kepler 1967) opens up the possibility that this rodent may affect the numbers and distribution of other (both ground and tree-nesting) species, although no evidence on the matter was found during our surveys. No birds of prey occur in the Tokelau Islands, but of the many invertebrates found there, the Coconut Crab *Birgus latro* may well eat the eggs and young of birds.

Man appears to be the most important and efficient factor affecting birds in tropical islands (Amerson 1969). Thus vegetational changes are caused by the planting of coconut palms or other crops, and direct predation must be admitted too, insofar as wild birds or their eggs are used as human food. According to Macgregor (1937), in former times birds and their eggs played a much less important part in the diet of the Tokelauans than did coconuts and fish. Nevertheless, we now know that practically all the birds found in the Tokelaus (with the apparent exception of *Egretta sacra*), and their eggs, are quite commonly collected. Formerly, the elders seem to have regulated this kind of collecting to a certain degree, but nowadays it seems that any number of birds or eggs may be taken by any inhabitant of the islands on their own family holdings.

During our discussions with many Tokelauans, evidence was advanced that most of the birds particularly sought for food, such as noddies, terns and pigeons, are steadily though not drastically declining. It is thus felt imperative that not only should the existing ban on firearms in the Tokelaus be rigorously maintained, but that a return to the pre-European policy of a *regular* and *controlled* exploitation should be advocated. As in olden times, the control of the bird life — and also of some other natural resources — in the three islands should be entrusted to the Council of Elders (Fono Toeaina) of each atoll, who should decide about the numbers of birds to be taken, and the time when it is permissible to hunt them. The "Big Fono" (a two-days meeting of delegates from all three atolls convoked by the Administration from time to time) would be the appropriate forum where the necessary legislation could be mooted before being tabled before Parliament in New Zealand. Concurrently it is recommended that an account of the Tokelau Islands birds and of other important renewable natural resources of the atolls and of their conservation should be included in the Tokelau schools curriculum.

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of all five expeditions. Mr. Opeta Faraimo, also of the Administration, provided much-appreciated assistance too (particularly to M.L. in 1960).

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