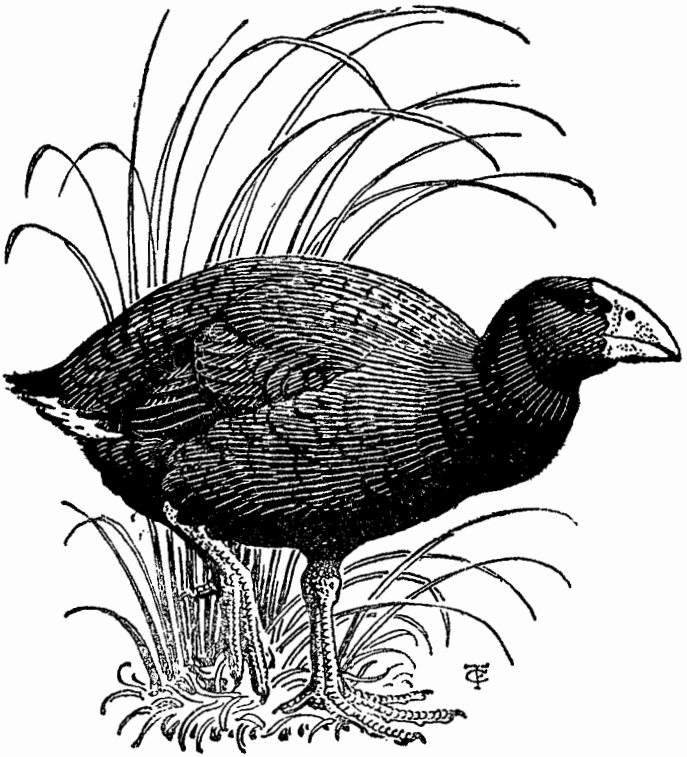
NOTORNIS

Journal of the Ornithological Society of New Zealand



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REMARKS ON THE TAXONOMY OF THE AUSTRALASIAN HARRIER (Circus approximans)

By D. J. BAKER-GABB

INTRODUCTION

There has been considerable confusion among New Zealand ornithologists about which species and subspecies names to use for the Australasian Harrier *Circus approximans*. Since Vaurie's (1965) work on the genus *Circus* was published most authors outside New Zealand have referred to the Australasian Harrier as a subspecies of the European Marsh Harrier *C. aeruginosus*. That is, the Australasian Harrier has been named *C. aeruginosus gouldi*. However, the Australasian Harrier was referred to as *C. approximans gouldi* in the "Annotated checklist of the birds of New Zealand" published in 1970, and in all other scientific works published in New Zealand up to and including 1979. Similarly, the Fiji Harrier has been named *C. aeruginosus approximans* by workers outside New Zealand and referred to as nominate *C. approximans approximans* by New Zealand ornithologists. More recently, Amadon (1978) has provided convincing evidence that *C. approximans* should be retained as a full species and he included it as one of the five component species (= allospecies) of a marsh harrier superspecies.

The members of the marsh harrier complex range through north-western Africa, western and northern Eurasia to Japan, New Guinea, Australia, New Zealand and some islands of the South-west Pacific and the Indian Ocean (Vaurie 1965). The points of contention in this distribution and the recent changes in nomenclature that have occurred are discussed. Data are also presented demonstrating that the two current subspecies of *C. approximans*, nominate *approximans* of Polynesia and *gouldi of* Australasia, are indistinguishable and are therefore not valid.

SPECIES

Within the marsh harrier complex, the plumage coloration of the adult male harriers from eastern Asia *(C. spilonotus)* and central and western Europe *(C. aeruginosus)* is so sharply differentiated that they have long been considered separate species. This separation is important taxonomically because Brown & Amadon (1968: 382) stated that if these two harriers are not distinct species then all other members of the marsh harrier complex, including the Australasian Harrier, are subspecies of the European Marsh Harrier *(C. aeruginosus)*. Vaurie (1965: 205) pointed out that where these two taxa come into contact in eastern Siberia and western Mongolia they interbreed. Whether this contact area should be considered a zone of full intergradation or alternatively and conversely, an area of partial hybridisation, is an unresolved point of contention. Vaurie (1965) believed that full intergradation occurs and that the lack of reproductive isolation strongly suggests the two taxa are conspecific. However, Amadon (1978) referred to possible ' polymorphs ' where the taxa meet and suggested that only partial hybridisation may occur.

Amadon (1978) raised two further points of interest. Firstly, he stated that the conspecific harriers of Mauritius and Madagascar *(C. maillardi)* are geographically isolated and morphologically distinct from *C. aeruginosus*. Secondly, he noted that where two other species of the marsh harrier complex are sympatric in lowland New Guinea, interbreeding has not been recorded. These species are *C. spilonotus* and *C. approximans*.

Further study is needed of all three points outlined above, but I believe Amadon's (1978) cautious proposal that *C. approximans* be considered a full species and a member of a marsh harrier superspecies is at present the only acceptable solution.

SUBSPECIES

In establishing a criterion for differentiating subspecies I have followed Amadon's (1949) definition of " 75 per cent of a population must be separable from all (99+ per cent) of the members of overlapping populations to qualify as a subspecies."

In the past, various attempts to define subspecies of the Australasian Harrier have been made, mainly based on size. To date Amadon's (1941) investigations, from which two subspecies were distinguished from five previously described forms, is the most widely accepted work. The subspecies he defined were: *C. approximans approximans* (Fiji Harrier) and *C. a. gouldi* (Australasian Harrier). Amadon (1941) was definite about his criteria when he said that the smaller size of *C. a. approximans* seemed to be the only valid character for distinguishing it from *C. a. gouldi*. During his study he examined 124 skins of *C. approximans* and, although many of these were damaged or ill-prepared, he stated that they " made it possible, perhaps for the first time, to investigate the alleged racial variations in colour in this species.

None seems to exist. Statements to the contrary have presumably been based on differences due to age, sex, or individual variation." This stance was slightly modified by Brown & Amadon (1968: 383) who stated that *C. a. gouldi* was much larger than *C. a. approximans* and rather darker above and more heavily streaked below. However, Amadon (1978) reaffirmed his earlier view when he again stated that the subspecies differed only in size.

Following the general acceptance of Amadon's (1941) distinction of two subspecies, there was speculation among ornithologists as to why the measurements of wing and tail length of harriers from Norfolk Island and the Kermadec and Chatham Islands should have fallen into the *C. a. approximans* range, when the islands lie much closer to Australia and New Zealand where *C. a. gouldi* is resident.

As the major criterion for retaining the subspecies is still size differences, a comparison of the measurements taken by Amadon (1941) with those available today is needed to test his classification. In reference to this point, Oliver (1955) stated that " there is no good evidence for subdividing the species either on size or on coloration. . . Some of the ranges in size overlap." Although he rejected Amadon's (1941) classification, Oliver (1955) did not provide the necessary data to support his statement.

In Tables 1 and 2, I have summarised the available data on wing and tail length of *C. a. gouldi* and *C. a. approximans,* including measurements I obtained from the Fiji Museum, the National Museum of New Zealand and the National Museum, Melbourne. The museum measurements are referred to in the tables as " museum data." Because Amadon's (1941) data on *C. a. gouldi* were rather scanty he did not determine averages. However, this stance also was modified by Brown & Amadon (1968: 383), who presented the mean values and ranges, and so I too have included them.

The range of measurements of wing and tail length that Amadon (1941) took of *C. a. approximans* and *C. a. gouldi* overlapped very little, but note the small sample of *C. a. gouldi.* As may be seen in Tables 1 and 2, this is not what has been found by other workers: the measured ranges of wing and tail length of the subspecies overlap completely, and there is of course no possibility of separating 75% of Polynesian harriers from all (99+%) of Australasian harriers. Furthermore, the mean measurements of most samples are similar, except Amadon's (1941) of *C. a. gouldi* and Carroll's (1970) inexplicably low mean wing length of female *C. a. gouldi.* Carroll *(in litt.)* is unable to check this value as the original data are no longer available.

I agree with Oliver (1955) that there is no valid reason to distinguish subspecies of the Australasian Harrier based on differences in size, or on differences in colour, as Amadon (1941) reasoned. I therefore propose that the previously defined subspecies be combined under the nominate form: *Circus approximans* Peale 1848.

TABLE 1 — Male harrier measurements

Reference	Classification	Wing length (mm)			Tail length (mm)		
		Mean	Range	No	Mean	Range	No
Amadon (1941)	*C. a. approximans*	403	392-412	20	231	222-239	27
Baker-Gabb (museum data)	*C. a. approximans*	403	397-410	7	228	216-235	7
Amadon (1941)	*C. a. gouldi*	419	410-425	7	240	234-252	8
Carroll (1970)	*C. a. gouldi*	402	381-429	58	231	211-251	61
Fox (1977)	*C. a. gouldi*	408	390-430	22	229	220-240	22
Baker-Gabb(1978)	*C. a. gouldi*	404	385-425	95	225	195-240	95
Robertson(1978)	*C. a. gouldi*	399	382-412	19	230	210-240	22

TABLE 2 — Female harrier measurements

Reference	Classification	Wing length (mm)			Tail length (mm)		
		Mean	Range	No	Mean	Range	No
Amadon (1941)	*C. a. approximans*	423	418-430	4	247	240-252	10
Baker-Gabb (museum data)	*C. a. approximans*		409	1		234	1
Amadon (1941)	*C. a. gouldi*	436	430-444	6	254	249-259	6
Carroll (1970)	*C. a. gouldi*	408	390-455	66	239	224-258	70
Fox (1977)	*C. a. gouldi*	428	412-450	29	244	230-255	27
Baker-Gabb(1978)	*C. a. gouldi*	423	400-440	107	236	214-257	107
Robertson(1978)	*C. a. gouldi*	422	405-435	21	244	230-260	25

Under this classification, arguments about the origin of the harriers on Norfolk Island, the Kermadec and the Chatham Islands become unprofitable. A combination of the data of Amadon (1941), Oliver (1955), Brown & Amadon (1968) and Kinsky (1970) gives the known range of *C. approximans* as: south-eastern New Guinea, northern, eastern and southern Australia, Tasmania, New Caledonia, New Zealand, Chatham, Society, Tonga, Fiji, New Hebrides and Loyalty Islands, Wallis (Ueu) Island, a regular visitor to the Kermadec Islands, Norfolk Island and Lord Howe Island and straggling to Samoa.

ACKNOWLEDGEMENTS

I would like to thank Professor J. M. Cullen and B. D. Heather for the helpful comments they made on a draft of this paper. I am grateful for the assistance of F. Clunie, F. C. Kinsky and A. McEvey for allowing me access to and providing measurements of museum specimens.

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D. J. BAKER-GABB, *Department of Zoology, Monash University, Clayton, Victoria 3168, Australia.*

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SHORT NOTES

MANY ANTARCTIC PETRELS AROUND FOVEAUX STRAIT

In normal years, Antarctic Petrels *(Thalassoica antarctica)* are rarely seen, but towards the end of winter 1978 there were unusual numbers from Preservation Inlet to Stewart Island.

Roy Milford, who fishes these waters, passed on these comments to me. "Three or four have been round every fishing boat; and altogether there must have been some hundreds. It is nice to have a new bird around. They are very tame, the tamest seabird of all. In fact, you can reach down and pick them off the water. They seem completely fearless. Near the boats they sit alongside the Cape Pigeons *(Daption capense)* eating scraps, and the Cape Pigeons bully them. The Antarctic Petrels appeared in such numbers at the beginning of September. Coinciding with their arrival was an unusual abundance of octopus."

Roy Milford, with 70 pots, added that normally he would get three or four octopus per daily round, but that in 1978 he was getting 20 per day and other crayfishermen were reporting similar numbers.

Any connection ?

MAIDA BARLOW, *38 Filleul Street, Invercargill.*

★

ARCTIC SKUAS AT SEA

On 1 Nov. 1979 at 34° 11'S 177° 07'E, seven Arctic Skuas *(Stercorarius parasiticus)* were seen. They were in a loose flock spread over a front of about 100 yards and between 50-150 feet high. The birds were on a course of about south-west and were flying at a speed estimated to be about 20-25 knots.

JOHN JENKINS, *14 Lochiel Road, Remuera, Auckland.*

SHORT NOTE

SIGHT RECORD OF *Egretta intermedia* IN NEW ZEALAND

On Saturday, 1 September 1979, we saw a solitary white heron near Huntly West Road, between Lake Whangape and the Waikato River. We were able to study the bird for about 10 minutes in the morning and for about 20 minutes in the afternoon on our return. The day was windy and at times overcast and showery, but we had good views from about 70 metres with x 7 binoculars and with a x 20 telescope.

This bird was a little larger than a Cattle Egret *(Bubulcus ibis)* but much smaller than a White Heron *(Egretta alba)*. Fortunately, a flock of 118 Cattle Egret was only a few hundred yards away, flying and feeding as a close-knit group, and so we had an opportunity to compare them. We also spent some time studying a White Heron at nearby Lake Hakanoa within the hour. We could see how much bigger the White Heron was, with its much longer neck and its distinctive feeding as it tip-toed delicately across the floating weed in the shallows of the lake.

Our solitary bird was a more active feeder than the Cattle Egret, continuously probing among the maize stubble and gulping down small objects which we could not identify. It did not associate with stock nor with the large flock of Cattle Egret, which were often in sight of it, on pasture with sheep or cattle.

The yellow bill was heavy at the base, sharply pointed and looked longer than the head. Orange-yellow was across the base of the bill and around the eye like very small spectacles, with white feathers extending forward below the eye and round the gape. The iris was yellow. All the plumage was pure white. The neck was longer and more sinuous than that of a Cattle Egret. The legs — lower tibia, tarsi and feet — were all-black. Our bird lacked the hunched-up attitude of a Cattle Egret. With its longer bill and longer neck and the absence of a jowl, it looked more elegant. There were no plumes, although some mantle and neck feathers fluffed out in the wind.

We identified the bird to be an Intermediate (Plumed) Egret *(Egretta intermedia)*, and we believe that the dark tibias and absence of plumes may indicate that this was an immature bird.

The first, and only other, record of this species in New Zealand is a mounted specimen in the National Museum. It came to hand as a result of a prosecution relating to the possession of totally protected wildlife. The specimen, an adult in full plumage, was picked up on Foxton Beach by L. O. Burmeister, Palmerston North, during October in either 1972 or 1973.

J. H. & B. H. SEDDON, *11 Grey Street, Cambridge.*

OBSERVATIONS ON THE WEDGE-TAILED SHEARWATER (Puffinus pacificus) IN THE SOUTH-WEST PACIFIC

By J. A. F. JENKINS

SUMMARY

Records of Wedge-tailed Shearwaters made between 1960 and 1978 in the South-west Pacific are collated to indicate changes in their annual distribution between New Zealand, Fiji, Samoa, and Tonga.

The absence of Wedge-tailed Shearwaters from the study area on migration from June to September is shown, and migration tracks to and from their supposed wintering grounds in the eastern Pacific are suggested.

Reference is made to feeding, and to birds seen in feeding flocks with Wedge-tailed Shearwaters. The apparent absence of avian food piracy on the species is discussed. An attempt is made, with little success, to deduce the location of breeding sites in the study region.

INTRODUCTION

The observations of the Wedge-tailed Shearwater *(Puffinus pacificus)* presented here are based on the author's records made on occasional passages from 1960 to 1973 and on regular fortnightly voyages from May 1973 to October 1978. During the last five years, most voyages were between Auckland, Lautoka, Suva, Pago Pago, Apia, Nukualofa, and Auckland, whereas earlier passages were mainly between Auckland or Onehunga and Fiji. The data include observations made by other Union Steamship Company deck officers on various voyages to the Pacific Islands up to 1977.

The region under consideration lies between 12°S and 36°S latitude, and 171°E to 170°W longitude. Almost all the observations were made from merchant ships on commercial voyages, so that most lie on the direct routes between the various island groups, and from New Zealand to the Pacific Islands.

Figures 1-5 show the highest numbers of Wedge-tailed Shearwaters recorded together in each one-degree " square," that is, a square of one degree of latitude by one degree of longitude (Cheshire 1977). Where a square has not been visited it is left blank.

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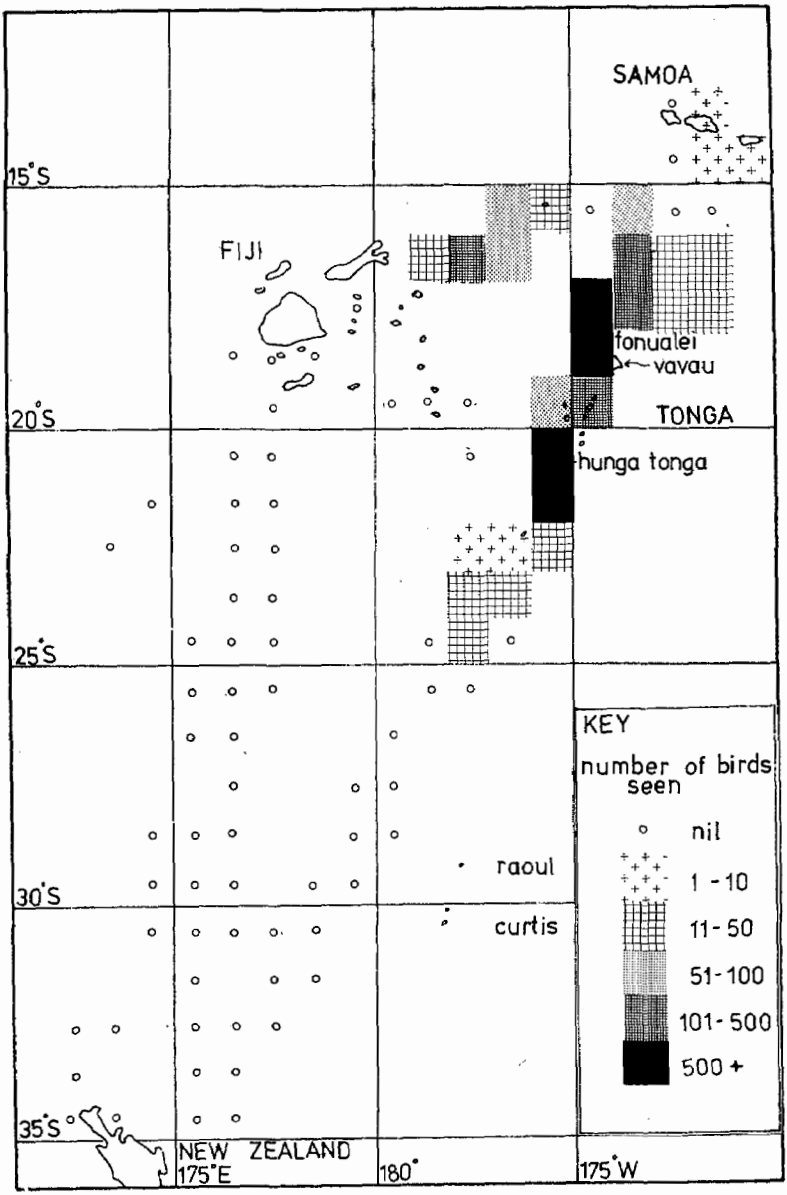

FIGURE 1 — Distribution of Wedge-tailed Shearwater — October.

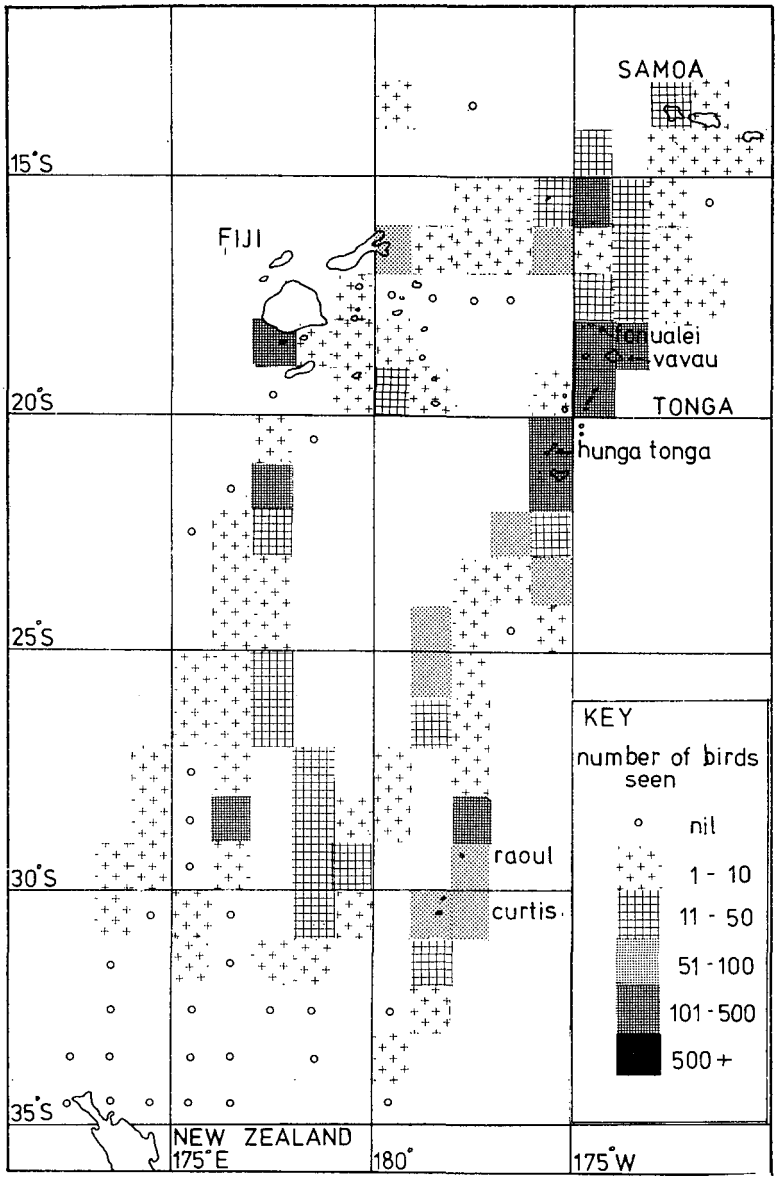

FIGURE 2 — Distribution of Wedge-tailed Shearwater — November to January.

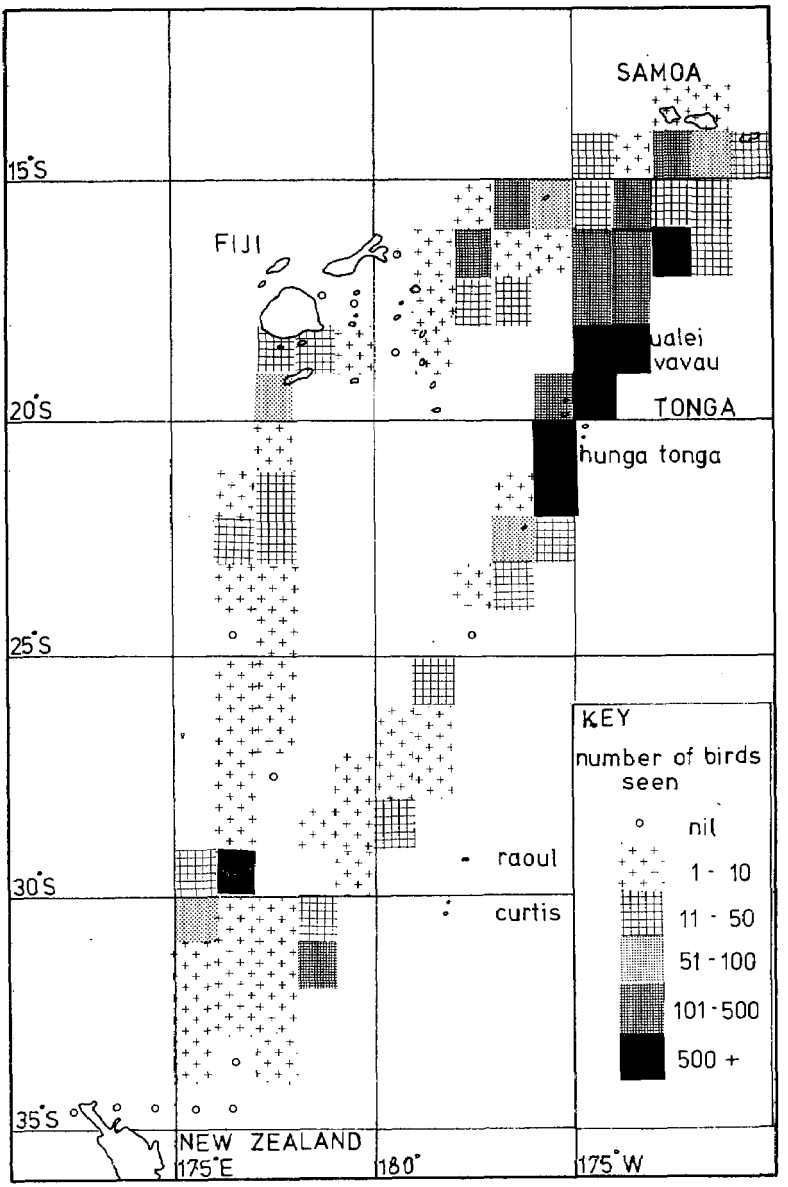

FIGURE 3 — Distribution of Wedge-tailed Shearwater — February, March.

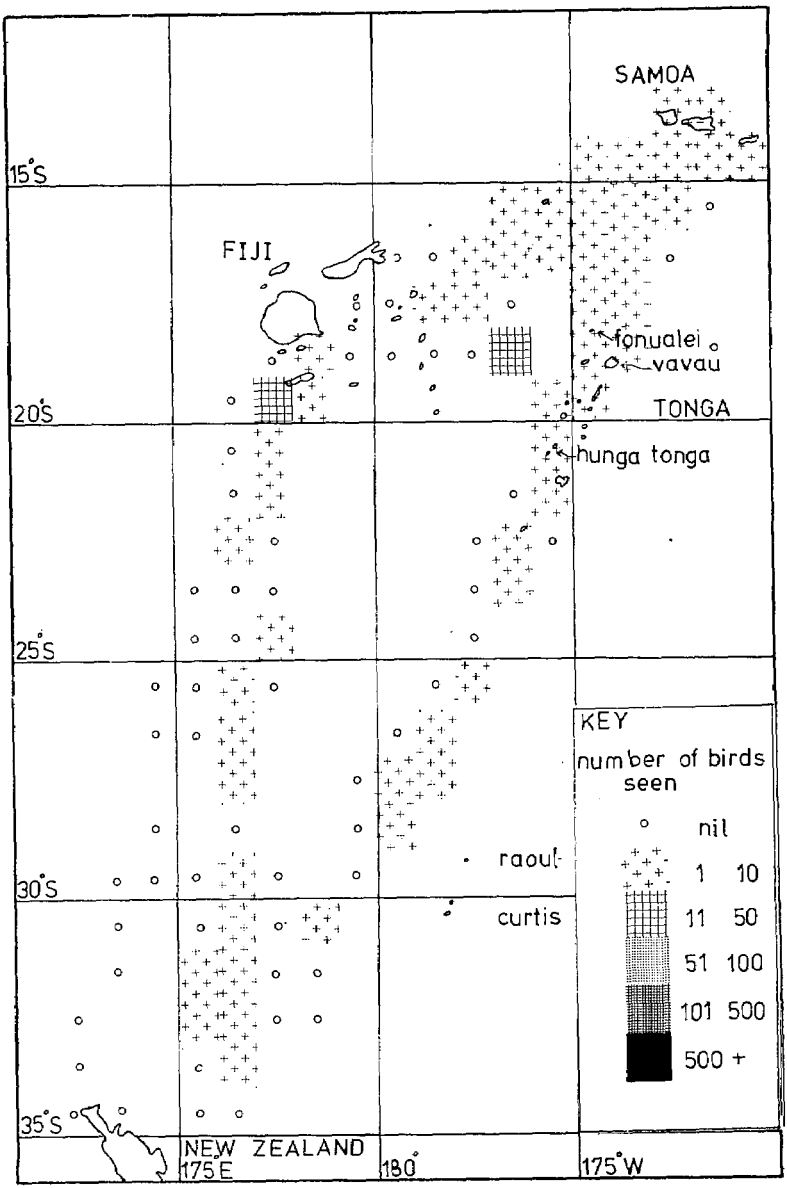

FIGURE 4 — Distribution of Wedge-tailed Shearwater — April, May.

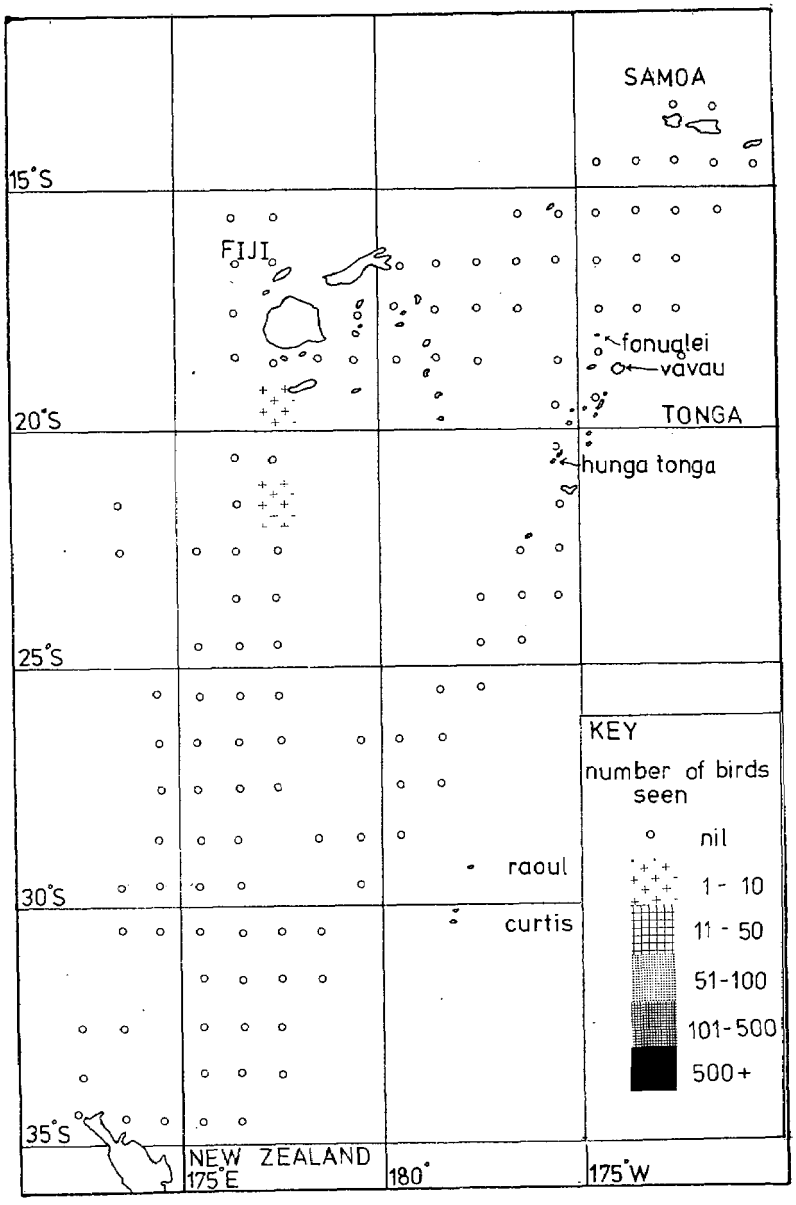

FIGURE 5 — Distribution of Wedge-tailed Shearwater — June to September.

During the period that Wedgetails are in the region under study, they are spread thinly throughout, concentrating only for specific reasons. The most regularly observed reason for concentration is feeding, when many are seen together with other seabirds (Table 1). Other reasons for concentrations are the assembling of birds off breeding islands, a habit of loafing in the lee of islands in bad weather, and the flocking of birds just before and during migration. The pattern of observation from a passing ship is to see either low numbers of from one to five birds on almost all sightings, or a concentration.

In this report, the Wedge-tailed Shearwaters seen were almost all of the dark phase, light-phase birds being very rarely seen. Over the whole time that records have been kept by the author and his fellow officers, only five light-phase birds were seen, three in Tongan waters and two between Fiji and Samoa. Light-phase birds have been reported north of Samoa at 12°S latitude in February (King 1974), and so it seems that light-phase birds may only rarely venture south of the latitude of the Samoan Islands.

THE BREEDING ISLANDS OF THE REGION

King (1967) lists Wedgetails as a breeding species for most of the island groups in the region without actually naming the breeding islands within the groups. Indeed, most of the literature on the South-west Pacific is similarly non-specific, and even when particular islands are mentioned, little is said about the actual site (Murphy 1951). Over the years, this vagueness has probably protected many colonies from hunters and ornithologists alike, but it is frustrating for those who try to collect information to confirm that recorded colonies still exist.

Kermadec Group

Edgar (1964) listed the islands with their relative positions and acreages when discussing the Kermadec Expedition of 1964. Merton (1970) described the breeding stations on Raoul and its offshore islets. For the Wedge-tailed Shearwater, Raoul and the Herald Islets are among the best documented islands in the South-west Pacific. For the southern islands of the Kermadecs, however, there appears to be little information. On Macauley Island in August 1966, a Wildlife Service party found the remains of many chicks, and considered it a common breeding species (Merton 1970). The party destroyed the feral goat population (Williams & Rudge 1969), and so the conditions for breeding petrels and shearwaters should have improved greatly since then. From the twin islands of Curtis and Cheeseman, Guthrie-Smith (1936) described a chick twice the size of a *Pterodroma nigripennis* chick, which may have been a Wedgetail.

Fiji

Smart (unpub.), in an attempt to check the breeding status of seabirds in Fiji, searched published records in what was hoped to be

a short-cut method to locate existing sites. This object was not realised, though his search provided a very useful list of earlier references to Fijian seabirds. Referring to Wedgetails, Smart stated " The Whitney South Seas Expedition first recorded this species from Kandavu in November 1924, where presumably it was collected from breeding burrows. Both Mayr and King state it breeds, without giving details. Morris described breeding on Nanuya-i-Ra Island in the Yasawas in March 1963. He found about 50 burrows which he attributed to this species near the top of the island at about 50 feet a.s.l. One burrow examined contained a large nestling." Murphy (1951) gave the measurements of 33 birds from Kadavu Island, and stated " We have no knowledge of Fijian representatives from islands other than outlying and relatively isolated Kandavu, on the southern border of the archipelago." F. C. Kinsky (pers. comm.) states that in mid-May 1975, during a combined expedition of the National Museum of New Zealand and the Fiji Museum, he and F. Clunie found a few starving fledglings in the Astrolabe Lagoon, off Bulia Island, on Yabu Island, and a rotting corpse on Ono Island.

Tonga

An excellent description of all the Tongan Islands is contained in the British Admiralty Pacific Islands Pilot Volume 2.

From observations made on voyages through Tongan waters it appears that the main colonies here are on the island of Fonualei, and the twin islands of Hunga Tonga and Hunga Haapai, all of which are uninhabited. Fonualei is a volcanic island having on its northern face large patches which are bare of vegetation and stained yellow with what appears from seaward to be sulphur. The southern peak of the island periodically emits smoke and steam, and fumes are always rising from it. This seems to be the main island for Wedgetails and apparently will remain uninhabited by man. Fonualei and Ata, the southernmost, are the only large islands in Tonga neither inhabited nor regularly visited to collect copra.

However, breeding colonies probably exist on some of the smaller islands. Davidson (1931) recorded breeding on Kelefesia Island in the Nomuka Group in January 1921 and gave the measurements of two males and three females.

Samoa

I have so far found no records of Wedgetail breeding in Samoa.

Lord Howe Island

Hindwood (1940) gave a full description and maps of Lord Howe and its offshore islets. He recorded the breeding sites on the main island and listed the islets where breeding occurs.

Norfolk Island

The literature apparently does not describe the breeding sites at Norfolk.

Cheshire (pers. comm.) records that in 1973 on voyages to Norfolk, no Wedgetails were seen on 23 September but that by 31 October a feeding flock of 100+ birds was seen 48 miles north-east of the island. On 1 November there were 1500+ birds in rafts in the vicinity of Philip Island.

DISTRIBUTION AT SEA

Figures 1-5 indicate that Wedgetails are almost absent from the study region between June and September. The birds of all the local sub-populations, for example, those of Tonga, Kermadecs, Norfolk, and Fiji, seem to leave together and arrive back at the same time. The return of birds to an area where their absence has been noted for months is dramatic.

October Figure 1

The chart for October shows the large numbers of Wedgetails to the north-east in the triangle formed by Samoa, Tonga and Fiji. The highest numbers are seen about Tonga, specifically near the probable breeding islands of Fonualei, north of the Vava'u Group, and about the more southerly islands of Hunga Tonga and Hunga Haapai. First sightings have always been made here, after which the birds have steadily spread out over the region. Over five years of October passages, no Wedgetails were recorded from Samoan or Fijian Waters, or from the seas south of Tonga, until this influx centred on northern Tonga had taken place.

The October sightings suggest that in 1973 the main population had returned by the 25th; in 1974 by the 19th; in 1976 there were apparently no Wedgetails in northern Tongan waters on the 1st October; in 1977 there were a few birds about on the 9th, and the main body seemed to be back by the 11th; in 1978 no Wedgetails were seen in Tongan waters on 3 and 4 October, but they were there in force on the 17th.

Thus, the sightings show a migratory return about mid-October. The sightings in Tongan waters are highest towards the end of October, suggesting possibly that all the South-west Pacific sub-populations arrive in Tongan waters together at the end of their return migration, and then the sub-populations that breed on other islands move on from there. There is little direct evidence to support such a hypothesis except that no birds are recorded elsewhere until after the influx centred on northern Tonga, and a single sighting of what was considered a migration flight of Wedgetails south of Tonga on 31 October 1973.

On 31 October 1973 between 0700 hours at 22.4°S 176.6°W and 1400 hours at 24.1°S 177.4°W, Wedgetails were seen spread out on each side of the ship in small parties of about six birds; all were flying strongly, low, and directly on a course of about 180-190° directly towards the Kermadec Islands, and from the *western* side of Tonga. During this period the ship was steaming on a course of 209° at 15 knots, and birds

were overtaking throughout so that their speed was between 20 and 25 knots. Though it is notoriously difficult to count seabirds under these conditions, an estimated 5000 birds at least overtook the ship.

November-January Figure 2

During this period Wedgetail sightings were spread throughout the study region, the highest numbers occurring about the breeding islands. Oliver (1955) referring to Raoul, recorded that eggs are laid in December and the young mostly hatched by the end of January. The numbers seen about the Tongan Islands were much smaller than in October, probably both because the birds had spread out and because 50% of the breeding birds, plus many subadult non-breeders were ashore.

The general picture for these months is that most sampled areas show a few birds employed in the searching/feeding pattern, while larger numbers congregate where and when food is found.

The high numbers recorded north-west of Kadavu, Fiji, are of feeding flocks and, as they are seen there only irregularly, do not appear to be related to a large breeding colony on the island.

February-March Figure 3

Numbers seen about Tonga increased from about the middle of February to the middle of March, when they approached but never exceeded the October numbers. This increase seems to be a gathering of birds before migration because, by the end of March, they appear to have left the region.

The higher numbers seen northwards, towards and about the Samoas in the middle of March, seem to indicate a drift of birds already migrating. The northward journey appears to take the form of smaller flocks with a less purposeful movement than the direct migration flight back into the region in October. This is emphasised by the sighting of many Wedgetail flocks of 30-1000 birds, all drifting north-northwest between Samoa and Tonga on 19 and 20 March 1978. Almost all these flocks were not accompanied by Sooty Terns *(Sterna fuscata),* White Terns *(Gygis alba),* or the other seabirds normally recorded with feeding Wedgetails, again suggesting that the Wedgetails were travelling. However, Wedgetails were still observed throughout the study region during these months, the most southerly sighting in 1978 being at 33.3°S on 22 March.

On 12 March 1978, at 29.6°S 176°E, at least 2500 Wedgetails were seen heading strongly on a set course to the north-east. This, the largest flock seen at this position, may have been a gathering of migrating birds downwind from the Kermadecs, but was more probably birds from Norfolk Island. Their course from this position would have taken them to Tonga.

April-May Figure 4

Sightings were much fewer by the beginning of April, although odd birds were recorded as far south as 34°S. The numbers continued to drop until the end of May when very few Wedgetails were seen. The figure also shows that the birds remaining had largely withdrawn to the north-east corner of the study region, and it may well be that such late migrants were the young of the year.

June-September Figure 5

The only sightings made during this period were in August when, on 10 August 1974, two small groups of six and two were seen south of Kadavu. Dhondt (1976) also recorded Wedgetails in August, in the Samoan group between Upolu and Tutuila in 1974.

WEDGE-TAILED SHEARWATERS IN NEW ZEALAND WATERS

Figure 3 shows the closest approach to the North Island of New Zealand, when birds were seen regularly about 100 miles north-east of Cape Brett. Even after the main body of Wedgetails had left by the end of March, Figure 4 shows sightings well within 150 miles of Cape Brett. It would almost seem that there is some invisible barrier that keeps the birds clear of New Zealand. Whether they are responding to a current or to a difference in sea temperature has been questioned. Murphy (1951) suggested a sea-surface isotherm of 20 °C as a limiting factor in the distribution pattern. However, charts prepared in Australia (CSIRO undated) showing the actual sea surface temperature of the seas about North Cape, indicate that in February, March and April 1967 and March 1969, the 20 °C isotherm was well to the south of North Cape. From this, it would seem that the birds may not range over waters with temperatures as low as 20 °C, or that there could be some limiting factor other than sea temperature. M. J. Imber (pers. comm.) suggests that the limiting factor is the existence close to New Zealand of high populations of seabirds that compete with Wedgetails for food. The Wedgetails have learned that coming too close to New Zealand results in greater difficulties in obtaining food because of this competition.

There are many years' records of seabirds encountered in waters just north of New Zealand but so far, no Wedgetails have been seen. Although it was thought that Wedgetails could have been missed among the very large numbers of dark shearwaters present, during this study special care was taken and yet no Wedgetails were seen. It is even harder to understand why, after the infrequent but regular strong easterly gales that affect northern New Zealand, no Wedgetails have been found on the regularly patrolled northern beaches. There are apparently only three records of Wedge-tailed Shearwaters near the New Zealand mainland. Only one of these was of the dark phase, recovered near Waikato Heads in November 1966 (Crockett 1966). Of the other two, both light phased birds seen in or near Cook Strait, one had been colour-banded as an adult at Johnston Atoll (King 1974).

MIGRATION

Figures 1-5 show that the birds arrive in the study region towards the end of October. Lack of sightings in the south or west suggests an inward migration from the north or east. Figure 1 shows the birds in large numbers about Tonga with much smaller numbers to the north towards Samoa and in Samoan waters. It is probable, therefore, that they arrive from an easterly direction. Our observations thus may show that the birds which breed on the other islands in the South-west Pacific first arrive back in Tongan waters with the main group of returning migrants and then move to their breeding islands. Had the migration path been directly to Tonga from the east, the Kermadec birds would presumably go directly to their islands without making the long detour to Tonga, but there is no evidence that they do. While not conclusive such reasoning may suggest a migration path from the north-east into Tonga.

Figures 3 and 4 show that over the years of observation, most Wedgetails had collected in Tongan waters by the middle of March and left on migration by the beginning of April.

DISCUSSION

It appears that the bulk of the population which breeds in the study region arrives back in force at the end of October, and that the non-breeding and main breeding flocks leave towards the end of March. This may mean that the late breeders and the young of the year follow later, and are the birds seen in April and May.

King (1974) showed that there is a large decrease in the numbers of dark-phase Wedgetails in the eastern Pacific at the end of September, which seems directly related to the Tongan increase in October. From an assumed central position in King's area of greatest abundance in September to northern Tongan waters is a great-circle distance of 4400 nautical miles. Lockley (1969) described sustained flights of the Manx Shearwater *(P. puffinus)* over long distances at about 240 miles a day; so it is reasonable to expect the larger Wedgetail to be capable of at least the same. At 240 miles a day, a migration flight from the eastern Pacific to Tonga would require about 18 days. We have seen Wedgetails on what was thought to be a migration flight, proceeding at 20 to 25 knots. To cover 240 miles, they would have had to fly for 9-12 hours each day, which appears to be well within their capabilities.

To a bird that spends much of its life within a few feet of the sea surface, favourable wind conditions must be very important. Figure 6 shows the average wind force and direction at various points along the assumed migration path (US Pilot Charts 1955), showing that the wind is abaft the birds' beam for 76% of their passage and at most only two points before their beam for a further 16%. Throughout, the following wind averages force 4 (11-16 knots) and

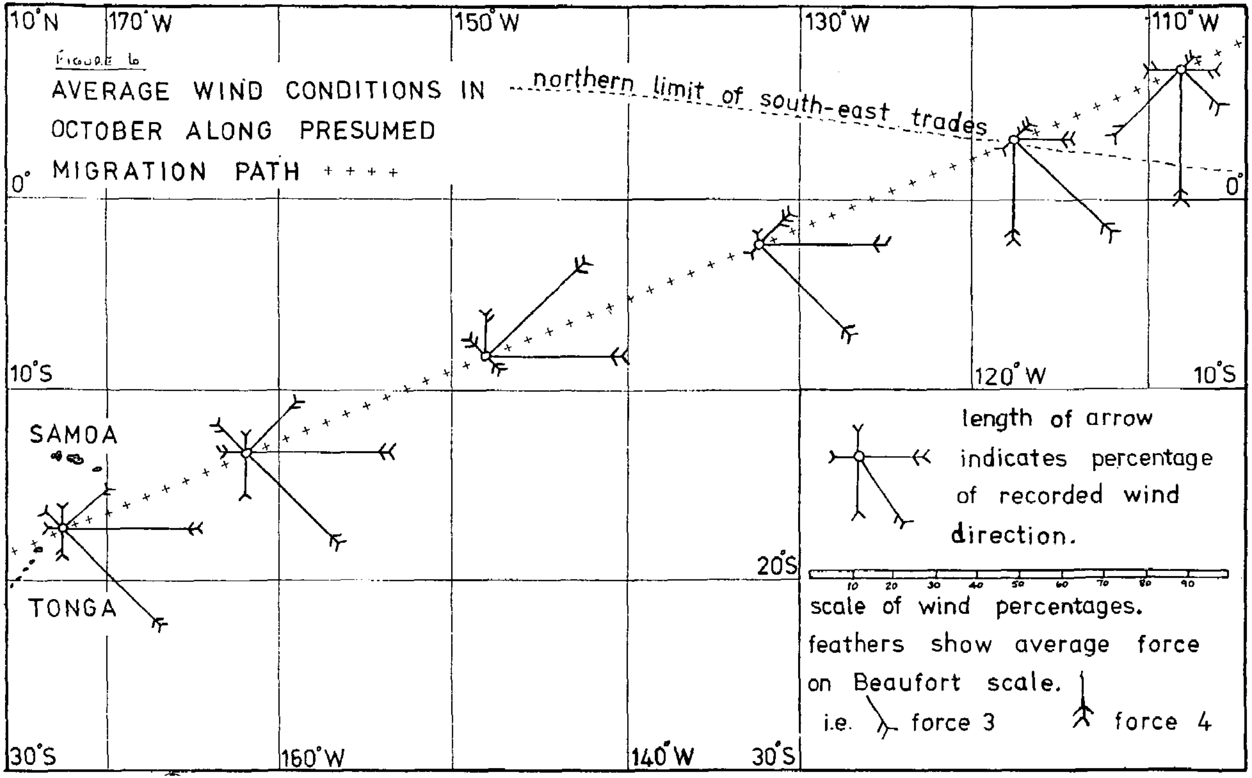

Figure 6
AVERAGE WIND CONDITIONS IN OCTOBER ALONG PRESUMED MIGRATION PATH + + + +
northern limit of south-east trades
10°N
170°W
150°W
130°W
110°W
0°
10°S
120°W
20°S
30°S
160°W
140°W
SAMOA
TONGA
length of arrow indicates percentage of recorded wind direction.
10 20 30 40 50 60 70 80 90
scale of wind percentages.
feathers show average force on Beaufort scale.
i.e. force 3 force 4

FIGURE 6

the average contrary wind is force 3 (7-10 knots). The South-east Trades, therefore, favour the migration flight along almost its whole length and for most of the time.

This whole speculation assumes that the birds of the eastern Pacific and Tonga are, in fact, the same individuals. King (pers. comm.) has pointed out that there are many breeding stations elsewhere in the Pacific and that the seasonal variations in numbers observed in the eastern Pacific may be due to unaccounted-for populations.

Shortly after the Wedgetails return to Tonga the average force of the local winds is quite low, and during the summer there are long periods of light airs and calms. Brown (1940) stated that "the Trades blow strongest when the sun reaches the maximum declination in the hemisphere opposite to the Trade," and so in December, with the sun at its maximum southerly declination, the Trades are strongest in the Northern Hemisphere and are weakened in the Southern Hemisphere. Buller's Shearwater *(P. bulleri)* seem to find it easier to feed and raft when sea conditions are reasonable (Jenkins 1974) and Wedgetails could well favour the same conditions. If they use the last of the steady Trades to facilitate the western migration, arriving back when the winds in the breeding area are abating they would then achieve optimum weather conditions for the breeding birds to feed and the non-breeders to raft and loaf. During the breeding season the study area is subject to occasional tropical revolving storms and while little is known, the effect of these storms on the breeding population could well be severe.

The migration out of the study area is more difficult to define. The bulk of the population leaves towards the end of March but not, the observations suggest, in the same compact manner as that in which it arrives. Thus there are still birds throughout the area in April and May, though they appear to be withdrawing to the north-east. There are higher numbers of Wedgetails about Samoa in March than at other times of the year, and in relation to the rest of the region the sightings remain higher there until the final, almost complete, withdrawal at the end of May. This could suggest that the outward migration from the breeding islands is not carried out on a directly opposite course to the inward migration, but is more northerly. Some support for this hypothesis came during a voyage from Samoa to Tonga in March 1978 when between these two island groups large numbers of apparently migrating Wedgetails were seen flying on a course of about north north-east. This course would put the then freshening south-east Trades two points abaft the birds' beam, furthering the progress of the flight. At this time the northern limit of the South-east Trades is less than 500 miles north of Samoa, and it is possible that the birds keep the prevailing wind abaft their beam until they are clear of the South-east Tradewind Zone. If this is so, then on clearing the Zone, they would have to make about 4000 miles back to the

eastern Pacific in latitudes about and slightly to the north of the Equator. Winds there should be light, and even if easterlies were encountered they would be interrupted by frequent calms. King (1974) showed that the daily density of Wedgetails in the eastern Pacific greatly increases by June, and it is suggested here that this increase could be caused by the return of the birds from the South-west Pacific.

Murphy (1951) allotted the trinomial *Puffinus pacificus pacificus* to birds from the Kermadecs and said that " Norfolk Island specimens are closer to the subspecies *pacificus* than to the only other subspecies here recognised. Kadavu specimens are similar, though intermediate in a slightly greater degree." There is no evidence to show where the Tongan birds fit into the scheme of things, but since the Norfolk, Kermadec, and Fijian birds all appear to have the same migration pattern, arriving and departing from the area at the same time, they may all belong to the same subspecies. The differences noted by Murphy (1951) between the Norfolk birds and those of Lord Howe, which he says " are really quite distinct in the means and amplitudes of their dimensions, particularly of wing length " could well be reflected in their migration regimes. The literature apparently does not show the dates the Lord Howe birds return to their breeding localities, but they could reasonably be expected at the same time as the New South Wales population (Murphy 1951), to which they are closest taxonomically and physically. Rogers (1975) has shown that the New South Wales Wedgetails arrive back in mid-August, that is, about six weeks before those of the South-west Pacific.

The New South Wales birds do not migrate through our study region for they would be a source of sightings during early August, a time when the region has no Wedgetails. The only recorded sightings during this month were in 1974 (Fig. 5), which may have been of New South Wales birds on migration and displaced by bad weather conditions. Since the New South Wales birds apparently do not migrate in an easterly or north-easterly direction, they must move more directly north. The recovery of three NSW-banded birds in the Philippines, discussed by Rogers (1975), seems to support this.

It seems, therefore, that the Wedgetails of Norfolk Island, although breeding only 500 miles from those of Lord Howe, have a completely different pattern of migration and a later breeding season.

FEEDING

Feeding associations

Table I records the various species seen feeding with Wedgetails. White and Sooty Terns were seen feeding with Wedgetails equally often and more often than any other birds in the study region. King (1974) found that in the eastern Pacific feeding Wedgetails were accompanied by Sooty Terns in 77.4% of observations, and White Terns in 18.6%. This difference between eastern and western Pacific

records is probably explained by the fact that in the area covered by this study, especially about and north of Tonga, islands providing bases for White Terns are scattered throughout. King's area, however, is more oceanic and the distribution of White Terns more restricted. This difference in the study areas probably also accounts for the more frequent occurrence of Red-footed Boobies *(Sula sula)* feeding with Wedgetails, 16.6% in King, and 50% here.

By far the most common feeding pattern seen was mixed flocks over boiling shoals of fish. Dr. D. Eggleston (pers. comm.) says " We have observed that schools of jack mackerel, kahawai, and skipjack often form boiling schools when they are feeding on euphausid shrimps. Euphausids frequently form cloud-like swarms in the water, and when the fish are feeding on them they really seem to boil at the surface. Just why they do this we do not know, but it must be of some advantage in their feeding behaviour. Smaller fish under attack usually tend to form tight schools, but these do not necessarily boil at the surface." Wedgetails have often been seen to catch flying fish, flying low after the fish while they are in the air, and taking them just as they return to the water. Although flying fish do not change course noticeably while in the air, the bird must use carefully controlled flying to get behind them. The only other bird observed feeding repeatedly by this method has been the Red-footed Booby, and it is worthy of note that both the Wedgetail and the Red-footed Booby have the longest tails of birds of their respective types. When taking flying fish both species spread their tail feathers below and at right angles to their bodies, evidently using their tails as flaps to lower their stall speed and increase their manoeuvrability at low speed.

Other species seen in the feeding flocks together with Wedgetails but on fewer than 3% of observations include *Pterodroma arminjoniana, Sterna bergii, Puffinus griseus, Puffinus tenuirostris, Catharacta skua,* and in the south of the study region *Diomedea exulans.*

TABLE 1 — Percentage of sightings (n = 168) of various species in feeding flocks with Wedge-tailed Shearwaters.

Species	%	Species	%
Gygis alba	62	Anous stolidus	14
Sterna fuscata	62	Puffinus lherminieri	12
Sula sula	50	Pterodroma externa cervicalis	12
Sula leucogaster	26	Fregata sp.	12
Anous minutus	17	Pterodroma rostrata/alba	7
Pterodroma hypoleuca nigripennis	17	Phaethon lepturus	5

Food piracy

While Frigatebirds (*Fregata* sp.) were seen on 7% of the feeding observations, they were never seen to attack Wedgetails, seeming to confine their attacks to White and Sooty Terns and to Red-footed Boobies.

On three separate occasions a large skua, all probably *maccormicki* from their light colouring, was seen feeding in flocks containing Wedgetails. Each time the skua seemed more concerned with direct feeding on the large shoals of fish, rather than on victimising the other birds present.

At 22.4°S 177.7°E on 19 December 1973, three Pomarine Skuas *(Stercorarius pomarinus)* were seen rafted with a party of about 30 Wedgetails. The skuas were sitting on the water close to but not among the Wedgetails. At the close approach of the ship, all the birds went up and the skuas left in a completely different direction from the shearwaters, not seeming to be very interested in them. Similar behaviour has since been seen on six occasions.

A few sightings record Arctic Skua *(Stercorarius parasiticus)* in feeding flocks with Wedgetails, but on each occasion there were Sooty and White Terns in the flock. Observations on the New Zealand coast suggest that these skuas would be far more likely to harry the smaller terns than Wedgetails.

The records of skuas are so few when compared with the many thousands of observations of Wedgetails that they cannot indicate significant piracy. This, together with the apparent preference of frigatebirds for harrying other species would seem to show that the Wedgetail is almost totally free of avian piracy when at sea in the study region.

King (pers. comm.) has pointed out that, while there are no records, Wedgetails may well be attacked by sharks when they are rafted.

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SHORT NOTE

WHITE-FACED HERON NESTING ON SOUTH EAST ISLAND, CHATHAM ISLANDS

During 24-30 November 1977, a Wildlife Service party visited South East Island in the Chathams. On 25 November, while walking along the shoreline on the north-east side of the island, we saw a White-faced Heron *(Ardea novaehollandiae)* fly out from beneath a very large boulder. We found a nest placed among three boulders underneath the large one, in the splash zone about 1.5 m above the high-tide line.

The nest was made of bracken with a grass lining. The four sky-blue eggs measured 47.9 x 36.5, 47.7 x 35.3, 48.7 x 35.7, and 47.1 x 36.7 mm. To prevent disturbance, the nest was not examined again. During a subsequent visit, the site was inspected on 13 February 1978. From the droppings around the deserted nest, it was presumed that the pair had successfully raised young.

Although there are some suitable trees for these birds to nest in, the site may have been chosen because of the high winds or to protect the nest against predation by Southern Skuas *(Stercorarius skua lonnbergi)*.

ALAN WRIGHT, *Wildlife Service, Department of Internal Affairs, P.O. Box 30, Portobello.*

THE EFFECT OF STORMS ON THE BREEDING SUCCESS OF SOUTH POLAR SKUAS AT CAPE BIRD, ANTARCTICA

By PAUL H. ENSOR

During the 1977-78 summer, while I was at Cape Bird, Ross Island, Antarctica, with the University of Canterbury Antarctic Research Unit, to study marine plankton, there was a succession of storms during the start of the breeding season of South Polar Skuas *(Catharacta maccormicki)*. As many pairs were losing their eggs, I became interested in observing what effect the storms might have on their breeding success. There were snowfalls and high winds during early December which left snow drifts up to one metre deep for many days. Smaller drifts were still present in mid-January, a time when the area is usually free of snow.

I inspected 79 nesting territories, where at least one bird of each pair wore the bands of previous investigators, every few days over most of the breeding season. The changes in numbers of eggs and chicks are shown in Figure 1. The mean laying date observed was 20 December with a range 2 December - 8 January. Almost equal numbers of single and two-egg clutches were found (Table 1).

TABLE 1 — Breeding Success of South Polar Skuas at Cape Bird, Antarctica, 1977-78.

Number of pairs	79
Number of eggs laid	119
Number of one-egg clutches	39
Number of chicks hatched from one-egg clutches	17
Number of two-egg clutches	40
Number of chicks hatched from two-egg clutches	11
Total number of chicks hatched	28
Number of chicks alive on 24 January	24
Breeding success to 24 January (chicks per breeding per)	0.30

75.2% of eggs were lost (Table 1). Several nests with eggs were flooded by water from melted snow but the accumulation of broken eggshells on some territories suggested that most eggs had been predated by other skuas.

By 24 January (the last date of observation), four chicks had died (14.3% of those hatched). We left Cape Bird on 26 January,

before the chicks had fledged, but because hatching had been late it is unlikely that all the chicks alive at that time did fledge. Therefore, the final breeding success was probably less than the 0.3 chicks per breeding pair alive on 24 January (Table 1).

Discussion

The breeding biology of the South Polar Skua in the McMurdo Sound region has been well documented (Young 1963, Spellerberg

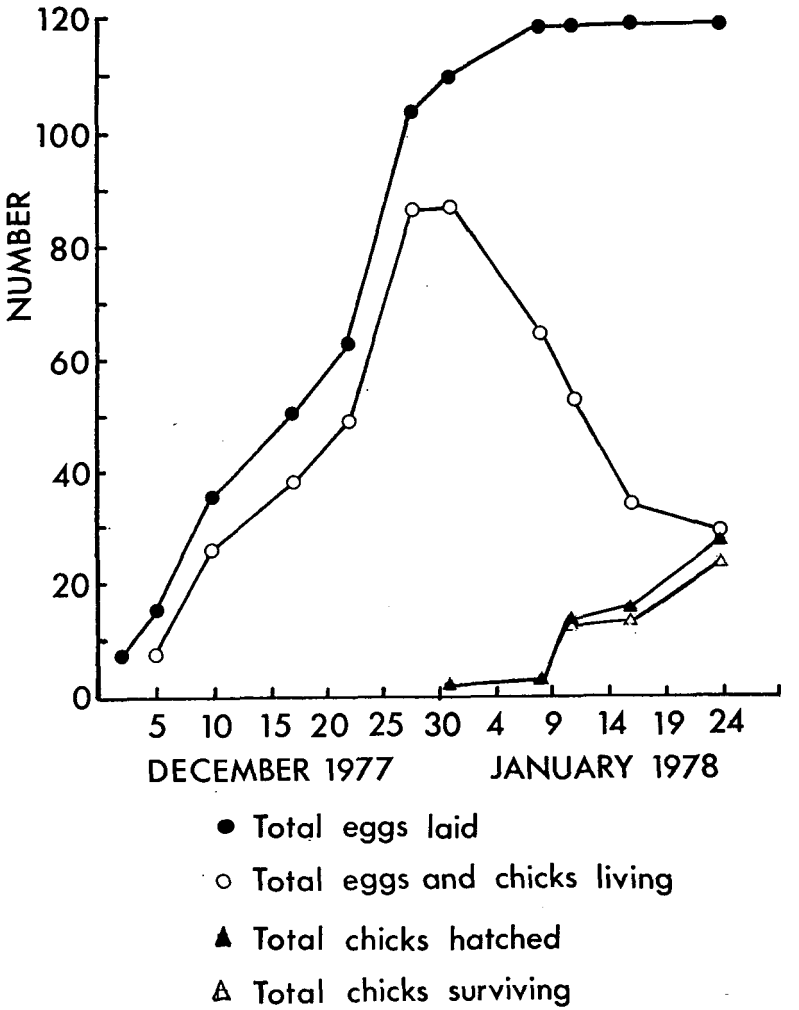

FIGURE 1 — The breeding of South Polar Skuas at Cape Bird 1977/78.

1971). Young (1977) concluded from his observations and from published records that the first laying dates of South Polar Skuas were remarkably consistent from year to year. The mean laying date is usually in late November or early December.

Although the skua nesting areas at Cape Bird were frequently inspected during November 1977, careful records of the nests were not begun until 2 December. Therefore, it is possible that eggs laid early in the season had been covered with snow and not found. Renesting after loss of eggs has been recorded in South Polar Skuas (Eklund 1961, Spellerberg 1971) and it is possible that many of the late laying dates of the present study were those of second or subsequent clutches. The unexpectedly high proportion of single-egg clutches I recorded could indicate that they were relayings, since Spellerberg (1971) found that most pairs laid only one egg after losing a clutch.

The 75.2% egg loss which I recorded is much higher even than the 41.7% lost at Cape Royds (Spellerberg 1971) in the 1965-66 season of unfavourable weather. Spellerberg reported egg losses at Cape Royds of 26% and 18.9% during the 1963-64 and 1964-65 seasons when the weather was favourable.

Fine weather and low wind speeds late in the season probably helped chicks survive. Spellerberg (1971) found that in fine weather fewer chicks were taken by other skuas than in bad weather.

Wood (1971) at Cape Crozier during the eight seasons from 1961-62 to 1968-69 recorded breeding successes of 0.41, 0.60, 0.41, 0.31, 0.17, 0.12, 0.13 and 0.48 chicks per pair. The very low breeding success in some of these seasons was caused by loss of chicks in blizzards in late January. At Cape Royds in 1965-66, periods of snowfalls and high winds caused a breeding success of 0.29 chicks per pair (Spellerberg 1971).

In good weather, breeding success has been recorded at Cape Royds as 0.46 (Young 1963), 0.69 and 0.79 (Spellerberg 1971) and at Cape Hallet as 0.83 (to 22 January) (Trillmich 1978).

The low breeding success that I observed was probably a result of the severe weather during the early part of the breeding season causing a high loss of first and possibly second clutch eggs and reflected in the late hatching of chicks. Wood (1971) showed that storms late in the breeding season are particularly devastating but the information provided by Spellerberg and this study show that storms at any time in the season can greatly reduce the breeding success of South Polar Skuas.

Acknowledgements

I was fortunate in being a member of the University of Canterbury Antarctic Research Unit with Professor G. A. Knox as its director. Thanks are due to Dr J. Warham, to G. J. Wilson and P. M. Sagar

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SHORT NOTE

BLACK-WINGED PETRELS IN THE FAR NORTH

Several sightings have been made recently of Black-winged Petrels *(Pterodroma nigripennis)* flying around headlands in the Far North in broad daylight.

On 2 February 1978, Mrs Gillian Eller counted 13 of these birds flying around Hoopers Point, Spirits Bay, very early in the afternoon and she also saw 8 of them actually flying further inland over the camping ground. The birds were usually in pairs in tandem, wheeling and diving very low over the ground and then soaring high into the air and calling frequently.

Mr Vic Hensley had also noted similar behaviour of Black-winged Petrels around North Cape the previous summer.

On 27 January 1979, Miss Helen Boutell, Vic Hensley and I saw some of these petrels in the air continuously during an afternoon walk out to Cape Maria van Dieman. They were first sighted overhead while still well over a kilometre from the coast behind Twilight Beach. A most spectacular display occurred out at the Cape with several pairs of birds chasing each other up and down the steep slope of a sand dune to within a few feet of us.

Is this behaviour a simulation of courtship display by young adults ? Is the same behaviour to be observed at the known breeding grounds at this time of the year or are these birds possibly seeking new breeding areas ?

R. N. THOMAS, *25 Ravenwood Drive, Auckland 10.*

THE GROWTH OF A CATTLE EGRET COLONY

By ELLA PRATT

Since the first pair of Cattle Egrets *(Bubulcus ibis)* was found breeding in New South Wales in 1954, the number of known colonies in New South Wales has risen to five and the total of breeding pairs to 2300 (Morris 1979, *Australian Birds* (13) 4: 72-74). In addition, there are large colonies in south-eastern Queensland, especially in the Brisbane area. Now that the Cattle Egret has become a prominent bird in New Zealand (Heather 1978, *Notornis* 25: 218-234), I shall not be surprised if it starts to breed in New Zealand in much the same way as it has in my district. The following notes, therefore, record the events as I have seen them at one Australian colony, perhaps foreshadowing events in New Zealand and at the least giving information on times of plumage change and breeding that may correlate in New Zealand.

The events concern the thriving colony at Murwillumbah in the Tweed River district of north-eastern New South Wales. My first record was of 9 birds at Anthony's Lagoon near Murwillumbah on 9 September 1971. Some were following cattle and the others were standing at the water's edge.

During the following two years (1972-73), small numbers of up to 30 were noted in the same area. On 3 September 1974, I noted that they were changing into breeding plumage but I could find nobody who had seen any breeding, even in the most secluded places. In 1975, there were many more, and on 23 December they were either in full breeding plumage or changing visibly into breeding plumage.

On 14 March 1976, however, I received a report of large numbers of white birds nesting in a patch of *Melaleuca* growing in a small swampy area. When I visited the site on 15 March, I was not surprised to find that they were Cattle Egret, but I was surprised that they were nesting so close to human habitation, including a ready-mixed-cement works and a cement-brick plant. I estimated that at this stage some 250-300 birds were present, 80% of the young were flying, and that there were some 60 nests. The breeding plumage of most of the adults looked very faded. A local resident told me how surprised he was about the colony being so close to human habitation and that he had seen about 50 birds there in the 1974-75 season.

In the 1976-77 season, the first birds I saw changing into breeding plumage were on 24 September, and nesting started about 6 November. I estimated the number of nests as about 700-800. The young started

to leave their nests by 29 January, and by 18 March only about 40 nests were still in use and contained large young.

In the 1977-78 season, the first birds in breeding plumage were noted on 8 October. No birds were at the colony on 11 October, but by 19 October, hundreds of birds were there, and on 22 October about 100 were brooding eggs. I estimated the number of nests to be the same as the previous season, 700-800. The chicks started to leave their nests by 19 January 1978. On 10 February, the first young were away from the colony, and by 5 March the remaining young were out of the nests.

In the 1978-79 season, the first birds changing into breeding plumage were noted on 27 September 1978. The colony was kept under close observation but the birds did not go near it. By mid-October, they all had plumes, but on 28 October no birds were at the colony and we began to think they had deserted, as has happened at other colonies, particularly because of the number of new industrial buildings nearby and a new power line across one of the main approach lanes to the colony. However, on 1 November my brother reported that at least 500 birds were there and that they were building feverishly. By 8 November, some were brooding eggs. On 20 January 1979, about 300 young were out of their nests. During a brief visit to the colony on 2 February, I counted roughly 800 young egrets on the ground. I estimated that there had been 800-900 nests in the 1978-79 season.

By 20 February, it was evident that the nesting was just about over. The number of occupied nests was down to about 300, all containing well-advanced young. Most of the adults still in attendance had very faded plumage and were moulting their back plumes. By 15 March, only the Large and Plumed Egrets had occupied nests. About 35 young Cattle Egrets were still in the colony area in a group on the ground and would have left in a few days.

At the Murwillumbah colony, the nesting trees, the coastal broad-leafed paperbark *(Melaleuca quinquinerva),* are also used by Large Egrets (White Herons *Egretta alba*) and Plumed Egrets (Intermediate Egrets *E. intermedia*). Small numbers of Little Pied Shags *(Phalacrocorax melanoleucos)* and Little Black Shags *(P. sulcirostris)* also nest at the colony, starting at the same time as the Cattle Egrets. In 1975-76, one Large Egret was seen in breeding plumage but I could find none nesting, and there were no Plumed Egrets. On 4 December 1976, 60 Plumed Egrets were incubating and a few others were at the courting stage. Three pairs of Large Egrets were found on nests late in the season. In 1977-78, only 30 pairs of Plumed Egrets nested, most starting in December, and 5 pairs of Large Egrets nested late. In 1978-79, there were 12 pairs of Plumed and 6 pairs of Large Egrets. I have noted that most of the Plumed Egrets arrive early in December and start nesting immediately; in contrast, most Large Egrets nest late, although a few are usually pottering about

the colony in full breeding plumage early in the season. The Large Egrets prefer to nest at the top of the trees, whereas the Plumed Egrets will take any position.

I have no detailed notes on Cattle Egret plumage, but the following may be of interest. Non-breeding adults are all-white, with bill, face and eye lemon yellow and legs grey or greyish green. Breeding adults have the bill, eye, head, neck, breast, back and plumes bright orange and the legs grey. The thighs and eyes turn red for a brief period during courting but quickly fade. I have never seen birds with completely red legs; I have seen only the bare part of the thigh down to the knee joint red, the tarsus seeming to remain grey. However, as the red fades so quickly, I may have missed a short period when the whole leg is red.

A few Cattle Egrets have been seen breeding that are not in full breeding plumage. They have a faint orange or buff wash on the back and breast and no plumes, but they have bright orange bills and eyes. They successfully rear young. The plumage of the chicks is all-white with grey bill and face, pale yellow eyes, and grey or greyish green legs. Before it fledges, the chick has a yellow tip to the bill, and after fledging, the whole bill quickly changes to dull lemon yellow, as does the face.

From my observations with binoculars, most nests have two or three chicks, but I have no information on fledging success.

In this district, Cattle Egrets remain in large numbers all year. I have noted a decline in the numbers, however, by late April/early May and a definite increase by early September. They usually feed among cattle, preferring no particular breed. Birds often run a considerable distance after moving cattle. In places where insects are plentiful, one cow can have up to 12 egrets in attendance. At such times they often start fighting — they flap their wings, jump into the air, and stab at each other with their bills. Sometimes one chases another for a short distance, and then they settle to feed again. They seem to eat all kinds of insects and also frogs and lizards — in fact, anything that walks, flies or crawls. Although the authorities in literature disagree on the subject of Cattle Egrets taking ticks off cattle, the egrets certainly take them in this district and they are much favoured therefore by most cattle owners. They stand near a grazing animal's head, make a quick dart, and pick a tick from the animal's ear. They also spring up and pick ticks from the front-leg areas and the flanks. Once the cattle accept the egrets, the birds can walk along their backs and pick ticks from along their necks and the base of the tail. The ticks taken vary from the small flat brown stage, about half-grown, to the fully engorged stage.

One of my brothers, while mowing one day, found that the Cattle Egrets moved away from the cattle on to the fresh mowing and began stalking prey, standing with their necks stiffly extended, their bodies swaying from side to side, then making a quick stab,

a few gulps, and starting again. On another occasion, an egret was following a grazing cow as usual when a large (about 2½ inches) grasshopper was flushed. As it rose into the air, the egret gave chase, but the grasshopper's zig-zagging soon out-manoeuvred the egret, and it dived to the ground, unluckily near a Starling, which was much too agile to be out-manoeuvred.

At the start of the 1979-80 season, I saw the first Cattle Egrets starting to change into breeding plumage on 16 September, and by mid-October about half the birds seen were well coloured, the rest at all stages, including a few still plain white. On 24 October, earlier than in previous years, about 200 nests were in the early stages of construction. These early nests had eggs by early November, and by the time of writing (mid-November) some 800 nests had been bulit.

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SHORT NOTE

TUIS ALL YEAR ROUND

In my area on the northern side of Whangarei Harbour, the population of Tuis *(Prosthemadera novaeseelandiae)* seems to remain most of the year, being less plentiful only around February. This persistence seems to be dictated by the availability of suitable food plants in most seasons. The berries of the haekaro *(Pittosporum umbellatum)* is a favourite food in June, and I have seen 9 Tuis feeding in one tree. The Taiwan cherry *(Prunus campanulata)* flowers in August and is a favourite for nectar. The winter red gum *(Eucalyptus leucoxylan rosea)* is another favourite, and I have seen 15 Tuis in one tree. The flame tree *(Erythrina Xsykesi)* has a varied flowering period from May to September-October and is another attraction. Kowhai flowering sees the birds more dispersed because of the kowhai groves in the bush. The puriri flowers over a longer time and they are many here. Mid-December is the pohutukawa season, which brings the Tuis to the seaside. Flax in season, peach blossom and loquat blossom all add to the menu.

I have no doubt that the flame tree, the Taiwan cherry, the haekaro and the winter gum help increase the number of Tuis able to survive the winter in Northland.

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THE VOICE OF THE SOFT-PLUMAGED PETREL (Pterodroma mollis)

By JOHN WARHAM*

During the expedition to Antipodes Island between 28 January and 12 March 1969, recordings were made of the aerial songs of the Soft-plumaged Petrel *(Pterodroma mollis)* discovered there (Warham 1969; Warham & Bell 1979). The recordings were made with a Uher 4000 Report L machine fitted with a Grampian DP4 microphone without a parabolic reflector. Analyses were made on a 6061B Kay Sona-graph.

These petrels were not heard calling from the ground. Their flight calls, however, were quite distinctive, bearing little similarity to those of the other petrels breeding on the island, including the White-headed Petrel *(Pterodroma lessonii)*, and it was the strangeness of the calls that first drew our attention to the presence of the Soft-plumaged Petrels.

Their voices consisted of low musical moans lasting for 1-2 sec and often repeated several times. A simple example is shown in Figure 1A. This call consisted of a note at around 1 kHz whose clear harmonics no doubt contributed to its musical quality. In this example, as in many others, a fall in pitch occurred during the moan — after about 1.3 sec in this instance. However, with some calls the pitch was stepped upwards during a moan and very often the harmonics rose and fell irregularly, as in the call of Figure 2C, giving the song a wavering quality.

Most moans concluded with an abrupt upturn in frequency, creating a whip-like ending heard as a sudden *whik*. In the calls of some birds, like that of Figure 1B, the moan began with a very sharply descending staccato note, and in the different call of Figure 1C, where a wide-band filter has been used to increase the time resolution, it can be seen that both the fundamental and the harmonics had a similar reversed-arc pattern in the first phrase of the call. This may have been because at first the bill was opened, then partly closed and finally opened again.

Rather more complex are the calls analysed in Figure 2. In A the moan started without any downward glissade through the frequencies, but had a marked waver and ended with a strong upturn in pitch. A second shorter moan followed after about 0.4 sec, but the two were linked by a shrill relatively high-pitched squeak (X) at

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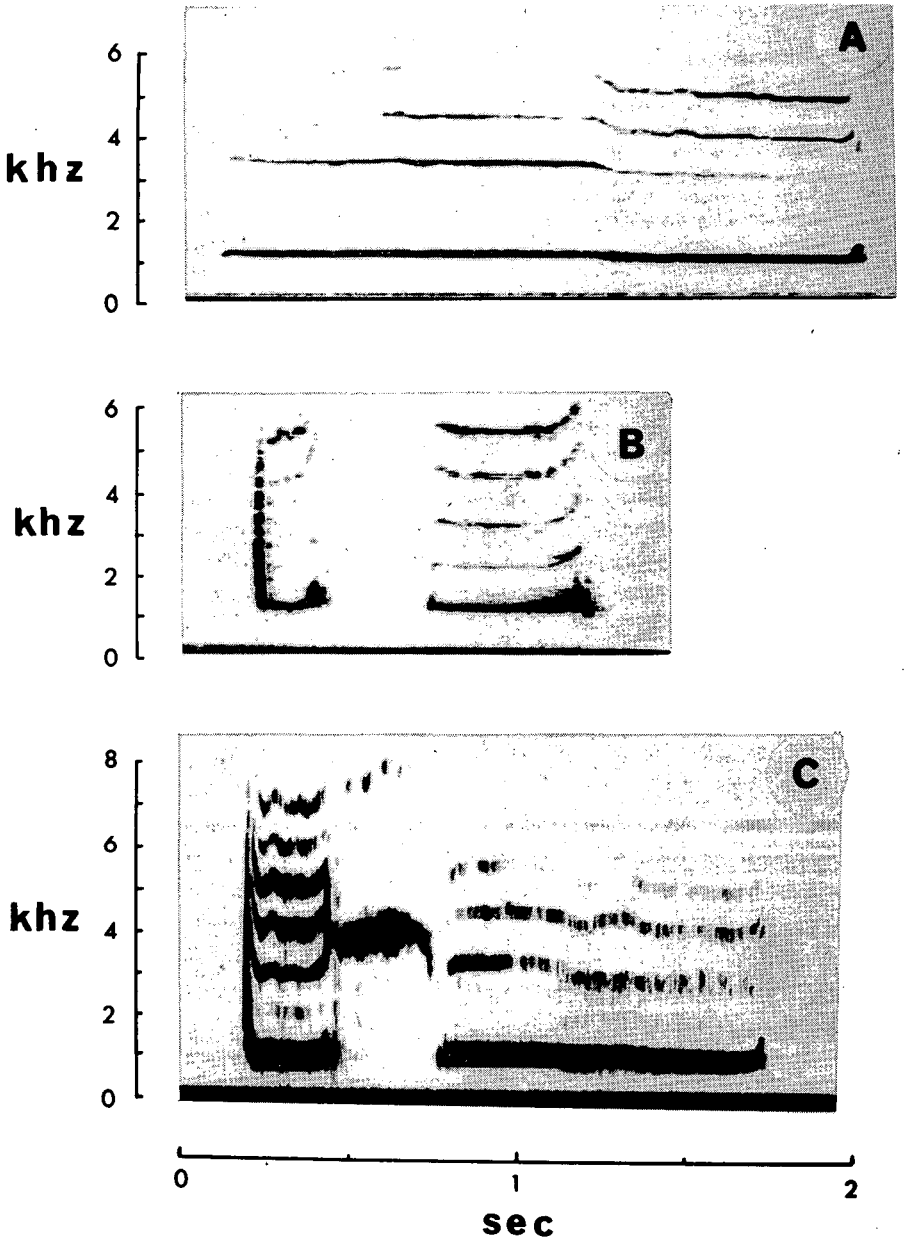

FIGURE 1 — Spectrograms of calls of Soft-plumaged Petrels in flight — I. (All with narrow band filter except C)

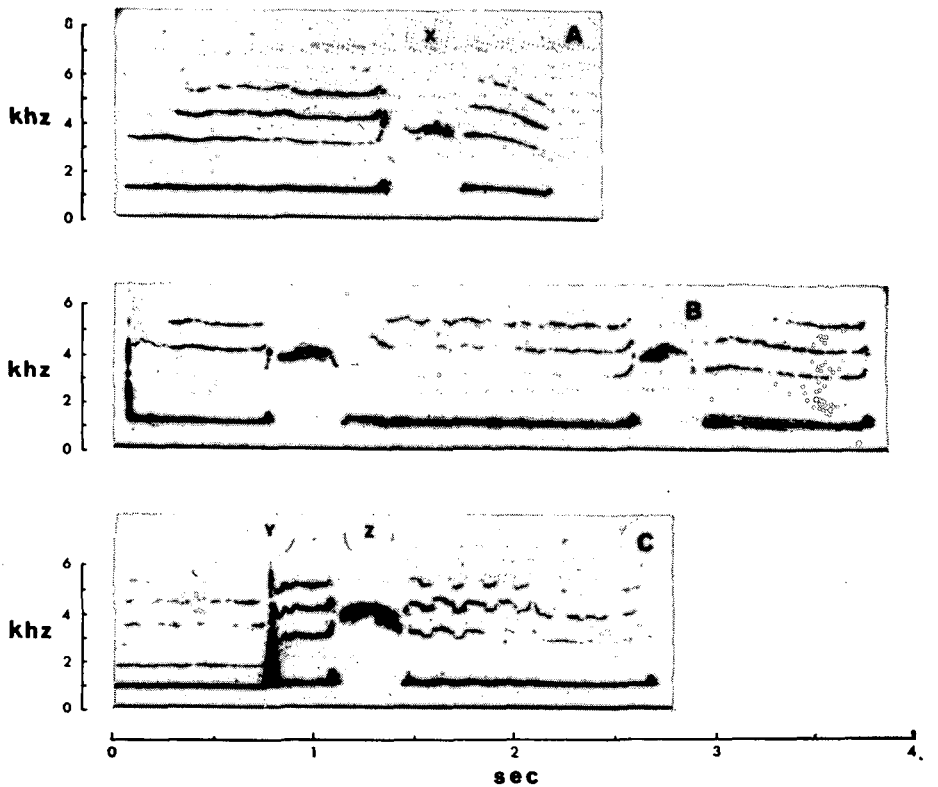

FIGURE 2 — Spectrograms of calls of Soft-plumaged Petrels in flight — II. (All with narrow band filter)

around 3.8 kHz — see also Figure 1C. Such interspersed notes were often recorded, and although they resembled some of the chatterings of the White-headed Petrels which were also flying when the recordings were made, these interspersed notes seemed to be made by *mollis* and probably by the same bird as made the moan. Yet it cannot be ruled out that, in the darkness, these shrill cries were responses of other *mollis*, perhaps of opposite sex to that of the moaning bird. This seems unlikely as the females and males we collected were all located by their calls without two main types being identified. Unfortunately, I cannot match the calls recorded with the sexed specimens collected.

In Figure 2A the final moan is on a declining frequency whereas that of the bird analysed in Figure 2B ended with an abrupt upturn in frequency. Such differences seemed to form part of a pattern of individual variation. Likewise, the frequencies of the fundamental and harmonics varied slightly from bird to bird, differences which were

quite clear to us when two or more birds were singing simultaneously. Figure 2C provides an example of this. Here, the first bird's moan ended at Y with an abrupt upturn in frequency which overlapped the downwards glissade of the second bird. This bird's call was of slightly higher pitch than that of the first, had an intercalated shrill squeak (Z), and differed also in the greater waver of both fundamental and harmonics.

In all the calls analysed, the fundamental contained most of the energy, as shown by the greater intensity of the lowest trace on the spectrogram. Also, the second harmonic was weak, often not registering at all (e.g. Fig. 2A & B). The three to five harmonics were variously stressed and no doubt such variation forms another aspect of the individual differences noted between calls and which presumably have adaptive value in individual and/or sexual recognition.

These low flutings and their intercalated squeaks were the only kinds of call we associated with *Pterodroma mollis*. They are rather different from those of the Mottled Petrel *(Pterodroma inexpectata)* figured by Warham *et al.* (1977), although the extended *gor-wik* of that species shows some similarities to the Soft-plumaged Petrel's moan. Very similar calls of this species can be heard on M. K. Swales's recording of " Night atmosphere of birds on Gough Island " (BBC disc 25009), an audiospectrograph from which is reproduced in Cramp and Simmons (1977: 131).

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SHORT NOTE

GOLDEN PLOVERS SETTLING ON ROOFS

I was interested to read the note on this topic by Jenkins & Sibson in *Notornis* 26 (2), and the quote from Dr N. W. Cusa. While in Kuching, Sarawak, from October to December 1976, my attention was drawn to Golden Plovers *(Pluvialis dominica fulva)* which regularly roosted at night on the roofs of suburban houses in groups of up to a dozen or so. It seems, therefore, that this habit may be widespread in the Asiatic race of the Lesser Golden Plover. It is interesting to note that nothing similar has been noted for either the American race of this species *(P. d. dominica)* or for the Golden Plover of the Western Palaearctic *(P. apricaria)*. As this behaviour is probably of recent origin, further observations on the subject may be of considerable interest.

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SEABIRDS FOUND DEAD IN NEW ZEALAND IN 1977

By C. R. VEITCH

During 1977, 3073 kilometres of coast were patrolled by 132 members of the Ornithological Society of New Zealand and their friends. 5542 dead seabirds and 135 non-seabirds were found. There were no major wrecks. Small, sometimes local, wrecks of Broad-billed Prions *(Pachyptila vittata)*, Sooty Shearwaters *(Puffinus griseus)*, Short-tailed Shearwaters *(P. tenuirostris)* and Fluttering Shearwaters *(P. gavia)* are noted. Unusual finds were one each of: Antarctic Petrel *(Thalassoica antarctica)*, Fulmar Prion *(Pachyptila crassirostris)*, Black-bellied Storm Petrel *(Fregetta tropica)*, Grey Ternlet *(Procelsterna cerulea)* and Pitt Island Shag *(Stictocarbo punctatus featherstoni)* (a new record for beach patrolling).

INTRODUCTION

This paper records the results of the Ornithological Society of New Zealand's Beach Patrol scheme for 1977. The coastline of New Zealand is divided into 15 sections (Imber & Boeson 1969) with an additional grouping of "OI" for Outlying Islands which this year includes patrols from the Chatham Islands. This year there were patrols on all sections of coast except Fiordland. 440 Beach Patrol Cards and 21 Specimen Records Cards were filed.

Nomenclature follows the Annotated Checklist (OSNZ 1970), except where patrollers could not identify birds to a subspecific level and where some trinominals have not been used in the tables to save space.

RESULTS AND DISCUSSION

The numbers of birds found and kilometres of beach travelled and covered per month and per coast are recorded in Table 1. Kilometres covered are the lengths of coast covered monthly; kilometres travelled are the total lengths of coast patrolled. Hence, if one kilometre of beach is patrolled three times in one month, then three kilometres have been travelled but only one kilometre covered.

The total distance travelled (3563 kilometres) is slightly above the average for the past nine years and the total number of seabirds found (5542) is slightly lower than average. The number of birds found per kilometre of coast covered (1.8) is the lowest since 1972.

This year there were no major wrecks. Several minor and localised wrecks occurred. The monthly and coastal distribution of the more common birds is given in Tables 2 and 3 and of the less common birds in Table 4.

In February, large numbers of Fairy Prions *(Pachyptila turtur)* were found on Wellington West beaches. The young of this species leave the nest at the end of January (Falla 1970), and so mortality at this time can be expected.

In May, there was the usual mortality of Sooty Shearwaters *(Puffinus griseus)*. During August, large numbers, presumably from the same wreck, were found on Mason's Bay, Stewart Island (Southland beach patrol district).

In July, Fluttering Shearwaters *(Puffinus gavia)* were found in high numbers on Auckland East beaches. The centre of this wreck moved around to Auckland West during August when dead birds of this species were found at a rate of 2.4 per kilometre. During the same period higher numbers than usual of Fluttering Shearwaters were also found on Taranaki, Bay of Plenty and Wellington South beaches. There is no apparent reason for this wreck.

Following severe westerly gales during late October and early November, high numbers of Broad-billed Prions *(Pachyptila vittata)* were found on Southland beaches. There were also several reports of live Broad-billed Prions being found in inland Southland (M. L. Barlow, pers. comm.).

Also in November, Short-tailed Shearwaters *(Puffinus tenuirostris)* were found to be at least three times more numerous than usual on Auckland West beaches due, it appears, to persistent west to north-west winds during the latter half of October and early November. This high, in addition to slightly increased numbers in January and December, made the total for the year the highest since 1968.

It is notable that with the relative absence of south-west winds during October and November there was no marked increase in numbers of Sooty Shearwaters on North Island west coast beaches as has been observed in other years (Veitch 1977).

Throughout the year the numbers of Spotted Shags *(Stictocarbo punctatus)* found on Canterbury South beaches continued to be high, the peak being 32 birds on 5 km of beach during May. Many of these birds were reported as shot.

The Antarctic Petrel *(Thalassoica antarctica)* found on Muriwai Beach (AW) in November was the sixth specimen of this species found during beach patrols. Previous records are 1973, two birds (AW & SD); 1975, three birds (WW, 2 & AE).

The Fulmar Prion *(Pachyptila crassirostris)* was found on Petone Beach, in Wellington Harbour, during September. Previous records are 1970, three birds (AW, 2 & WW); 1971, two birds (CS); 1973, two birds (CN).

This is the third time that a Black-bellied Storm Petrel *(Fregetta tropica)* has been found on the New Zealand mainland. This specimen was on Oreti Beach, Southland, in November. Previous records are of single birds in 1968 (WS) and 1975 (WW).

TABLE 1 — Numbers of dead seabirds recorded and kilometres patrolled in 1977.

COAST	CODE		MONTH												TOTALS		BIRDS/KM
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	KM	BIRDS	/COAST
AUCKLAND WEST	AW	KM	167	143	116	64	160	91	114	203	92	88	231	274	1743		
		BIRDS	262	249	130	129	645	31	116	657	32	129	424	342		3146	1.80
TARANAKI	TA	KM	21	22	7	19	12	2	20	11	4	2	2	1	123		
		BIRDS	23	26	2	24	5	1	7	12	3	0	0	0		103	0.84
WELLINGTON WEST	WW	KM	4	27	–	1	17	7	2	1	14	14	12	7	102		
		BIRDS	5	314	–	4	91	1	1	1	20	14	12	8		471	4.44
WESTLAND	WD	KM	1	–	–	–	–	–	–	–	–	–	–	1	2		
		BIRDS	0	–	–	–	–	–	–	–	–	–	–	1		1	0.50
AUCKLAND EAST	AE	KM	109	23	39	35	47	45	62	37	40	14	28	36	515		
		BIRDS	236	33	23	10	22	21	179	79	13	4	25	40		685	1.33
BAY OF PLENTY	BP	KM	7	15	15	2	3	14	16	9	2	21	2	11	117		
		BIRDS	4	2	8	0	3	3	28	33	0	11	1	7		100	0.85
EAST COAST NORTH IS	EC	KM	–	–	6	4	–	–	–	2	–	4	–	–	16		
		BIRDS	–	–	1	1	–	–	–	3	–	2	–	–		7	0.44
WAIRARAPA	WA	KM	5	–	–	–	4	35	–	–	–	–	–	6	50		
		BIRDS	1	–	–	–	2	5	–	–	–	–	–	3		11	0.22
CANTERBURY NORTH	CN	KM	–	–	2	1	10	13	–	10	–	–	–	11	47		
		BIRDS	–	–	6	1	17	19	–	48	–	–	–	7		98	2.09
CANTERBURY SOUTH	CS	KM	7	5	7	6	5	4	5	4	5	5	6	4	63		
		BIRDS	42	9	16	21	54	21	22	9	3	14	6	3		220	3.50
OTAGO	OT	KM	–	–	–	–	11	–	–	–	–	–	–	–	11		
		BIRDS	–	–	–	–	17	–	–	–	–	–	–	–		17	1.55
SOUTHLAND	SD	KM	14	–	8	14	–	15	8	2	8	–	13	7	89		
		BIRDS	7	–	15	7	–	17	0	78	1	–	165	2		292	3.28
WELLINGTON SOUTH	WS	KM	3	17	25	6	24	10	15	11	22	4	4	14	155		
		BIRDS	1	28	9	6	200	18	13	13	25	3	9	24		342	2.21
NORTH COAST SOUTH IS	NS	KM	14	–	–	–	3	–	–	–	–	–	–	–	17		
		BIRDS	12	–	–	–	9	–	–	–	–	–	–	–		21	1.24
OUTLYING ISLANDS	OI	KM	–	6	–	13	–	–	–	–	–	–	–	–	19		
		BIRDS	–	10	–	18	–	–	–	–	–	–	–	–		28	1.47
TOTAL KM TRAVELLED			371	270	252	211	385	255	297	330	227	177	354	434	3563		
TOTAL KM COVERED			352	258	225	165	296	236	242	290	187	152	298	372	3073		
TOTAL BIRDS			593	671	210	221	1065	137	366	933	97	177	635	437		5542	
BIRDS/KM COVERED/MONTH			1.68	2.60	0.93	1.34	3.60	0.58	1.51	3.22	0.52	1.16	2.13	1.17			1.8

TABLE 2 — Coastal distribution of the more common seabirds found dead in 1977.

SPECIES OR SUBSPECIES	COAST															TOTAL
	AW	TA	WW	WD	AE	BP	EC	WA	CN	CS	OT	SD	WS	NS	OI	BIRDS
Megadyptes antipodes	–	–	3	–	–	–	–	–	–	1	–	3	7	–	–	14
Eudyptula minor	111	10	25	–	65	1	–	–	2	1	3	10	12	5	1	246
Diomedea spp*	9	2	–	–	3	–	–	–	–	–	1	–	5	–	1	21
exulans	3	–	–	–	–	–	–	–	1	4	–	–	3	–	–	11
cauta subspp*	11	–	2	–	1	–	–	–	–	–	–	–	2	–	–	16
cauta	11	–	–	–	–	–	–	–	–	–	–	3	2	–	–	16
Macronectes giganteus	9	–	1	–	–	1	–	–	–	2	–	–	2	–	–	15
Daption capensis	25	–	1	–	6	–	–	–	–	9	–	4	5	–	–	50
Pterodroma macroptera	24	2	–	–	10	4	–	–	–	–	–	–	–	–	–	40
lessoni	29	1	–	–	1	2	–	–	–	–	–	–	2	–	–	35
inexpectata	32	–	1	–	–	–	–	–	–	4	–	–	1	–	–	38
cooki	11	–	–	–	9	–	–	–	–	–	–	–	–	–	–	20
Pachyptila spp*	71	3	117	–	5	–	–	–	–	–	–	5	11	1	3	216
vittata	17	–	2	–	3	–	–	–	1	–	–	108	1	3	–	135
belcheri	3	1	–	–	9	1	–	–	–	–	–	–	–	–	–	14
turtur	196	2	213	–	38	1	–	–	–	2	–	5	17	–	2	476
Puffinus carneipes	31	–	–	–	24	2	–	–	–	–	–	–	–	–	–	57
bulleri	150	5	5	–	30	–	–	–	–	–	–	–	2	–	–	192
griseus	795	2	43	–	54	6	–	5	–	24	1	84	143	1	12	1170
tenuirostris	248	7	8	–	44	4	–	–	–	3	5	28	2	–	4	353
gavia	733	13	16	–	235	49	1	–	3	3	–	–	28	–	–	1081
assimilis	13	2	–	–	8	4	1	–	–	–	–	–	–	–	–	28
Pelagodroma marina	6	–	1	–	5	1	–	–	–	12	–	–	–	–	–	25
Pelecanoides urinatrix	122	3	4	–	39	2	–	–	1	–	–	8	9	–	–	188
Sula bassana	118	1	–	–	24	1	1	–	–	–	–	–	–	–	–	145
Phalacrocorax carbo	16	2	3	–	2	–	–	–	–	–	–	1	–	–	–	24
varius	18	–	–	–	3	3	–	–	2	–	–	–	–	–	–	26
Stictocarbo p. punctatus	16	–	4	–	2	–	–	1	57	98	2	2	5	3	–	190
Larus dominicanus	97	18	19	1	15	6	1	4	9	32	–	9	53	5	–	269
novaehollandiae	146	20	2	–	24	7	1	1	15	13	–	3	11	2	–	245
Sterna striata	25	3	–	–	9	–	–	–	2	5	–	1	4	–	–	49
TOTALS	3096	97	470	1	668	98	5	11	93	213	12	274	327	20	23	5405

*Species or subspecies could not be identified by patroller.

TABLE 3 — Monthly distribution of the more common seabirds found dead in 1977.

SPECIES OR SUBSPECIES	MONTH JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL BIRDS
Megadyptes antipodes	–	–	1	1	7	3	1	–	–	–	1	–	14
Eudyptula minor	58	47	9	9	26	7	13	19	9	4	25	20	246
Diomedea spp*	6	4	1	5	2	1	–	–	–	1	1	–	21
exulans	1	2	4	–	1	2	–	–	–	1	–	–	11
cauta subspp*	4	2	–	1	4	–	–	1	–	4	–	–	16
cauta	–	–	–	–	1	1	–	3	1	–	6	4	16
Macronectes giganteus	–	–	2	–	–	–	2	2	5	3	1	–	15
Daption capensis	2	3	–	2	1	–	3	7	2	9	11	10	50
Pterodroma macroptera	7	6	1	–	2	–	6	7	–	1	8	2	40
lessoni	3	2	1	3	2	1	4	3	1	2	7	6	35
inexpectata	4	3	–	1	15	–	–	–	–	–	1	14	38
cooki	3	4	3	5	–	–	–	–	–	1	2	2	20
Pachyptila spp*	9	101	1	2	21	2	4	10	7	20	27	12	216
vittata	8	1	–	–	–	–	–	–	–	9	114	3	135
belcheri	9	1	–	–	2	–	–	2	–	–	–	–	14
turtur	25	209	2	3	30	5	43	63	9	22	50	15	476
Puffinus carneipes	18	20	7	–	–	–	1	–	–	–	6	5	57
bulleri	42	29	6	7	5	1	1	–	–	12	20	69	192
griseus	116	56	21	20	711	30	2	55	–	12	88	59	1170
tenuirostris	63	13	1	9	37	1	–	–	–	23	132	74	353
gavia	83	73	20	15	18	5	189	586	18	11	33	30	1081
assimilis	4	–	–	–	1	1	2	5	–	4	6	5	28
Pelagodroma marina	9	–	2	–	2	1	1	1	–	2	4	3	25
Pelecanoides urinatrix	17	7	1	2	12	4	37	68	4	2	15	19	188
Sula bassana	39	9	4	8	5	3	7	20	4	10	19	17	145
Phalacrocorax carbo	–	–	1	1	1	–	1	1	–	2	8	9	24
varius	1	1	1	–	1	2	1	1	–	3	7	8	26
Stictocarbo p. punctatus	7	5	8	8	68	32	14	33	3	7	2	3	190
Larus dominicanus	23	39	26	32	42	17	11	13	20	8	11	27	269
novaehollandiae	12	14	67	69	25	9	9	22	5	2	6	5	245
Sterna striata	5	2	11	4	4	2	4	3	1	1	7	5	49
TOTALS	578	653	201	207	1046	130	356	925	89	176	618	426	5405

*Species or subspecies could not be identified by patroller.

TABLE 4 — Seabirds of which 1 to 10 specimens were found dead in 1977.

SPECIES OR SUBSPECIES	NUMBER FOUND	COAST(S)	MONTH(S)
Eudyptula albosignata	8	AE,CN,CS(3),OT,WS(2).	JAN,FEB(2),MAY(2),JUN,AUG,DEC.
Eudyptes pachyrhynchus subspp*	1	CS.	APR.
pachyrhynchus	2	AW,SD.	NOV(2).
sclateri	1	OT.	MAY.
Diomedea epomophora	5	EC,WS(4).	MAR,MAY(2),DEC(2).
melanophris	9	AW(6),EC,SD(2).	FEB(2),APR,MAY(2),AUG(2),NOV,DEC.
chrysostoma	10	AW(6),TA,AE,WS(2).	JAN(3),FEB,MAY(2),AUG(3),SEP.
bulleri	4	AW(2),SD,OI.	MAR,APR,MAY,JUN.
cauta salvini	1	WS.	SEP.
Phoebetria palpebrata	2	AW(2).	FEB(2).
Thalassoica antarctica	1	AW.	NOV.
Pterodroma spp*	2	AW(2).	MAR,NOV.
brevirostris	2	AW(2).	MAY,OCT.
pycrofti	1	AE.	JAN.
h. nigripennis	2	AW(2).	FEB,DEC.
Halobaena caerulea	5	AW(3),WS,OI.	APR,JUL,SEP,NOV,DEC.
Pachyptila salvini	7	AW(2),AE(3),SD,WS.	JAN(2),FEB,APR,MAY,SEP,NOV.
desolata	7	AW(2),AE(3),BP(2).	APR,JUL(4),NOV(2).
crassirostris	1	WS.	SEP.
Procellaria cinerea	5	AW,TA,BP(2),CS.	JAN,MAR,JUL(2),SEP.
parkinsoni	4	AW,AE(3).	FEB,MAR,MAY,JUN.
westlandica	4	AW(3),NS.	JAN,SEP(2),DEC.
aequinoctialis	3	AW(2),WS.	JAN,FEB,MAY.
Puffinus spp*	6	AW(3),TA,AE,WS.	JAN,MAR(2),JUL(2),DEC.
huttoni	10	AW(2),TA(3),WW,CN(3),WS.	JAN,FEB(2),APR,MAY,AUG,NOV(2),DEC(2).
Garrodia nereis	1	AW.	NOV.
Fregetta tropica	1	SD.	NOV.
Phalacrocorax spp*	1	AE.	JUL.
sulcirostris	1	AE.	JUN.
brevirostris	4	BP,CN,OT(2).	MAY(2),JUN,AUG.
Leucocarbo carunculatus chalconotus	6	OT,SD(5).	MAR,APR(2),MAY,JUN,NOV.
onslowi	2	OI(2).	FEB,APR.
Stictocarbo punctatus featherstoni	1	OI.	APR.
Stercorarius parasiticus	3	AW(3).	JAN,FEB(2).
Larus bulleri	9	CS(2),SD(7).	JAN,FEB,MAR,APR(2),JUN,NOV(3).
Hydroprogne caspia	4	AW(3),AE.	JAN,APR,MAY,DEC.
Procelsterna cerulea	1	AE.	FEB.
TOTAL	137		

*Species or subspecies could not be identified by patroller.

The Grey Ternlet *(Procelsterna cerulea)*, found at Pataua (AE) in February, is the third record for this species. Although not numerous, this species is regularly seen near northern off-shore islands. Previous records are from Auckland East in 1974 and Auckland West in 1976.

The Pitt Island Shag *(Stictocarbo punctatus featherstoni)* is a new record for beach patrolling but, considering the number of patrols now done in the Chatham Islands, not unexpected.

Miscellaneous birds recorded but not considered to be seabirds totalled 135. These were:—

20 Blackbirds, 14 Mallard Ducks, ten each of Magpies (both subspecies) and Rock Pigeons, nine Black Swans, seven Grey Ducks, five Starlings, four each of Bar-tailed Godwits, Pukekos, Pheasants and Song Thrushes, three each of South Island Pied Oystercatchers, Pied Stilts, unidentified ducks, Mynas, Yellowhammers and Skylarks, two each of White-faced Herons, Banded Dotterels, Spine-tailed Swifts, Brown Teal, NZ Pigeons and Chaffinches and one each of Stewart Island Kiwi, Variable Oystercatcher, NZ Dotterel, Wrybill, Cattle Egret, Shoveler Duck, Welcome Swallow, Oriental Cuckoo, Kingfisher, Harrier, California Quail, Tui, Greenfinch and House Sparrow.

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E & O E

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AUSTRALIAN SIGHT RECOVERY OF A COLOUR-BANDED BANDED DOTTEREL

During and since the 1977-78 breeding season, many Banded Dotterels *(Charadrius bicinctus)* have been colour-banded by Mary Bomford and Ray Pierce on the Cass River delta, Lake Tekapo, as part of their behavioural and population studies. On 25 November 1977, a nesting adult female was trapped and colour-banded with its own colour combination. In 1978, this bird returned to nest at the same part of the delta, where on 11 November 1978 Peter Dann found it with two chicks, at least one of which later fledged. The last sighting in the 1978-79 season was on 27 November.

While cannon-netting waders in southern Victoria with the Victorian Wader Study Group, Peter Dann saw this colour-banded female on 17 June 1979. It was in a flock of 150 Banded Dotterels and several Red-capped Dotterels *(C. alexandrinus ruficapillus)* roosting during high tide in a saltmarsh at Point Wilson, 46 km south-west of Melbourne and about 2000 km from the place of banding in New Zealand. The bird showed noticeably paler bands than most of the other adults in the flock. At this time, the juveniles had not acquired breeding plumage. The flock remained in the area for several days, but the female was not seen again.

During the 1979 winter and early spring, Ray Pierce kept a close check on Banded Dotterels returning to the Cass Delta. At that time of year all dotterels foraged either at the rivermouth or at a nearby muddy inlet of Lake Tekapo, and so they were easily checked for colour bands. The colour-banded female was not present on all dates leading up to and including 18 July. The next check was on 21 July when the bird (with the unusually pale breast and neck bands retained throughout the breeding season) was found at the rivermouth actively defending a small feeding territory. Three further sightings up to 21 August involved the bird at the rivermouth (once) and at the muddy inlet (twice). By 9 September, it had occupied a territory in the same area as the previous two years.

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THE MOULT GATHERINGS OF PARADISE SHELDUCK IN THE GISBORNE-EAST COAST DISTRICT

By MURRAY WILLIAMS

ABSTRACT

Paradise Shelducks *(Tadorna variegata)* were found moulting at 13 sites in the Gisborne-East Coast district in 1977. These moulting sites were mainly large empoundments that had open aspects with steep pasture-covered hillsides rising from the water's edge and overhead escape-cover nearby. Individual birds mainly moulted at the same site each year and were flightless for about four weeks. Males took longer to moult than females. Non-breeding birds and failed breeders were flightless in January, successful breeders in February and March, and both sexes arrived to moult at the same time. The areas to which birds dispersed after completing their moult were determined from the return of bands by hunters. About 60% of all banded birds shot were within 32 km of their moulting site, females being recovered closer to the moulting site than males, and almost all recoveries were from the Gisborne-East Coast area. Moult gatherings allow the wildlife manager to monitor annual changes in regional and local populations. By constructing empoundments in new localities and inducing shelducks to moult there, regional populations may be subdivided into smaller units and managed with greater sensitivity.

INTRODUCTION

Most species of shelduck migrate from their breeding areas to assemble in large flocks for their annual wing moult. The moulting assemblages of the Common Shelduck *(Tadorna tadorna)* in the shallow waters of the Heligoland Bight are especially spectacular with over 100 000 birds from the British Isles and coasts of western Europe from Norway to France gathering on the Grosser Knechtsands (Goethe 1961, Oelke 1969). Moulting flocks of other shelducks are smaller but hundreds, sometimes thousands of moulting Ruddy Shelduck *(T. ferruginea)*, Australian Mountain Duck *(T. tadornoides)* and Cape Shelduck *(T. cana)* have been reported (Dementiev & Gladkov 1952, Delacour 1954, Frith 1967). Similar assemblages of Burdekin Duck *(T. radjah)* have not been reported.

In New Zealand, the Paradise Shelduck *(T. variegata)* also assembles in flocks for its annual moult, using large stock ponds, reservoirs, lakes and rivers. Little is known about these assemblages except that both adults and newly-fledged young are present, that the same sites are used each year and that in January and February, breeding territories are abandoned and all birds are at moulting sites.

During a study of shelduck biology in the hill-country farmland of the Gisborne-East Coast district (Williams 1979), I recorded details of these moult gatherings with four questions in mind:

1. What are the characteristics of moulting sites ?
2. Do individual shelducks attend the same moulting site each year ?
3. When do birds of different breeding status attend ?
4. To which areas do birds from each moulting site disperse ?

The answers to these questions are important to the wise management of this game species. If the essential characteristics of moulting sites are known, empoundments can perhaps be created that the birds will use. Changes in numbers at various sites may be better interpreted if the attendance behaviour of individual birds is known, and better recorded by counting when all birds are present. If shelducks at each moulting site disperse over relatively discrete areas, the shelducks of the Gisborne-East Coast district may be considered as a series of sub-populations and managed with greater sensitivity than by applying the same hunting regulations throughout.

TABLE 1 — The location and characteristics of moulting sites in Gisborne-East Coast.

Site No.	Name of site	NZMS 1. map ref.	Approx. size (ha)	Grazing to edge	Marginal escape cover	Hillside alongside	Aspect	January count 1977
1	Huiarua 1	N80/379059	0.2	+	-	+	c	300
2	Huiarua 2	N80/435017	1.5	+	+	+	o	*40
3	Matanui	N80/455995	1	+	-	+	c/o	1200
4	Puketawa	N80/435978	1.5	+	-	+	c/o	1900
5	Puketawa 1	N80/453913	0.4	+	-	-	o	0
6	Puketawa 2	N80/468913	0.4	+	-	+	o	500
7	Parehaka	N89/392765	2	+	+	+	o	1800
8	Puhatikotiko	N88/219647	2.5	+	-	-	o	1500
9	Holdsworth	N97/213568	8	+	+	+	o	250
10	Ngakaroa	N98/347566	3	+	-	+	c/o	400
11	Burke's Dam	N98/342537	8	+	+	+	o	100
12	L. Repongaere	N98/262458	52	-	+	-	o	3000
13	Noble's Lake	N106/930277	16	+	+	+	c/o	200

+ = present c = closed aspect c/o = partially closed aspect
- = absent o = open aspect * = moulting flock of over 300 birds present in February

CHARACTERISTICS OF MOULTING SITES

Thirteen major moulting sites (Fig. 1) and several others used by few birds (10-20) were found in the Gisborne-East Coast district in 1977. The characteristics of the major sites are summarised in Table 1.

Most sites were large water empoundments about which flocks of non-breeders remained for all or part of the breeding season. Lake Repongaere near Gisborne, the largest lake in the Gisborne-East Coast

FIGURE 1 — The locations of Paradise Shelduck moulting sites in the Gisborne-East Coast district in January 1977. The identity and map reference of each site are given in Table 1. Site 14 is at Whakaki Lagoon.

district, is located amongst farmland containing numerous small stock ponds where shelducks are extremely abundant.

Three major moulting sites near Tokomaru Bay and Tolaga Bay, Huiarua 2, Matanui and Puketawa yards, are the largest empoundments on the East Coast. Of the many lakes at Tiniroto, however, the shelducks moulted on one of the smallest, probably because many of these lakes were used extensively for public recreation and moulting had to occur on the most secluded. Three small stock ponds on the East Coast were used. Puketawa 1 and 2 were only a few hundred metres apart and the use of Puketawa 2 followed two years of harassment at Puketawa 1. A small flock of non-breeders remained about these ponds throughout the year. Huiarua 1, a small secluded pond less than 1 km from the larger Huiarua 2 site, was not used as a breeding territory nor regularly by non-breeders. Shelducks have moulted there since 1956, prior to the construction of the larger empoundments nearby.

It was characteristic of moulting sites that grazing was available immediately at the water's edge (Fig. 2), an important requirement because moulters feed extensively during both daylight and dark and seldom move far from the safety of the water. Only Lake Repongaere was an exception. Its entire perimeter was ringed by a wide, dense stand of raupo *(Typha occidentalis)* and few moulters ventured to the nearby pasture during daylight. There, moulters fed almost exclusively at night.

Most sites had a relatively high open hillside rising directly from the water's edge (Fig. 3). From these hillsides, the usual resting and feeding areas for all moulters and some fliers, the birds had a panoramic view of the empoundment and the surrounding terrain. So important was this panoramic view that moulting sites did not occur in relatively narrow gullies. Some sites had high hills rising on all sides (Noble's Lake) or on two opposite sides (Ngakaroa, Matanui, Puketawa Yards) but the large expanse of water created an impression of openness and the view from one or both sides was extensive.

Six sites contained dense escape cover: Lake Repongaere, Holdsworth and Parehaka had raupo along their edges, Noble's Lake and Huiarua 2 had bush or scrub immediately alongside, and on Burke's Dam a single large willow *(Salix babylonica)* in the middle of the empoundment provided refuge.

The numbers of birds present at these moulting sites in January 1977 (Table 1) could not be correlated with the size of the water body or with any topographical feature.

THE TRADITIONAL USE OF MOULTING SITES

The same moulting sites were used each year and Lake Repongaere has been used ever since shelducks first reached the district in about 1947 (Williams 1971). This traditional use is probably first established amongst newly fledged young when they accompany their

FIGURE 2 — Puketawa 2 moulting site showing the grazing that is available to the water's edge.

FIGURE 3 — Puketawa yards moulting site showing steep hillsides rising directly from the water's edge.

parents to the moulting site and may be further reinforced when they remain there as a flock throughout most of the subsequent year.

Many birds returned to the same site each year. During January 1974 and 1975 shelducks were trapped at five sites. Most of the birds banded in 1974 and recaptured in 1975 were caught on the site where they had originally been banded (Table 2).

TABLE 2 — The percentage of shelducks banded as moulters subsequently retrapped at the same moulting site.

Moulting site	No. banded birds retrapped	% retrapped at banding site
Parehaka	199	77.4
Noble's Lake	72	91.7
Huiarua 1	54	96.3
Burke's Dam	54	40.7
Lake Repongaere	88	77.3
TOTAL	467	77.5

Disturbance from the annual banding operations probably caused some birds to change moulting sites. For example, up to 500 birds were recorded in some years at Burke's Dam but after banding commenced in 1969 there was a steady decline, even though shelduck numbers increased throughout the Gisborne-East Coast district, and only 100 were present in January 1977. More than half of the birds originally banded at Burke's Dam and subsequently retrapped were caught elsewhere, especially at nearby Lake Repongaere. Few banded at Noble's Lake were caught elsewhere, perhaps because this is an isolated moulting site with no others nearby. Two birds from there were retrapped at Huiarua, a straight-line movement of 84 km.

Only two of 54 banded at Huiarua 1 were retrapped elsewhere, both at nearby Parehaka. However, intensive banding operations at the Huiarua sites since 1974, including the retrapping of birds in February and March, had by 1977 resulted in birds moulting at six sites within a radius of 6 km, at all of which birds banded at the two Huiarua sites were retrapped. From 1974 to 1976, 35 shelducks banded at other moulting sites were retrapped at Huiarua 1 and 2; nine each from Burke's Dam and Lake Repongaere, two from Noble's Lake and 15 from Parehaka.

PHENOLOGY OF THE MOULT AND ATTENDANCE AT THE MOULTING SITE

Onset of the moult

Adults with young showed their first signs of moult when their ducklings were about 40 days old. The female began first, having a generally shabby appearance, the down showing through on breast

and abdomen and the breast slowly losing its bright chestnut colour and darkening as new feathers with predominantly black tips replaced the old. Males started later; in 12 of 14 pairs the male showed no obvious plumage disarray until the ducklings had fledged. Once the ducklings had fledged, however, the adult body and tail moult was rapid.

The body moult of breeders who failed to produce young usually began in early November, apparently irrespective of when their breeding attempt had failed. Four pairs lost their nests in mid-October and showed signs of body moult two weeks later. One pair lost their young within two days of hatching in late September and four pairs lost their nests in mid-September but in all I did not detect the start of their body moult until mid-November.

Amongst non-breeding birds which had remained in a flock throughout the breeding season I first observed signs of body moult in early October, and most birds were in heavy body moult by mid-November.

By the time birds reached the communal moulting site, most of the body moult had been completed. Only then were all remiges and coverts shed simultaneously and the wing reduced to a down-covered stub. I do not know how long elapsed between their arrival at the moulting site and the onset of flightlessness.

The earliest date on which I saw a flightless bird was 26 November at Puhatikotiko, the latest was 24 March on Huiarua 1.

Juvenile moult

In two years when selected moulting sites were trapped in January, February and March, 84 banded juveniles were caught. Most (85%) completed their wing moult during January (Table 3) and only one was caught in early March.

TABLE 3 — The numbers of flightless juvenile Paradise Shelducks caught in January, February and March.

Month	No. of juveniles trapped		
	Male	Female	% of total
January	29	42	85
February	3	9	14
March	1	0	1

Adult moult

Thirty-three birds of known breeding status were caught in two years when selected moulting sites were trapped in January, February and March. The successful breeders were flightless mainly during February and March, the failed breeders during January (Table 4).

TABLE 4 — The numbers of flightless adult Paradise Shelducks of known breeding status caught in January, February and March.

Month	Breeding males		Breeding females	
	Successful breeders	Failed breeders	Successful breeders	Failed breeders
January	1	5	3	2
February	12	1	7	
March	2		1	

The four successful breeders that were flightless during January had all successfully fledged their young by mid-November. All three successful breeders that moulted in March had been involved in successful renesting attempts, while the only failed breeder caught flightless in February was an unsuccessful renester, her second nest having been lost in early December.

Amongst these 33 birds were seven pairs. Both members of five pairs were caught on the same moulting site at the same time, those of one pair on the same site but in different months, and those of the seventh pair were caught at different sites at the same time.

The duration of flightlessness

The interval between successive retrappings of banded birds at various moulting sites provided an indication of the duration of the wing moult (Table 5).

TABLE 5 — The percentage of Paradise Shelducks which were flightless when first trapped and which were still flightless 28-44 days later.

Interval (days) between trappings	MALES		FEMALES	
	No. initially trapped	% retrapped	No. initially trapped	% retrapped
28	100	25	103	9
30	17	18	9	0
32	35	11	36	6
34	106	6	84	1
44	52	0	45	0

Significantly fewer ($X^2 = 9.6$, $0.01 > p > 0.001$) females than males were recaptured 28 days after their initial trapping, suggesting that most females completed their wing moult faster than males. Few birds spent longer than one month flightless.

Wing moult of males and females

At six moulting sites, all flightless birds present in January, February and March were caught. In each month equal numbers of males and females were present (Table 6), showing that they do not moult at different times. Counts of all the birds (fliers and flightless) at another three sites recorded equal numbers of both sexes (January 49.2% of 982, February 51.9% of 792, March 50.5% of 499 were females).

TABLE 6 — The numbers of flightless Paradise Shelducks caught in January, February and March and the percentage of them which were females.

Month	No. of sites	No. of birds trapped	% female
January	6	3133	51.2
February	6	1775	49.7
March	6	320	52.5

Spread of moulting

The numbers of birds at moulting sites increased during January as more birds arrived, mainly the successful breeders, often accompanied by their newly fledged young. However, most birds moulted in January. At the six sites where all flightless birds were trapped in January, February and March, 5228 birds were caught: 3133 (59.9%) in January, 1775 (34.0%) in February and 320 (6.1%) in March. Some birds handled in February and March had also been caught in the previous month and by correcting these totals according to data in Table 5, this suggests that 4891 individuals were handled, 64.2% in January, 30.9% in February, and 5.0% in March. The maximum number of birds present at a moulting site probably occurred in mid-February.

DISPERSAL FROM MOULTING SITES

The areas to which birds dispersed after completing their moult were determined by plotting the locations at which banded birds were shot during the annual game season in May. This method is not completely satisfactory because sportsmen probably did not hunt with equal intensity throughout the area over which the birds dispersed. However, it does reflect the area from which hunters obtained birds coming from particular moulting sites, an important management consideration.

Flightless birds were first banded at Lake Repongaere in 1961. Birds at other sites were banded later; at Noble's Lake in 1965 and then 1970-1974 inclusive, at Burke's Dam 1965 and 1969-1974 inclusive, at Parehaka 1969-1974 inclusive and at the two Huiarua sites in 1974 and 1975.

The birds were caught and banded early in January each year and although they were simply designated as ' adults,' it is likely that most were juveniles undergoing their first wing moult.

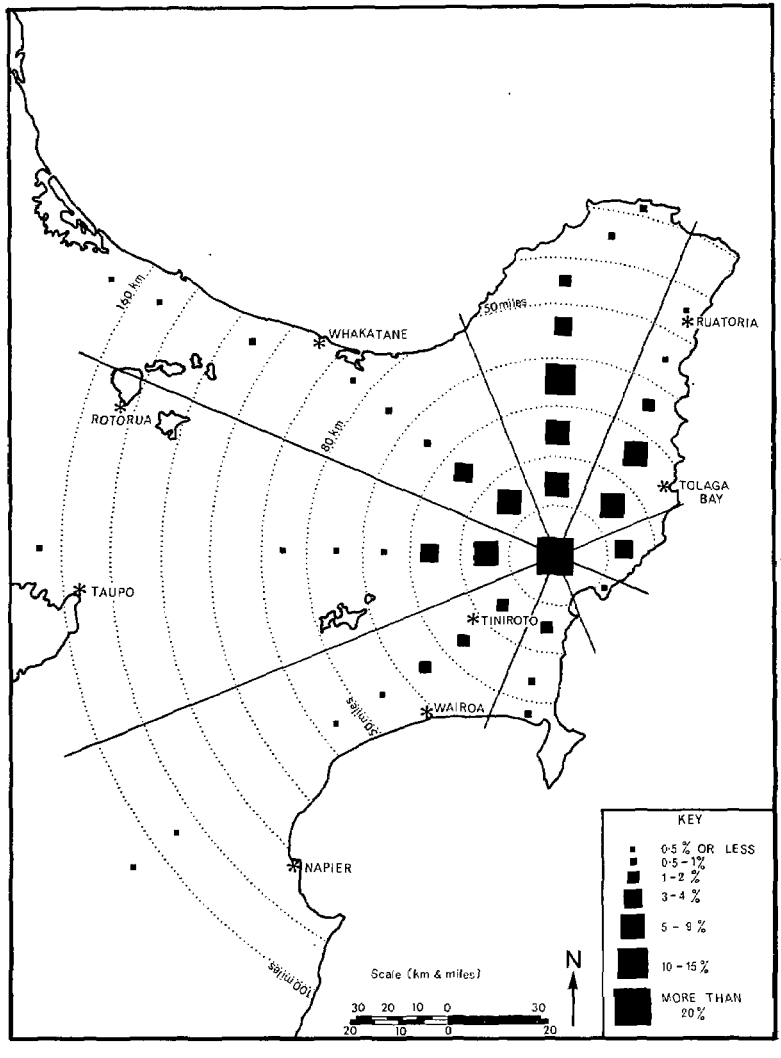

FIGURE 4 — The locations of recovery of 760 Paradise Shelducks banded at Lake Repongaere between 1961 and 1974. The numbers recovered in each sector are expressed as a percentage of the total recoveries.

TABLE 7 — The numbers of male Paradise Shelducks banded at Lake Repongaere between 1961 and 1974 that were reported shot at various distances and directions from the banding site between 1961 and 1975.

	DISTANCE (km)											
DIRECTION	0 – 16	17 – 32	33 – 48	49 – 64	65 – 80	81 – 96	97 – 112	113 – 128	129 – 144	145 – 160	161 +	TOTAL
NORTH	23	23	19	50	22	7	4	5				153
NORTH-EAST	2	28	19	10		1						60
EAST	8	13										21
SOUTH-EAST	3											3
SOUTH	9	6	2	4								21
SOUTH-WEST	1	6	7	6	3	2				2	3	30
WEST	12	24	11	2	2	1						52
NORTH-WEST	1	16	24	3	5	2		3			1	55
BANDING SITE	22											22
TOTAL	81	116	82	75	32	13	4	8	0	2	4	417
% OF TOTAL	19.4	27.8	19.7	18.0	7.7	3.1	1.0	1.9		0.4	1.0	
CUMULATIVE %	19.4	47.2	66.9	84.9	92.6	95.7	96.7	98.6		99.0	100	

TABLE 8 — The numbers of female Paradise Shelducks banded at Lake Repongaere between 1961 and 1974 that were reported shot at various distances and directions from the banding site between 1961 and 1975.

	DISTANCE (km)											
DIRECTION	0 – 16	17 – 32	33 – 48	49 – 64	65 – 80	81 – 96	97 – 112	113 – 128	129 – 144	145 – 160	161 +	TOTAL
NORTH	22	20	19	37	9	5	1	2				115
NORTH-EAST	3	26	29	5	1							64
EAST	11	7										18
SOUTH-EAST	2	1	1									4
SOUTH	4	2	2	1								9
SOUTH-WEST	2	6	3	3							1	15
WEST	10	24	10		1						1	46
NORTH-WEST	2	33	12	2	2			1			1	53
BANDING SITE	19											19
TOTAL	75	119	76	48	13	5	1	3	0	0	3	343
% OF TOTAL	21.9	34.7	22.1	14.0	3.8	1.4	0.3	0.9			0.9	
CUMULATIVE %	21.9	56.6	78.7	92.7	96.5	97.9	98.2	99.1			100	

Lake Repongaere

By the end of the 1975 game season the bands of 760 (18%) of the 4240 birds banded at Lake Repongaere had been returned to the banding office. Tables 7 and 8 summarise, for males and females separately, the locations of recovery in relation to distance and direction from the lake, and these are shown in Figure 4. More than 90% of all recoveries were made within 80 km and approximately two-thirds within 48 km of the lake. Only nine birds were shot 130 km or more away, six in southern Hawkes Bay, two in Bay of Plenty and one at Taupo.

Most recoveries from beyond a 16 km radius were made to the north on the East Coast (concentrated around Tolaga Bay, Tauwhareparae and the headwaters of the Mata River) with a smaller westward dispersal toward Matawai, Rere and Wharekopae. Recoveries south of the lake were few and imply that birds resident near Tiniroto, Nuhaka and Wairoa did not migrate to Lake Repongaere.

Similar proportions of the two sexes were shot within 16 km of Lake Repongaere, significantly more females ($X^2 = 4.2$, $0.05 > p > 0.02$) within 16-32 km, while beyond 48 km from the lake only 21.3% of the female recoveries were made compared with 33.1% of the male recoveries, a very significant difference ($X^2 = 13.1$, $p < 0.001$). These results show that females tend to remain close to their area of birth whereas males disperse more widely.

Noble's Lake, Tiniroto

Of the 559 moulting birds banded at Noble's Lake, 101 (18.1%) were reported shot by the end of the 1975 game season. The distribution of these recoveries is summarised in Table 9 and shown in Figure 5.

TABLE 9 — The numbers of Paradise Shelducks (both sexes) banded at Noble's Lake in 1965 and between 1970 and 1974 that were reported shot at various distances from the banding site between 1965 and 1975.

DISTANCE (km)	0 – 16	17 – 32	33 – 48	49 – 64	65 – 80	81 – 96	97 – 112	113 – 128	129 – 144	145 – 160	161 +	TOTAL
MALES												
NUMBER	31	8	6	2	4		6			1	2	60
% OF TOTAL	51.7	13.4	10.0	3.3	6.6		10.0			1.7	3.3	
CUMULATIVE %	51.7	65.1	75.1	78.4	85.0		95.0			96.7	100	
FEMALES												
NUMBER	18	7	4	1	6	4		1				41
% OF TOTAL	44.0	17.0	9.8	2.4	14.6	9.8		2.4				
CUMULATIVE %	44.0	61.0	70.8	73.2	87.8	97.6		100				

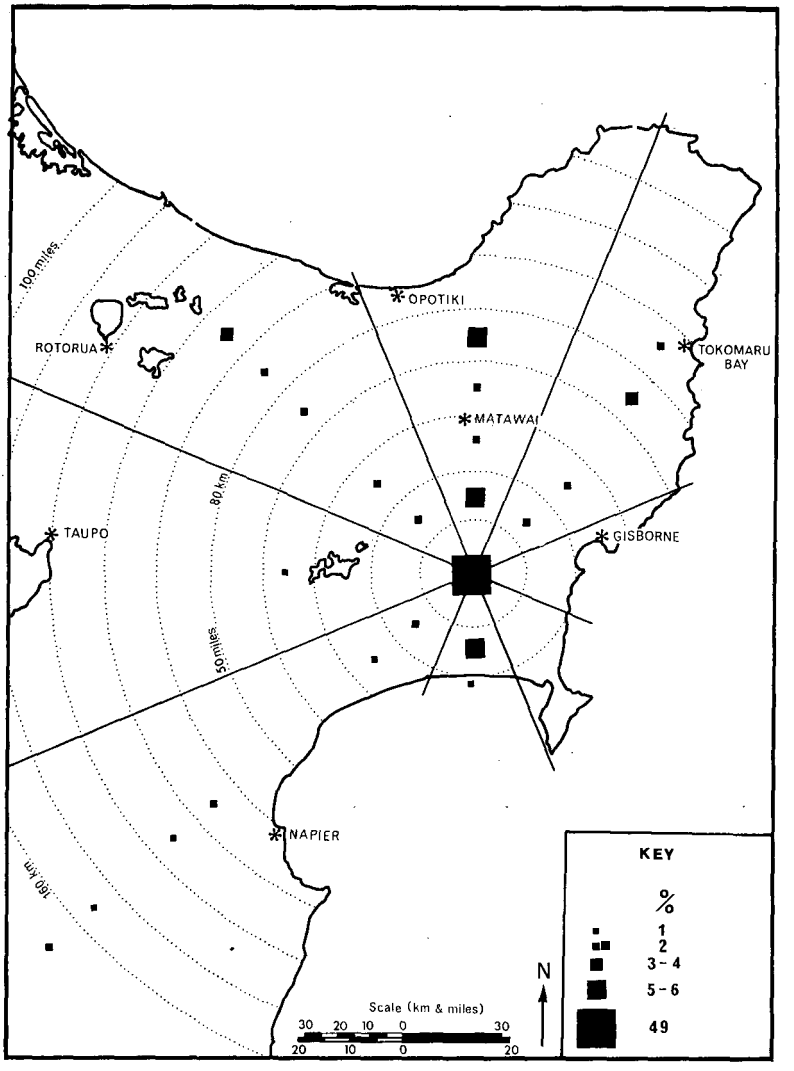

FIGURE 5 — The locations of recovery of 101 Paradise Shelducks banded at Noble's Lake, Tiniroto, in 1965 and between 1970 and 1974. The numbers recovered in each sector are expressed as a percentage of the total recoveries.

Half of the recoveries were made within 16 km of the banding site and three-quarters within 48 km. Ten birds, nine of which were males, were recovered more than 100 km away.

Some movements were outstanding and involved crossing the forested ranges. Two were shot near Waiouru, a straight-line movement of over 180 km SW, and eight were recovered in the eastern Bay of Plenty. Four others were shot in central Hawkes Bay, south of Napier.

Most birds recovered beyond the 16 km radius were from north of Tiniroto; 11 from the East Coast, 4 from the Ormond-Te Karaka area, and 10 from the area between Tiniroto and Lake Repongaere. Those which dispersed into the East Coast were probably birds that had moulted away from Tiniroto in the year after banding; eight of these 11 birds were shot two or more years after banding.

Burke's Dam

A total of 1138 moulting shelducks were banded at Burke's Dam, and by the end of the 1975 game season 245 (21.5%) had been reported shot. The distribution of these recoveries is summarised in Table 10 and shown in Figure 6.

TABLE 10 — The numbers of Paradise Shelducks (both sexes) banded at Burke's Dam in 1965 and between 1969 and 1974 that were reported shot at various distances from the banding site between 1965 and 1975.

DISTANCE (km)	0 - 16	17 - 32	33 - 48	49 - 64	65 - 80	81 - 96	97 - 112	113 +	TOTAL
MALES									
NUMBER	39	48	17	9	8	1	3	0	125
% OF TOTAL	31.2	38.4	13.6	7.2	6.4	0.8	2.4		
CUMULATIVE %	31.2	69.6	83.2	90.4	96.8	97.6	100		
FEMALES									
NUMBER	50	26	16	17	9	0	2	0	120
% OF TOTAL	41.7	21.7	13.3	14.1	7.5		1.7		
CUMULATIVE %	41.7	63.4	76.7	90.8	98.3		100		

About 36% of all recoveries were made within 16 km of Burke's Dam, a significantly higher figure ($X^2 = 25.1$, $p < 0.001$) than for nearby Lake Repongaere, and two-thirds within 32 km compared with only 51% from Lake Repongaere.

Of the 156 birds recovered beyond the 16 km radius, only 19 (12.2%) came from south of the moulting site. The principal direction of movement was north and north-east, mainly to the Tolaga Bay and

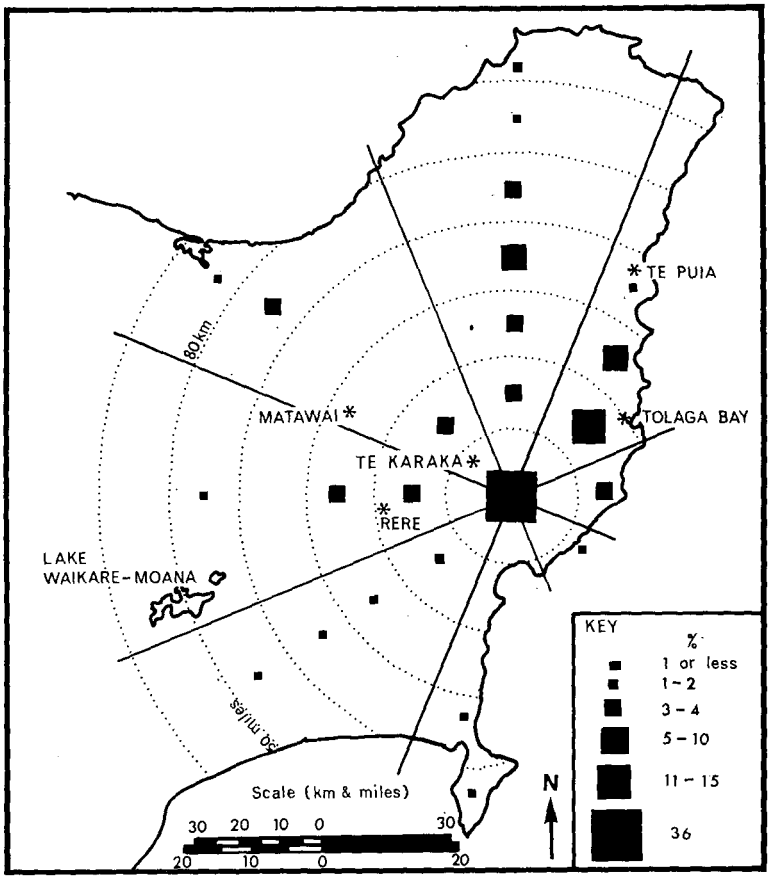

FIGURE 6 — The locations of recovery of 245 Paradise Shelducks banded at Burke's Dam in 1965 and between 1969 and 1974. The numbers recovered in each sector are expressed as a percentage of the total recoveries.

Tokomaru Bay areas. There were few distant movements of consequence; seven birds were recovered from the Opotiki area and six from north of Ruatoria, but none more than 112 km away.

There was no significant difference in the pattern of dispersal of males and females.

Burke's Dam and Lake Repongaere are only 10 km apart, and many birds originally banded at Burke's Dam were retrapped on Lake Repongaere. The above results suggest that the two moulting populations differ in that the Burke's Dam moulters primarily live close to their moulting site.

Parehaka

Of the 1502 Paradise Shelducks banded at Parehaka, 76 (5.1%) had been reported shot by the end of the 1975 game season. This is a very low return compared with that from other moulting sites and implies that these birds dispersed over an area where little hunting occurred. Table 11 summarises the distribution of these recoveries and they are shown in Figure 7.

TABLE 11 — The numbers of Paradise Shelducks (both sexes) banded at Parehaka between 1969 and 1974 that were reported shot at various distances from the banding site between 1969 and 1975.

DISTANCE (km)	0 – 16	17 – 32	33 – 48	49 – 64	65 – 80	81 – 96	97 +	TOTAL
MALES								
NUMBER	11	11	5	3	2	3	0	35
% OF TOTAL	31.4	31.4	14.3	8.6	5.7	8.6		
CUMULATIVE %	31.4	62.8	77.1	85.7	91.4	100		
FEMALES								
NUMBER	21	10	9	0	1	0	0	41
% OF TOTAL	51.0	24.5	22.0		2.5			
CUMULATIVE %	51.0	75.5	97.5		100			

Thirty-two (42%) recoveries were made within 16 km of the moulting site and most of the females were shot within 48 km. Eight (23%) of the males were recovered beyond 48 km, two in Bay of Plenty, one near Wairoa, and five on the East Coast north of Ruatoria. No bird was recovered more than 96 km from the moulting site.

Most of the 44 birds recovered more than 16 km from Parehaka were shot to the north or north-east. Only 16 (36%) were recovered south of Parehaka, eight of them at Lake Repongaere.

Huiarua

In 1974, 196 moulting adults were banded at Huiarua and a further 958 in 1975. By the end of the 1977 game season, 34 (2.9%) had been reported shot. The distribution of these recoveries is summarised in Table 12.

Most recoveries came from hill-country farms near the moulting site; of 21 (62%) recovered within 32 km, most were within the Mata and Waitahaia River valleys. Twenty-four (71%) of the recoveries were from north of Huiarua, including two from near Hick's Bay and three from Te Kaha on the Bay of Plenty coast. The most distant recovery was of a female shot at Nuhaka in northern Hawkes Bay, approximately 112 km south.

Discussion

The distribution of the locations at which banded birds have been shot suggests that for the majority of shelducks the moult migration does not exceed 32 km. However, those birds which moulted at Lake Repongaere tended to be recovered over a wider area than those from elsewhere. Banding there extended over 14 years, from the time when the species was establishing in the district until the time when it became widespread and numerous. As the population increased, moulting occurred at new localities and as a consequence birds did not travel so far. This is shown by data in Table 13 where I have divided the recoveries into two periods 1961-1969 and 1970-1975. For both sexes

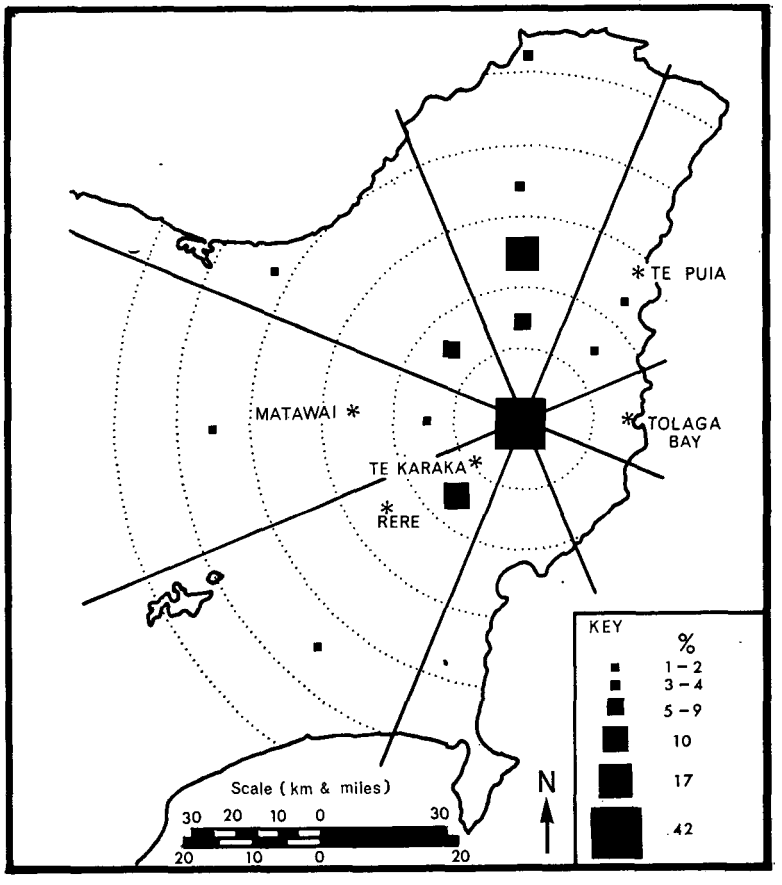

FIGURE 7 — The locations of recovery of 76 Paradise Shelducks banded at Parehaka between 1969 and 1974. The numbers recovered in each sector are expressed as a percentage of the total recoveries.

TABLE 12 — The numbers of Paradise Shelducks (both sexes) banded at Huiarua Station in 1974 and 1975 that were reported shot at various distances from the banding site between 1974 and 1977.

DISTANCE (km)	0 - 16	17 - 32	33 - 48	49 - 64	65 - 80	81 - 96	97 - 112	113 +	TOTAL
MALES									
NUMBER	6	4	2	3	3				18
% OF TOTAL	33.3	22.2	11.1	16.7	16.7				
CUMULATIVE %	33.3	55.5	66.6	83.3	100				
FEMALES									
NUMBER	7	4	1	3			1		16
% OF TOTAL	43.8	25.0	6.2	18.8			6.2		
CUMULATIVE %	43.8	68.8	75.0	93.8			100		

TABLE 13 — The cumulative percentage of the total recoveries of Paradise Shelducks banded at Lake Repongaere between 1961 and 1974 and reported shot at various distances from the banding site during the periods 1961 to 1969 and 1970 to 1975.

DISTANCE (km)	MALES		FEMALES	
	1961 - 1969	1970 - 1975	1961 - 1969	1970 - 1975
0 - 16	16.3	29.0	21.1	23.2
17 - 32	46.2	50.3	52.8	64.6
33 - 48	65.5	75.3	75.6	86.7
49 - 64	83.4	88.2	91.9	94.9
65 - 80	91.1	96.8	96.4	96.9
81 - 96	95.0		97.9	97.9
97 - 112	96.3	97.8	98.4	
113 - 128	98.4	98.9	99.6	
129 - 144				
145 - 160	98.8	100		100
161 +	100		100	
SAMPLE SIZE	324	93	244	99

a higher percentage of total recoveries was made closer to the lake after 1970; significantly more females ($X^2 = 5.5$, $0.02 > p > 0.01$) were recovered within 48 km of the lake after 1970 than before while, within the same radius, the difference between the male samples was almost significant ($X^2 = 3.0$, $0.10 > p > 0.05$).

The birds banded at all five sites were mostly recovered near the banding sites and within the Gisborne-East Coast district. Recoveries from Hawkes Bay and Wairoa were few and the physical barrier of the forested Raukumara and Huiarau Ranges probably prevented all but a minor movement west into the Bay of Plenty and to Rotorua-Taupo. The small number of recoveries from East Cape probably reflects the low density of hunters there rather than the number of banded birds reaching the area. No moulting sites are known north of Huiarua Station and on the East Coast and my observations of Huiarua-banded birds near Ruatoria, Tikitiki and Te Araroa suggests none occur.

The locations at which banded birds were shot suggest that birds moulting at Noble's Lake and at the Huiarua sites can be regarded as relatively discrete sub-populations, and that those moulting at Parehaka, Lake Repongaere and Burke's Dam (and probably the other smaller sites in the Te Karaka-Ormond area) can be regarded as a third sub-population. The extent to which the Noble's Lake population is separate from those birds which moult further south could be determined by a short-term banding study at the Whakaki Lagoon moulting site near Wairoa.

MANAGEMENT IMPLICATIONS

The moult gatherings of Paradise Shelducks are very important to the wildlife manager because with all birds, breeders, non-breeders and fledglings, concentrated at moulting sites during January and February, they offer a unique opportunity to census regional populations, and because most birds return each year to the same moulting site, an opportunity to monitor changes in local populations.

Obviously the manager must know of all the moulting sites in his district. In the Gisborne-East Coast district, for example, 13 major sites were known in 1977, but as the shelduck population there increases, some of the minor sites containing only 20-30 moulters in 1977 will gradually increase in importance and they too should be monitored. Without knowing of new sites the manager cannot always properly interpret the changes in numbers at a particular site. A change in numbers may reflect a true change in the local population because of changes in mortality rates, emigration, immigration or breeding success, or it may indicate the development of another moulting site nearby. An example of this is recorded in Table 1; the Huiarua 2 site, where in 1976 almost 800 birds were caught, contained only 40 moulters in January 1977. The considerable disturbance caused by banding operations there had caused birds to moult at another site

about 3 km away. Such major drops in numbers clearly indicate changes in moulting site, but smaller fluctuations such as those which have occurred at Burke's Dam are more difficult to interpret unless all the moulting sites are well known.

The timing of counts is also important. Counts made in early January may record only about two-thirds of the population and exclude many of the successful breeders and their progeny. The time when adults and fledglings arrive at their moulting site may differ year to year, and so in a poor breeding season most adults may be present in early January, whereas in a successful season most adults and their young may not arrive until early February.

Although the Paradise Shelducks of the Gisborne-East Coast district can be regarded as a single population, the pattern of their dispersal shown by band returns suggests a division into three sub-populations; those birds moulting at Noble's Lake, those moulting at or near Huiarua Station, and those moulting at Lake Repongaere, Burke's Dam, Parehaka and elsewhere in the Ormond-Te Karaka area. By using these subdivisions, shelducks within the district can be managed with increased sensitivity, for example, by monitoring population trends in the three areas and, if necessary, applying different hunting restrictions.

No moulting site is known north of Huiarua Station and the recoveries and sightings of banded birds suggest that at least some birds resident near East Cape moult at Huiarua. As Paradise Shelducks are less intensively hunted north of Ruatoria than in the area of Tokomaru Bay and Tolaga Bay, it would be advantageous to induce the birds of the two areas to divide into two moulting populations by creating a suitable moulting site north of Ruatoria and so to follow population trends in the two areas more accurately. The principal characteristics of moulting sites in the Gisborne-East Coast district included large water areas with high grass-covered hillsides rising directly from the water's edge and with dense escape cover nearby. The construction of a large empoundment conforming to these characteristics would be a useful first step in this management exercise and thereafter techniques to induce birds to moult there could be tested. Should this experiment prove successful the same management procedure could be used widely throughout the hill-country of the North Island.

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SHORT NOTES

OBSERVATIONS ON THE CHATHAM ISLAND PIGEON IN CASCADES GORGE

In March 1977, A. E. Billing and I formed a small Wildlife Service party that searched for 12 days in the Cascades Gorge region (c.20 ha) of Chatham Island for the endangered Chatham Island Pigeon *(Hemiphaga novaeseelandiae chathamensis)*.

To determine whether pigeons were in the gorge, I spent the first day scanning the forest from vantage points along the rim of the gorge. In six hours, nine sightings were made. The Chatham Island Pigeon, being large and noisy of flight like the New Zealand Pigeon, was most obvious when flying above the canopy of the forest. On sunny days, the birds were often conspicuous from a great distance as they rested on prominent perches where their dazzling white breast plumage stood out against the darker background.

At the time of our visit, the adult pigeons were undergoing tail moult, and we could recognise individuals at close quarters by differences in their tail shape.

Population

During our visit, ten different Chatham Island Pigeons were recognised in the gorge. Seven were adults, two were juveniles — each closely accompanied by an adult — and a single fledgling was seen once, accompanied by its parents.

The two juveniles were similar to adults in plumage colour but their eyes were hazel brown instead of crimson as in adults and the otherwise brightly coloured bill was still dark at the tip.

The fledgling pigeon was much duller than the parent birds. Its head and neck were drab grey, and slightly paler than on the adult, and around the eye was a faint area of buff. The eye itself was dark, almost black, the bill appeared shorter than that of an adult, and was purplish brown, blacker towards the tip. The feet were dull purplish red.

Behaviour

When not feeding, the birds were generally seen perched on some prominent limb, with tail drooping, the wings closely folded and the head drawn in.

However, on the first day 17 March 1977, two pigeons were watched 'hang gliding' from the top of the cliffs on the western wall in bright sunlight. Each bird in turn soared out over the gorge in a wide arc, then returned to the rim, only to reappear minutes later and repeat the circuit. This continued for almost half an hour until the weather became overcast and the birds moved down into the gorge.

Forbes (*Ibis* 1893, p. 527) must have observed similar behaviour on many occasions during his visit in 1892 for he wrote that along the south coast ". . . it loves to play in the strong up current that towers into the air, rebounding from the perpendicular face of the cliffs, when a strong sea breeze is blowing."

Several days later, two pigeons were again seen up on the western rim, this time resting in the late afternoon sun. After some 35 minutes, the sun finally left the rim, and within 5 minutes the birds left too, dropping down into the gorge. As they flew from tree to tree down the steep western wall, the second bird of the two repeatedly tried to displace the first from its perch whenever it attempted to land, coming in so close behind that the first bird was forced to leave its perch and move on, the second bird landing briefly before taking off once more in pursuit.

The fledgling pigeon was seen on 26 March, apparently only recently out of the nest. After moving clumsily about in a *Coprosma chathamica* feeding on the foliage, the bird flew to the edge of a nearby clearing and landed on the ground. An adult pigeon sat on a fallen branch close to where the fledgling landed, and a short distance off a second adult sat in a karaka *(Corynocarpus laevigatus)*. This bird later flew down to sit on the ground near the fledgling. For some time the fledgling fed on the leaves of *Hydrocotyle* growing on the ground. When it was disturbed by a weka, it hopped up on to the fallen branch beside one of the adults for a short time while the other adult remained on the ground nearby. Both adults continued mostly to rest but the fledgling was soon back on the ground feeding.

Suddenly, for no apparent reason, the adult on the fallen branch flew directly at the youngster, which flew up into a nearby tree. The attacker, presumably the male, turned to face the other adult and with feathers slightly puffed and tail and wings drooped so that their tips dragged along the ground, it walked towards the second pigeon, head bobbing extravagantly, and then flew at it. Both birds rose about one metre into the air and tumbled together, then landed again. This tumbling was repeated a second time, and then both pigeons flew to a nearby karaka.

This very brief display was remarkably similar to the posturing and head bobbing of domestic pigeons *(Columba livia)*.

Feeding

Most of our observations were of feeding birds.

Pigeons were watched feeding on the foliage of two forest-tree species. The leaves, buds and shoots of the ribbonwood *(Plagianthus betulinus* var. *chathamicus)* were frequently taken. A bird would alight in a tree and would proceed to strip all the branches immediately around it, before shifting to another perch. Leaves were torn off in fragments until the entire leaf and stalk had been eaten. The leaves, terminal shoots and green leaf stalks of *Coprosma chathamica* were also taken. After eating leaf and stalk, a bird would often break off and eat the green shoots up to 10 cm long. Although *Coprosma* berries are probably eaten too, none were seen to be taken.

Pigeons were seen feeding on the *Hymenanthera chathamica, Myrsine chathamica,* and *Pseudopanax chathamica,* even though the berries of the last two were still hard and green.

Of the shrubby species growing in thickets along Cascade Stream, pigeons ate both leaves and the berries of *Coriaria arborea* as well as the ripe fruits of *Macropiper excelsum* which were carefully stripped off their spindles.

Of the creepers and vines the Chatham Island Pigeon fed on the leaves of *Calystegia tuguriorum* where it draped the foliage, again mainly along Cascade Stream, and the ripe berries of *Rhipogonum scandens,* especially where its large bunches of red berries were abundant along the rim of the gorge on the warm western wall.

Two small herbs growing on the grassy slips and clearings, that were frequently grazed by pigeons were *Hydrocotyle* spp. and *Epilobium* spp.

Three species which previous observers have recorded as being taken were also growing in the gorge, *Rhopalostylis sapida, Corynocarpus laevigatus,* and *Corokia macrocarpa.*

ROD MORRIS, *4 Ocean Parade, Pukerua Bay.*

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BREEDING OF THE CHATHAM ISLAND FANTAIL

From 17 November to 27 December 1978 we made observations on the breeding of the Chatham Island Fantail *(Rhipidura fuliginosa penitus)* in the Tuku and Awatotara Valleys in the south-west of Chatham Island. Five occupied nests were found and notes were kept on several other pairs and family groups in the region. These observations supplement those made at a nest the previous summer (Dennison *et al.* 1978).

The nests resembled those of the mainland subspecies *(R. f. placabilis* and *R. f. fuliginosa)* in construction and site. Nests were found in *Coprosma chathamica, Cyathea dealbata, Dracophyllum arboreum* and *Hymenanthera chathamica,* the lowest at 1.5 m in *C. dealbata,* the highest at 5 m in a *H. chathamica.* They were composed

of a variety of small twigs, rootlets, leaves, moss and spiderweb, and were usually lined with *D. arboreum* needles. All were situated on a lateral branch above a gap in the shrub layer and all but one of the nests had a tail.

The only territorial dispute seen, on 11 December, was between two birds from pairs that we suspected had nests with eggs. Initially, one bird chased the other through its territory to the boundary. They then flew parallel along the boundary for 10 metres, a few centimetres apart and about 1 metre above the ground, snapping their bills loudly. At the end of each flight they perched facing each other, flicking their wings open and calling with harsh " saw-like " notes. After a brief 10-15 second confrontation they flew back along the boundary repeating the bill snapping. This boundary flight occurred four times before each bird returned to its own territory. This noisy display attracted a pair of Chatham Island Warblers *(Gerygone albofrontata)*, which were feeding fledglings nearby; a male Chaffinch *(Fringilla coelebs)* and several Silvereyes *(Zosterops lateralis)* became agitated and gave alarm calls.

Courtship behaviour before egg-laying consisted of noisy aerial chases interrupted with bouts of loud " saw-like " song; sometimes these chases ended in courtship feeding. On one occasion, five days before the female began laying, courtship feeding of the female by the male was followed by brief copulation. When incubation began, singing, particularly near the nest, became infrequent, the birds fed singly rather than together, and the noisy chases and courtship feeding ceased.

At two nests, we were able to follow laying and incubation daily. One female began laying in the morning of 4 December, the other on 7 December. In both nests, an egg was laid each morning and the full clutch was four eggs. Both sexes incubated and began when the third egg was laid. A pair studied in January 1978 (Dennison *et al.* 1978) began incubating after the second egg of a three-egg clutch was laid. Therefore, at all three nests, incubation began with the penultimate egg. The Chatham Island Fantail seems to differ from the mainland subspecies in this respect as, according to Blackburn (1966), the North Island Fantail begins incubation after the final egg is laid. The incubation period of the two pairs watched was 15 days. Blackburn (1966) and Soper (1972) also recorded 15 days incubation for the North and South Island subspecies respectively.

The parents shared the continuous brooding of the chicks at these two nests during the first five days, while the chicks were still blind. The brooding bird left the nest to preen and forage whenever the relieving bird returned to feed and brood the chicks. During six hours' observations, faecal sacs were removed by the adults about every 30 minutes. By nine days old, the chicks were being brooded less often during the day, for about 10-15 minutes per hour. The adults fed the chicks at a rate of about one feed per 2.25 minutes, increasing to one feed per minute in the last hour before dusk. The chicks were still brooded at night.

Adults with chicks often called and sang near the nest, usually before feeding the chicks. The " saw-like " song was given when both parents were at the nest or when one bird was waiting to feed the chicks and the other was brooding. During incubation, birds called when nest change-overs occurred. Our observations on Chatham Island ceased before the fledgling period of any brood was determined. In one instance a nest was preyed upon when the chicks were ten days old.

Adults often fed in *Cyathea dealbata* systematically flying and hopping along the underside of the fronds catching insects they disturbed. Moths were commonly flushed from the vegetation and caught in mid-air. On returning to a perch the bird transferred the moth from bill to foot, and holding the moth " hawk-like " the bird removed the moth's wings before eating it or feeding it to chicks.

Three recently flledged chicks, being fed by both parents on 30 November, was our earliest record of flying young, even though several weeks had been spent in suitable habitat prior to this date. This pair had probably begun nesting at the end of October, allowing 15 days incubation and assuming a fledging period of 15 days as in the North Island subspecies (Blackburn 1966). A pair with flying young was seen in the Awatotara valley on 8 December and another pair was very vigorously defending a nest with two chicks, that were nearly ready to fly.

The latest laying date recorded for the Chatham Island Fantail is 21 January (Dennison *et al.* 1978). The nest had been repaired and added to and so was probably a repeat clutch. At this time, breeding in the Tuku valley had virtually ended, and adult and juvenile Fantails, Silvereyes and Chatham Island Warblers were feeding in mixed flocks.

The breeding season of the Chatham Island Fantail therefore probably extends from late October to late January, which allows time for only one or two broods to be raised. The mainland subspecies have a longer season, with up to five broods being raised between August and February (Blackburn 1966, Falla *et al.* 1979). The single-brooded Chatham Island Robin *(Petroica traversi)* similarly has a shorter breeding season, from mid-October to early December, than the double-brooded Robin *(Petroica australis)* in New Zealand, from September to February (Falla *et al.* 1979). Chatham Island Fantail breeding reaches its peak around late November-early December, about the same time as other bush-bird species. In November-December 1978, many Silvereye nests with eggs and chicks, two Chatham Island Warbler nests probably with eggs, another with chicks, and Blackbird *(Turdus merula)* and Hedge Sparrow *(Prunella modularis)* nests were found. In eight hectares of bush around our campsite 12 pairs of Chaffinches had territories and were nesting.

The breeding of bush-birds on the Chatham Islands, therefore, seems more synchronised than on the mainland. This is not surprising as the islands have a bleak climate and so there is probably only a

short period from November to January when conditions are optimal for breeding.

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PARAKEET HYBRIDISATION

On 24 December 1978 I was on Little Barrier Island in a photographic hide at a nest hole I believed to be occupied by parakeets. This nest hole was in a kauri *(Agathis australis)* of 60 cm d.b.h. some 230 m above sea level in unmodified forest described as " kauri forest with beech and rata as important elements " by Hamilton (1961, *Little Barrier Island (Hauturu)*, DSIR Res. Bull. 137).

At about 10 a.m., a male Yellow-crowned Parakeet *(Cyanoramphus auriceps auriceps)* came to a perch beside the nest hole and gave a chattering call. After a few seconds a parakeet came so rapidly out of the nest hole that I could not see what species it was before it disappeared from view. A few minutes later it returned to the nest with equal speed. By 4.30 p.m., I had determined that a Red-crowned Parakeet *(Cyanoramphus novaezelandiae novaezelandiae)* was leaving the nest in response to the Yellow-crowned Parakeet's calls. To make further observations, I cut peepholes in all sides of the hide.

At 9.58 the next morning the male Yellow-crowned Parakeet approached the nest chattering. At 10.10 the female Red-crowned Parakeet left the nest, and the two birds flew to a branch some 12 metres away behind the hide. I observed that the female begged for food and was fed by the male. At 10.16 the female returned to the nest.

It is not known whether this pair raised young. Aviculturists who have seen but not bred hybrid parakeets from Red-crowned × Yellow-crowned matings report that the progeny vary in size and may be distinguished by " a variable mottling of red and yellow on the crown " (A. G. Dobbins, pers. comm.) or a " flame-coloured crown " (J. Lobb, pers. comm.).

Extensive parakeet hybridisation in the wild is known on Mangere Island in the Chatham Group and on the Auckland Islands, where the habitats have been modified (C. A. Fleming, pers. comm.; Taylor 1975, *Some ideas on speciation in New Zealand parakeets,* Notornis 22: 110-121). There appear to have been no previous records of interspecific breeding among parakeets in unmodified situations on New Zealand's main islands.

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CLASSIFIED SUMMARISED NOTES

30 June 1978 to 30 June 1979

Compiled by R. B. SIBSON

These notes have been contributed by more than 120 observers, surely an encouraging sign of vitality. Most of the contributors are amateurs, who watch birds for recreation and the fun of the game. Although these notes are by their very nature 'snippety,' they touch upon a wide variety of topics, eg: breeding, distribution, behaviour, diet, flocking, beachcombing and of course, migration. It is not to be expected that the tens of thousands of square miles of bird-rich ocean, which surround our long chain of islands can be adequately covered, but a glance through the notes will show how both land-tied zealots and sharp-eyed mariners can make observations of unusual interest.

The annual gathering and publication of data leads to a clearer understanding of what birds are where; how numerous they are and how successful in a changing environment. These notes cannot give the full picture, but they can fill in a few details. May I thank all contributors, especially those Regional Representatives who so carefully sorted and sifted the notes from their regions. If I have inadvertently omitted a note which some observer thinks particularly significant, I apologise for the slip.

Most of the observations here recorded were made between 30 June 1978 and 30 June 1979. A few made before or after these dates are dated accordingly.

Abbreviations: est = estuary, pen = peninsula, N.P. = National Park, S.F. = State Forest, S.F.P. = State Forest Park, S.P. = Sewage Ponds, W.R. = Wetland Reserve.

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BROWN KIWI *Apteryx australis*

Russell S.F. (KLO) Waiotira calling 18/4 (TGL). Coroglen Rangihau R. heard frequently (Brian Baker per BB). Taranaki, calls heard Huatoki Valley, New Plymouth; Taramoakou Trig on 20/1 (GD). (Sp?) reported by farmer, Waiatoto, S. Westland (HAR).

YELLOW-EYED PENGUIN *Megadyptes antipodes*

Jack's Bay, SE Otago, 4 on 19/11 (P & KM).

BLUE PENGUIN *Eudyptula minor*

B.O.P. Mt Maunganui, Aug '78; a few pairs courting very audibly (PCML).

Westland, Twelve Mile Bluff, reported breeding annually (DJO).

FIORDLAND CRESTED PENGUIN *Eudyptes pachyrhynchus*

Preservation Inlet. Pr. nesting in long cave on Weka Is. on 20/7 (JVM, KM).

CRESTED GREBE *Podiceps cristatus*

Nelson Lakes N.P. Rotoiti near Coldwater Hut 1 on 11/6. Elterwater, 2 courting Aug '77; apparently failed to breed and both had disappeared Jan '78 (TJT). L Alexandrina/McGregor 48 on 12/11 (RJP), L. Te Anau 1 pr. near Caves wharf on 29/11 (KM) 1 pr and 1 juv near Yacht Club on 20/2 (JVM); near Terrace on 27/3 (KM). L. Thomas, max 5 on 21/3 (MB).

N.Z. DABCHICK *P. rufopectus*

Waiotira, pr. on farm dam on 13/1 (TGL). Muriwai dune-lakes, 69 on February census, the average for the last seven years being 65 (SMR). Karioitahi, max 3; Ryburn's lagoon, 1 on 15/7 (DAL). Tuakau/Pukekohe S.P. occasional visitor (AH). Rotokauri 1 on 8/7. Hamilton lake on 15/4 (MAB). B.o.P. scarce; Awaiti wetlands 1 on 27/8 and 22/4 (PCML). Rotoiti, numerous on 24/3, especially in bays on north side (TGL). H.B., visits many lakes and farm dams. L. Runanga 20 on 15/6; Te Roto-o-kiwa 23 on 16/6 (KVT). Taranaki, scarce; Opunake 1 on 21/1 (DGM). Manawatu 227 on 22 ponds, lakes, farm-dams on 24/6 (LJD). Omanuka 16 on 5/5; Kaikotapu 12 on 6/7 (AC). Marton S.P. 25 on 9/6 (LJD).

HOARY-HEADED GREBE *P. poliocephalus*

L. McGregor, one July '78 (RJP). Redcliffe W.R. 2 present, June to November; nest building on 28/8. Adult on 21/3 seen to eat two large tadpoles, first held crosswise in bill and then hit against

the water 10-15 times. Grebe then lifted head and tossed tadpole down with some gulping. None seen on five visits between 29/8 and 21/3 to Lagoon Creek dam, Dawson Dam, L. Thomas and L. Luxmore (MB, RRS).

AUSTRALIAN LITTLE GREBE *Tachybaptus novaehollandiae*
Cheviot, St Anne's Lagoon 1 pr on 7/4 and two full-sized young (BDH, TJT). Redcliff W.R. max. 5 on 3/6 (RRS).

WANDERING ALBATROSS *Diomedea exulans*
B.o.I. 1 close astern on 3/10 (DWW). Foxton Beach, seen passing Aug, Jan, April (JL & MM).

BLACK-BROWED MOLLYMAWK *Diomedea melanophrys*
Raoul Is. 1 with dark brown iris freshly ashore in 31/8/77 (KM). Outside B.o.I. 1 on 3/10 (DWW). Poor Knights 1 on 29/10. Off C. Colville 1 ad. & 1 juv. on 23/5 (TGL). Foxton, 1 passing S. on 30/7 (JL & MM).

YELLOW-NOSED MOLLYMAWK *Diomedea chlororhynchos*
Several sightings in northern waters. 410 miles WSW of C. Reinga 1 on 10/9; 305 miles WSW of C. Reinga 1 imm. on 12/10; 11 miles SE from C. Brett, 1 ad. on 6/6; 12 miles NE from C. Karikari 1 on 6/6; 14 miles ENE of C. Reinga 1 adult on 6/6; 5 miles ENE of Needler Pt 1 on 26/6 (NGC). Cuvier I. Landing Bay 1 juv. on 18/8; 5 miles W of C. Colville, 1 on 23/5 (TGL).

BULLER'S MOLLYMAWK *Diomedea bulleri*
Tasman Bay 3+ May '79 (JH). Off Taiaroa Hd, 5 on 12/5 (P & KM). The swarthy Chatham Is form is commonly seen in coastal waters around Pitt, Mangere and SE Islands (BDB, RBS).

WHITE-CAPPED MOLLYMAWK *Diomedea cauta*
Foxton Beach 40-50 on 27/8 (JL & MM). Tasman Bay, 2 in early April; up to 100 May '79 (JH). Pipikaretu 11 on 10/2 (P & KM).

NELLY *Macronectes giganteus*
Raoul, an imm. of southern form died on the beach, 5/10/77 (KM). Bream Bay 1 on 28/10; off Tiri 1 on 23/5, Rangitoto beacon to Tiri, several on 3/8 (TGL). Waikato Heads, one flying within the estuary on 24/9 (BB). Clive 4 on 17/12 (JL & MM). C. Egmont 2 off-shore on 17/9. Totaranui, 1 on 18/9 (DDM). Foxton, seen off-shore at all seasons, max. 30 passing S. on 27/8. Wellington Hr. up to 6 between 16/10 and 5/12 (JL & MM). D'Urville Is. 12 on east side in early June (JMH).

ANTARCTIC FULMAR *Fulmarus glacialoides*
Many found wrecked between August and January, e.g. Auckland west coast 131, Taranaki 32, Wellington 8 (SMR, DGM, SL). Foxton 7 passing S and 1 N on 27/8 between 0730 and 1030 hrs (JL & MM).

ANTARCTIC PETREL *Thalassoica antarctica*
Dargaville beaches, Aug-Sept, 30 dead; one inland at Kaiwaka (DEC, WJC). Auckland beaches 16; Taranaki 3 (SMR, DGM). Foxton, two passing N close inshore at 0730 hrs and two passing S well out at 0930 hrs on 27/8 (JL & MM). Foveaux St. unusual numbers (MB).

CAPE PIGEON *Daption capense*

Between Tiri and Cuvier Is, several on 3/8 (TGL). Foxton, seldom seen close inshore; 4+ on 27/8 (JL & MM). Pipikaretu, several on 10/2 (P & KM).

GREY-FACED PETREL *Pterodroma macroptera*

Raoul Is, one wrecked on 5/10/77 (KM). Hokianga, several, 8 in one group chasing and calling over the south head on 9/7/79 (DJB). B.o.I. apparent increase of breeders on islets (DC). Tarahiki, many burrows on 11/11 (JMc). Cuvier, Aug 78, much coming and going on the steep slopes; 4/12 adults still feeding well-grown downy young; May '79, many flying over; some landing to clean out burrows (TGL). Mt Maunganui, Aug '78, many present (PCML).

KERGUELEN PETREL *Pterodroma brevirostris*

Pukekohe, one swept inland on 14/7 lived for two days (DAL). Several wrecked, Aug-Oct, e.g. Auckland west coast 12, Taranaki 2, Wellington 2 (SMR, DGM, SC).

TAIKO *Pterodroma magentae*

Tuku Valley, Chatham I. One caught on 1/12; 2 others on 3/12 (HAR).

COOK'S PETREL *Pterodroma cookii*

Great Barrier. Whangaparapara, mid-Jan; heard every dusk flying E to W towards Little Barrier; also 03-04 hrs, especially on 17/1 which was overcast and windy (BDH).

BLACK-WINGED PETREL *Pterodroma nigripennis*

Far North, flying round headlands from North Cape to C. Reinga in broad daylight, Feb '79 (GE, RNT, HB, VH). 4 miles N of Tom Bowling Bay, 4 on 1/2; then throughout day max. 22, till 100 miles W of C. Reinga; chasing and calling tee-tee-tee-tee and soaring up to 100 ft (NGC). Petone, 1 on 30/3 (SC). Invercargill, 1 on 4/1 (RRS). Chatham Islands, Feb '79, Big Mangere some overhead calling after dark; SE Is. after dark perhaps 100 around high ground; evidently a successful colonist; 4 old corpses in skua middens (BDB, RNT, MLF, MMcD, AW).

CHATHAM ISLAND PETREL *Pterodroma axillaris*

SE Island, Feb '79, 6+ seen; 4 banded (BDB, AW, MLF, RNT, MMcD).

BLUE PETREL *Halobaena caerulea*

Many wrecked July-October '78. Dargaville beaches 23 (WJC), Auckland 8 (SMR), Taranaki 4 (DGM), Wellington 5 (SC).

BROAD-BILLED PRION *Pachyptila vittata*

Seagrove, one on 18/7 in paddock attacked and killed by magpies (DAL). L. Tekapo, one landed on Cass Delta on 14/12 (RJP). Big Mangere and SE Islands, thousands in freshly moulted plumage coming ashore after dark to excavate burrows, claim nesting sites and set up prolonged subterranean cacophony, Feb-March (RBS).

ANTARCTIC PRION *Pachyptila desolata*

Wiroa Is, Mangere airport, 1 recently dead on 15/7 (AA).

FAIRY PRION *Pachyptila turtur*

Noted as common around Pinnacles, Poor Knights on 30/10; few Bream Bay 28/8 and 27/1; some between C. Colville and Cuvier on 3/8 and 23/5 (TGL). Mokohinau, 5 offshore on 9/1 (JMcC). Papamoa, at least one blown inland on 12/7 (PCML). Foxton Beach c.100 passing N, evening of 5/1 (JL & MM).

FULMAR PRION *Pachyptila crassirostris*

Dargaville, 1 dead on 5/8 (WJC); 1 on 15/7 at Petone; and 1 on 5/8 at Wainuiomata (SC).

GREY PETREL *Procellaria cinerea*

Aupori pen. 1 dead on 20/8 (DEC).

BLACK PETREL *Procellaria parkinsoni*

c. 5 miles NW of Little Barrier, several followed astern on 8/12; between G. Barrier and Cuvier c.15 astern with *P. carneipes* on 1/3 (TGL).

WHITE-CHINNED PETREL *Procellaria aequinoctialis*

Chatham Is, Waitangi to Big Mangere on 13/2, odd birds as temporary ship followers (BDB, RBS).

FLESH-FOOTED SHEARWATER *Puffinus carneipes*

G. Barrier to Cuvier, still a few on 23/5 (TGL).

BULLERS SHEARWATER *Puffinus bulleri*

275 miles WSW of C. Reinga, small flock (8) on 3/10 (NGC). G. Barrier to Cuvier, still a few on 23/5 (TGL). Chatham Is, several at either end of Pitt Str., Feb to mid-March (BDB, RBS).

SOOTY SHEARWATER *Puffinus griseus*

Dargaville beaches, probably 3000 wrecked Nov '78. 1513 picked up and counted! (WJC). Bream Bay small flocks on 28/10 and a few S of Little Barrier on 7/11 (TGL). Fiordland, large flocks had arrived by 20/9, rather early (Roy Milford per MLB).

FLUTTERING SHEARWATER *Puffinus gavia*

Spirits Bay, 28/1, large flocks offshore (BB). Numerous in northern coastal waters, thinning out by Cuvier (TGL). Foxton Beach max. c.100 on 4/1 and 4/3. Wellington Hr. up to 30, Sept-Oct (JL & MM). Abel Tasman N.P. hundreds offshore on 18/11 (DGM).

LITTLE SHEARWATER *Puffinus assimilis*

Bream Bay, Rimiriki Is, G. Barrier to Cuvier, usually in ones and twos while flutterers are commonly in biggish flocks. Scattered all the way from Cuvier to C. Colville on 23/5 (TGL).

WILSON'S STORM PETREL *Oceanites oceanicus*

5 miles W of C. Colville on course for Tiri, 3 on 23/5 (TGL, CM).

GREY-BACKED STORM PETREL *Garrodia nereis*

Chatham Is. Tuku; often attracted by bright lights (HAR). SE Island, a few still coming ashore in March among hosts of White-faced Storm Petrels (BDB, RBS).

DIVING PETREL *Pelecanoides urinatrix*

Cuvier, May '79, hundreds offshore (TGL).

AUSTRALASIAN GANNET *Sula bassana serrator*

15 miles W of C. Reinga, 100+ adults on 1/2 feeding over disturbed water; 320 miles W of C. Reinga, one adult flying E ahead of a strong wind on 13/5 (NGC). Muriwai, the new mainland colony had a successful season. Manukau, 42 out from Karaka on 24/6 (BB). Port Waikato 17 on 13/5, 7 km upstream (AH). Foxton Beach, at all seasons, max. 16 on 3/12 (JL & MM). Wellington Hr. max. 6 on 3/6, between Petone and Somes I. (SC). Abel Tasman N.P. c.60 offshore on 18/11 (DGM). Croiselles 6+ (1 juv) on 13/3; Tasman Bay 30+ all adults, 2-4/4 (JMH).

BLACK SHAG *Phalacrocorax carbo*

395 miles W of C. Reinga, 1 on 20/4 circled vessel and 19 miles further W the same bird or one in similar plumage (NGC). Cuvier, one, May '79 (TGL). Papakura reservoir, 15 occupied nests and 24+ chicks on 1/10 (AJG, JM). Kapiapia offshore stacks on 6/8, 54 mainly on nests (TH, BB, DMW). B.o.P., Awaiti, Aug-Sept, c.40 nests (PCML). H.B. common throughout (KVT). Mt Hauhungatahi 1 at 950 m on 10/5/78 (MDD). Diamond Lake, 2 on 2/3 (DGM). L. Tekapo, resident; nests in willows and on river cliffs (RJP).

PIED SHAG *Phalacrocorax varius*

Mokohinau, 2 on 21/5 (JMcC). Upper Waitemata, colony near Paremoremo, in use all year (DWW). Increasing in Manukau; Hingaia 97 on 23/7, already a few occupied nests (AH, RS). Kidds Bay, c.80 on 23/6 (AH).

LITTLE BLACK SHAG *Phalacrocorax sulcirostris*

Raoul, Blue Lake, 2 small shags 'long dark bill,' believed to be of this species, July-Oct '77 (KM). The usual winter flocks widely reported in the north, e.g. L. Kereta 18 on 1/10; Hobsonville 60 on 21/5; Glenbrook 25 on 23/9 (DWW). Weymouth c.60 on 22/5 (HRMcK). Waikare outlet 20+ on 16/7 (BB). Matata 16 on 6/5, Awaiti c.15 present on 27/8 (PCML). L. Whangape c. 350 pairs nested; colony almost deserted by 17/3 (JH & BS). H.B. visits most waters; breeds at Harimoana (KVT). Manawatu est, winter visitor, 10 on 3/6 (BDH), max. 17, 6/5 to 30/6. Wellington Hr c.10 July-Aug '78; up to 16 April-June '79 (JL & MM).

LITTLE SHAG *Phalacrocorax melanoleucos brevirostris*

Mokohinau 1 on 21/5 (JMcC). Waipu on 29/7, 18 (5 w.t., 7 l.p., 6 dark); 20 on 23/4 (TGL). Waikare outlet, 90+ on 16/7 (BB). B.o.P., Awaiti c.26 nests on 27/8 (PCML). Taupo, nesting in cave 17/10 and Motuwharu, 49 nests on 21/11, each holding 2-5 eggs or 3-5 young (TBST). L. Tekapo, resident, nesting in willows (RJP).

CHATHAM ISLAND SHAG *Leucocarbo onslowi*

Makarakau, c.30; 5 nests on 24/11 (TCD). Some present on the cliffs near Manukau Pt. on 12/2; but nesting over (BDB, RBS). None seen around Mangere or SE Island; but a few up the NE coast of Pitt; Feb-March (MLF, RNT).

SPOTTED SHAG *Stictocarbo punctatus*

F.o.T. along inner coasts, 1167 on 5/11; 500+ on 17/6 (BB). Kapiapia rocks, 43 nests on 6/8, a few with quarter-grown chicks; and all but two nests had one attendant adult (DMW). Somes I. c.100 on 3/6; nesting in progress; 19 nests, 12 c/3, 7 c/2 (SC).

PITT ISLAND SHAG *Stictocarbo punctatus featherstoni*

Generally distributed; c.40 at Makarakau on 24/11 (TCD). Waitangi, Owenga, Manukau Reef, Pitt Is. Scattered thinly round Mangere and SE Is. max. together 8 (MLF, RBS).

WHITE-FACED HERON *Ardea novaehollandiae*

Flocking after nesting season widely reported. Cuvier 3 on steep pasture on 2/3 (TGL). Auckland isthmus, after mid-winter, nesting widely in suburbs (BB, TGL, RBS). Te Anau, arrived May 1969 (Lionel Woods per MB). Southland lagoons 95 on 19/8; 157 on 30/12 (RRS). Chatham Is, well established and has spread to Pitt, Mangere and SE Is (AW, RBS).

KOTUKU *Egretta alba*

Singles reported from many traditional winter stations. Also Otamatea R. 7 in May '78 (MEW), Jordan's 4 on 13/10 (GE, SMR). Pahurehure Inlet, 3 wintered (HRMcK). L. Whangape, 7 on 16/7 (BB, R & NP) and on 13/12 (BS). Horowhenua 5 on 7/8 (BDH). Waimea est, 3 on 27/2 (KLO). Wairau est. 4 on 5/11 (JH & BS). At Miranda one on 29/4 captured 11 'herrings' with 20 stabs in 8 minutes (ARL).

LITTLE EGRET *Egretta garzetta*

Kerikeri April '79, one on seasonal lake (ATE). Bayly's Beach, one at small pond for two weeks in April (WJC). Otamatea R. one during May '78 (MEW). Whangateau 1 on 28/9 (DWW). H.B., Westshore 1 from at least 24/3 to 4/6 (KVT). New Plymouth, Rotomanu, 3 April-May (RWW). Tangimoana 1 on 20/7 (AC). Foxton No. 1, one July-October '78 (MDD) and 7 April-30 June '79 (MD, JL & MM).

REEF HERON *Egretta sacra*

Widespread reports in N.I. of ones and twos; but none of communal roosts, e.g. Taranaki, thinly distributed from Urenui to C. Egmont. S.I.: Croiselles 1 on 13/3 (JMH). Heathcote-Avon est. usually one or two (GG). Katiki 1 on 10/6; Nugget Pt. 1 on 11/5 (P & KM).

CATTLE EGRET *Bubulcus ibis*

Some non-breeders stayed over the summer, 78-79, the winter irruption surpassed all others, as these egrets returned in record numbers 600+ to most traditional localities or explored new ones.

BITTERN *Botaurus stellaris poiciloptilus*

N. Wairoa, widespread (WJC). Waiotira 2 on 18/6 (TGL). L. Kereta and Kawakatai c.12 on 13/8 and 1/10; frequent daylight booming (DWW); 1 perching in Kanuka for more than two hours till two others flew past on 13/8 (MJT). Aka Aka swamp near Hood's Landing, several on 7/9 booming frequently on a calm day (BB). B.o.P., Thornton lagoon 4 on 24/9 (PCML). Tutaekuri est.

1 on 11/1 (MD). East Clive 2 on 1/7; Ahuriri 6 on 12/8; Te Rotokere 2 on 25/4 (KVT). Waitotara est. 4 on 26/11 (RWW, WFC, DGM). Foxton (JL & MM). Rai Valley 1 on 16/6 (K & AU). Martin's Bay 1 on 25/6 (KM). Redcliffe W.R. max. 2; L. George 8 on 7/8 (IAM per RRS).

GLOSSY IBIS *Plegadis falcinellus*

Meremere, one on 4/6; 19/6; still present mid-October '79 (J. Cheyne *et al.*). L. Elterwater 1 on 2/6 (TJT). Waimea est., 1 on 18/2 and 17/4 (KLO, JMH).

WHITE IBIS *Threskiornis molucca*

Foxton No. 1, one on 6/8 (HAR).

ROYAL SPOONBILL *Platalea regia*

Waitara est, 1 on 3-4/12 (WFC, RWW). H.B., Westshore 1 on 4/6 (KVT). Manawatu est, usually some 23-26 during June (BDH, LJD, JL & MM). Farewell Spit, 6 on 3/3 (JMH). Waimea est, 14 on 27/2 (KLO), 16 on 18/3 (JMH, PMS). Bromley S.P. 2 on 19/5 (P & KM). Wairau lagoons, 6 in May '79 (C. Macnab per JC).

YELLOW-BILLED SPOONBILL *Platalea flavipes*

Near Waipapakauri, one on 20/10; evidently a 'lost' youngster now at least two years old (KLO).

CANADA GOOSE *Branta canadensis*

Waikato northwards, strays appearing more often (MAB, DAL). Harrisville 7 on 16/11. L. Waikare, 25 on 6/5 and 21/5 (AH). Taranaki, 2 over Fitzroy on 27/11 (GEL). Westshore, 12 on 30/9 (KVT). Foxton 10+ on 9/5 (MD). L. Elterwater, max. 36 in June (TJT). Molesworth, Saxton Valley 100+ on 19/2; Ada Valley 300+ on 25/4 (AC). Rainbow Valley 7 on 8/4 (PJ). Kaikoura, occasional visitor (JAC). Barrytown, 11 on 26/8 and 18/11 (DJO). St Anne's Lagoon, 15 on 7/4 (TJT). L. Tennyson, 2 on 20/11; Diamond Lake, Dart Valley c.150 on 2/3; Glenorchy, dozens on 2/3 (DGM). Te Anau Downs, pr with 5 goslings on 12/12 (KM, JVM). Redcliff W.R. max. 51 on 28/7 (RRS). L. Waitaki 350+, May '79 (JCH).

PARADISE SHELDUCK *Tadorna variegata*

Continues to increase in once forested northern districts and visiting most sizeable waters. C. Reinga 18 on 28/1. Waiotira moulting flock of c.200 on 13/1 (TGL). Clevedon 29 on 27/5 (MEMcK). Coromandel near Jackson's Bay 30+ on 3/4 (WE & MF). B.o.P. and lower Kaimais scattered pairs, Aug-Sept (KF). Awaiti wetlands, max. 325 on 22/4 (PCML). H.B. widespread, 54 on 30/6 at Kautuku swamp (KVT). Foxton 28 on 16/6 (JL & MM). Pauatahanui 3 on 22/4 (MD). Nelson Lakes 168 at Lake Station on 1/4 (PJ). L. Maerae 100+ on 21/2 (AC). Cass Delta, 600+ moulting on one tarn Jan '79 (RJP). Pleasant R. 28 on 8/4 (P & KM). Rees R. dozens on 1/3; Diamond L. and Dart Valley c.150 on 2/3; upper Glenroy 8 on 20/11; Rainbow R. 5 on 20/11 (DGM). Redcliff W.R. max. 94 on 27/2 (RRS).

GREY DUCK *Anas superciliosa*

Breeds at Tuakau/Pukekohe S.P. in competition with many Mallard. 29 ducks and 22 ducklings on 14/10 (AH). B.o.P. 30 at

Matata on 22/4; c.50 on 6/5 (PCML). H.B., Westshore 6 on 4/6 (KVT).

GREY TEAL *Anas gibberifrons*

Tuakau/Pukekohe S.P. 5 broods — 8, 7, 6, 5, 4, on 14/10; later c.200 (AH). F.o.T. up to 15 in March (RML) 41 on 19/4 (AH). B.o.P., Awaiti 4 on 22/4; Matata c.50 on 6/5 (PCML). H.B., Puketapu, 10 on 30/7; Westshore, c.90 on 20/5 (KVT). Karere Lagoon, ducklings seen on 3/10 (LJD). Manawatu est, 3 on 5/5 (JL & MM). Nelson Haven 1 on 25/6 (JMH). Birchwood N. Otago 11 on 16/2/78 (JCH). Hooper's Inlet 26 on 18/2 (P & KM). Redcliff W.R. max. 24 on 19/3 (RRS).

BROWN TEAL *Anas chlorotis*

Great Barrier, flocks max. 104 around coast at many streammouths and on tidal flats, sometimes near human habitations (TGL, BDH). Hokianga Hr, pair on upper tidal reaches of Mangamuka on 15/10; Whangaruru est., c.60 on 31/1 (KLO). Helena Bay, 8+ on 31/12 (TGL). Takou, 33 on 9/12: apparently moved to lakes on Te Pene Plateau about March; none at usual river bend on 22/5 (ATE). Tuakau, 1 on 7/12 (AH).

N.Z. SHOVELER *Anas rhynchotis*

Waiotira, c.20 on 13/1 (TGL). N. Muriwai lakes, 4 on 15/11 and 16/4 (DWW). Tuakau/Pukekohe S.P., 146 on 14/10, drakes outnumbering ducks;c. 175 on 21/1; only c.10 in April (AH). Miranda, 23 on 19/4 (AH). Hamilton Lake, 10 drakes and 7 ducks on 2/6 (MAB). B.o.P. Matata, 8 pairs on 27/8; c.80 on 6/5; Thornton Lagoon, c.30 on 24/9 (PCML). H.B., deserts lakes and ponds in May to go out to sea (KVT). Taranaki, an irregular visitor in small numbers to coastal lakes e.g. at Pihama (RWW, DGM). Kaikotapu, 13 on 6/7 (AC). Himatangi, c.20 on 24/9 (JL & MM). Nelson Haven, scarce; 9 on 1/10 (PM, PH). Barrytown, drake on 26/8; 2 pairs on 18/5 (DJO). Grassmere, 2000+ on 8/4 (BDH, TJT). L. Forsyth, 80+ on 7/2/78 (JCH). Redcliff W.R. max. 177 on 19/3 (RRS).

BLUE DUCK *Hymenolaimus malacorhynchus*

Upper Waikohu, pair nesting under homestead verandah, Sep '78; 4 pairs on 5 km of Korenga R, Matawai (AB). Nelson, 1 visiting waters within city and consorting with Paradise Duck (KLO). Hopeless Creek, Traver's Valley, one often with Paradise Duck (PJ). Shark Cove, Dusky Sound, drake with pr of Paradise ducks on 4/10 (KM).

N.Z. SCAUP *Aythya novaeseelandiae*

Western Springs, 2 on 24/9 (escapes?) (DWW). B.o.P., Matata, 5 pairs on 27/8; c. 30 on 22/4 (PCML). Tuakau/Pukekohe S.P., 1 on 7/12 (AH). H.B. Kautuku swamp, 9 on 13/5 (KVT). Taranaki, a thin scattering, Waiwakaiho est., 4 on 29/11 (RWW). L. Mangamahoe 40+ on 24/10/77 (JCH). L. Pounui, 7 on 9/9; Waikareiti, 17 on 17/5 (TCD, MDD). Runanga S.P., 1 pair on 9/3 (KLO). St Anne's Lagoon, 68 on 20/5 (JCH). Cass Delta, up to 80 Aug-Dec apparently non-breeders (RJP). Wanaka, 65 on 10/3/78. L. Hayes,

56 on 9/3/78 (JCH). L. Orbell, duck with 3 young on 6/2 (KM). Redcliff W.R. max. 198 on 27/11 (RRS).

HARRIER *Circus approximans*

Kerikeri, Jan '79, one quartering a farm lake banked sharply to avoid a flock of hawking Swallows (ATE). Cass Delta, first display flights seen on 18/7, during a mild spell; regular displays after 27/8 (RJP).

N.Z. FALCON *Falco novaeseelandiae*

An increase in reports from the northern fringe of this falcon's range. Otautu, near C. Colville, 2 in Jan preying on a young Black-backed Gull (TH). Pirongia, Tawhitiwhiti, 1 on 21/4 (DAL). Several sightings near Kawhia; pr playing and calling on 17/4 (Sue Grant). B.o.P., Waikino on 30/10 (JCH). Lower Kaimais, pr tumbling and squealing on 14/9. Omanawa Gorge, pr probably nesting on 29/10 (KF). Tolaga Bay (JCH). Gisborne, young male in suburbs, 26/5 (AB). Napier, seen at Bluff Hill (MPM) and Anzac Park (JCH). Mt Hauhungatahi, 1 on 9/5 (MDD, HAR). Taranaki, 1 at 1400m. on 11/3; 3 at Dieffenbach Cliffs on 13/3; Humphries Castle 21/9; ranging over farmland May-November (RWW). L. Rotoiti, 1 casually chasing 3 ducks on 11/6 (KLO). Mt Robert, Lakeland Flats, Sabine R. (PJ). Ward, several sightings, including dark juv. (TJT). L. Benmore, 1 on 28/5 eating mouse, flustered by human comings and goings (BS). Singles seen Livingstone Temple Forest, Hermitage, Kawarau Gorge (JCH). Birchwood Hill, 1 on 9/7. Te Anau, chasing and eating Sparrows, March '78 (JVM).

NANKEEN KESTREL *Falco cenchroides*

Picton, one reported hovering with gulls and terns over harbour (K & AU).

CHUKOR *Alectoris chukar*

Ward, No. 3 spur — up to 11 (TJT). Carr, few in '79 compared with past two years (RJP). L. Waitaki, 7+, Feb. '78 (JCH).

BANDED RAIL *Rallus philippensis*

Numerous coastal reports from Parengarenga (KLO) to B.o.P. (PCML, KF) and Kawhia (SG). Port Fitzroy, several calling in evening of 7/12 (TGL). Occasional inland reports: confluence of Kopuera and Maramarua R., 1 caught on 3/3 (DAL). Whatawhata (TC). Tasman Bay, Riwaka, 1 dead (KLO).

WEKA *Gallirallus australis*

Recolonists continue to thrive and spread at B.o.I. (DBR) and Waipu (TGL). Kaipara, Slater's Refuge, 1 on 9/6 (BS). Chatham Islands, the buff form *hectori* prospers, especially around the Tuku camp (RBS).

MARSH CRAKE *Porzana pusilla*

Rehutai, dune-lake, 1 seen in flight on 6/1 (WJC). L. Alexandrina, locally common (RJP). Redcliff W.R. resident. Monowai, 1 on 26/2 (RRS).

SPOTLESS CRAKE *Porzana tabuensis*

Tape-recorders have proved most effective in detecting the presence of these secretive 'purring' rails, which till a few years ago were thought to be rather rare. So far recorded from 30% of Northland map-squares (ATE); also Ponati lagoon and Spirit's Bay Oct-Nov (KLO); N. Wairoa and Pouto Lakes (WJC). Helena Bay calling 31/12; Waiotira seen in raupo on 13/1 (TGL). Tapora (BB). Waitakere swamps (DWW). Waiuku (DAL). Kawhia (MJT) and swamps in Pirongia foothills (JH & BS). Rotoiti, Waiiti stream (TGL). Taihape-Napier Rd, 2 calling in Long Swamp on 1/5 (BRK). Oakura (GD). L. Pounui on 9/9; L. Ngakawau on 9/4 (MDD, HAR).

PUKEKO *Porphyrio melanotus*

H.B., plentiful. Westshore c.200 on 26/5; L. Runanga 164 on 29/4 (KVT). Pauatahanui Inlet c.25 on 21/4 (MD). L. Alexandrina irregular visitor (RJP). Martin's Bay, McKenzie lagoon, 1 near airstrip on 20/2 and 13/6 (JVM, KM). Fiordland, Kaipo airstrip 7 on 12/6 (KM). Redcliff W.R. max. c.60. Southland Lagoons, 7 on 19/8; 42 on 30/12 (RRS). Chatham I. and Pitt, occasional sightings (MDD, TCD, HAR, BDB, AW).

COOT *Fulica atra*

Te Werahi swamp, one on 27/1 (J. Cheyne). Hamilton Lake; has increased rapidly, 33 on 13/8 (TC), 19 prs and 35 young in late Nov. (JC), 49 on 26/6 (DWW), 56 on 10/6 (MAB). University of Waikato Lake, 2 in Jan '79 (EM). H.B., Tutira, 200+ on 17/8/77 (JCH), c.114 in two groups of 90 and 24 on 27/9 (BRK). Palmerston North Centennial lagoon, 1 on 28/10. L. Pounui, 1 on 9/9 (MDD, TCD). Elterwater, 5 on 20/8/77 (TJT). St Anne's Lagoon, 3 on 7/4 (TJT), 18 on 20/5 (JCH). L. Alexandrina and McGregor, have declined (RJP). Oxbow Lagoon, 1 on 5/2 (MB).

S.I. PIED OYSTERCATCHER *Haematopus ostralegus finschi*

Numbers wintering in north still seem to be increasing, Paua c.30 on 22/8 and 1/3 (ATE). Rangiputa, 25 on 23/10 (KLO) and 4/11 (JHS). Whangarei Hr., 1365 on 6/7; 106 on 14/11; 462 on 3/3 (MPK). Waipu est., 4 on 23/4 (TGL). Jordan's x1000 on 18/3 (RBS). Hobsonville, 3 on 2/2. Waikato est. c.105 on 10/9 and 18/10 (AH). F.o.T., 1311 on 5/11; 12 091 winter census '79 Manukau 1974 on 3/12; 25 420 on winter census '79 (BB). Clevedon-Kawakawa Bay-Umupuia, 727 on 14/4 (AJG, MEMcK). Kawhia 1598 on 30/6 (JH & BS). Tauranga, rarely seen at eastern end of harbour; 2 with stilts at Aerodrome Bay on 20/5 (KF). Little Waihi-Maketu, max. 10 (PCML). H.B., 2 at Mangatahi on R. Ngaruroro c. 20 miles inland with stilts and dotterels on 30/12 (BRK). Mokau est, northward passage noted 26/12-14/1, flocks of 50+, 28, 16, etc. (RWW). Manawatu est., max. 75 on 17/3 (JL & MM) flocks flying N. Punakaiki, 15 on 3/12; Barrytown, 13 on 12/12 (DJO). Abel Tasman N.P. some dozens 18/11; Upper Wairau, Dip Flat, 3 on 20/11 (DGM). Ward, show little fear of working tractors. Marfell Beach Road, 24 on 25/7 (TJT). Lynwood Block, Te Anau average date of return '65-'74, June 29th (Lionel Woods per MLB). Bluff c.400 near Tiwhai smelter on 13/1 (MD). Southland Lagoons, 1231 on 19/8, winter census; 1233 on 30/12 (RRS).

VARIABLE OYSTERCATCHER *Haematopus unicolor*

Paua, 17 on 22/8; 20+ on 31/3 (ATE). Rarawa Beach, 34 on 20/8. Great Exhibition Bay, 122 in several flocks, certainly mainly Variables; possibly a few S.I.P.O. (KB, AH). Rangiputa Bank, 3 prs on 8/11 (JHS). Kerikeri Inlet, 26 over May-July '79 established a routine, gathering on a shellbank as tide rose, moving to a rock-shelf at full tide and dispersing thence to feed on exposed flats (ATE). Koutu Beach, Hokianga, winter flock up to 31 (DJB). Ruakaka, 28 on 24/9 (AHG), 31 on 4/11 (MPK). Waipu, max. 77 on 18/6 (TGL). Opoutere, 2 prs nesting over mid-summer (BB). Great Barrier, 26 in mid-Jan, including just-flying young; also nest c/2 on 14/1 (BDH). B.o.P. Omokoroa Beach, 36 non-breeders on 10/10 (KF). Sulphur Pt, 4 prs nested successfully; post-nuptial flocking, 38 on 7/3; 22 on 16/6. Little Waihi, max. 25 on 3/6. Maketu, 11 on 6/2 (PCML). Ohope Spit, 1 pr and 2 fledglings on 10/1 (MD). Waikato est., 17 on 24/9; 31 on 29/4; 20 on 10/6 (AH). Taranaki, Mimi est., 2 on 18/2; Abel Tasman N.P., 2 at Sandfly Bay on 18/11 (DGM). Manawatu est., usually 1-3 (JL & MM). Marfell Beach, one with S.I.P.O. (TJT). Nugget Point, 23 on 11/5 (P & KM).

CHATHAM ISLAND OYSTERCATCHER *Haematopus chathamensis*

Pairs at Durham Pt and Point Gap (PCML). Nest c/2 on 24/11 (MDD, TCD, HAR). Scattered pairs bred successfully on Pitt, Big Mangere and SE Is. (BDB, RBS).

SPUR-WINGED PLOVER *Vanellus miles novaehollandiae*

Miranda, one heard 6/12 (Gerald Robinson), 2 prs appeared, winter '79 (MSF). Gisborne, Muriwai Lagoon, pr for some weeks, Dec. '78 (AB). Volcanic Plateau, Tokoroa airstrip, 1 pr (JCD). Whakamaru, pr with 2 chicks on 8/9 (Hans Rook). Karatau, pr winter '78 (MPM). H.B., L. Poukawa, 26 on 25/4 (BRK), 9 pr on 11/5 (MDD, HAR). Waipawa, pr at farm dam, Sep '78 (IBD). Bred near Dannevirke below Ruahines (MPM). Hopelands, pr defending territory; Awatoto, 3 on 6/12; Te Hauke, 26 on 16/6 (KVT). Taranaki, 1 pr, spring '78 (Mrs Penwarden) at Urenui; Brixton, 4/2, first noticed mobbing a Harrier (RWW). Manawatu, now common and spreading inland (HAR), forming flocks 10, 16 etc (JL & MM). Turnbull's Lagoon, 11 on 12/3; others at Foxton, Santoft (LJD). L. Horowhenua, 9 on 19/8; Whiteman's Valley, 14 on 26/5 (BDH). Nelson Haven, 5 on 23/3 (JMH). Appleby, 18+ Murchison, 51 on 20/4 (KLO). L. Rotoiti, Lake Station c.50 on 6/6 (PJ). Ada-Waiau junction, 19 on 25/4 (AC). Ward, now well established, Marfell, Sept '78 pr and 3 chicks; 10 on 25/7/79 (TJT), Kaikoura, pr reared 4 chicks Nov-Dec '77 (JAC). Washdyke, 12 on 29/5 (BS). Cass Delta, no nests before August (RJP). Paradise, Dart Valley c.40 on 1/3 (DGM). Martin's Bay, 2 calling at night on beach on 13/6 (KM). Redcliff W.R. max. 44 on 30/3. Southland lagoons 252 on 19/8; 191 on 30/12 (RRS).

GREY PLOVER *Pluvialis squatarola*

Manukau. Kidd's Bay, 1 from at least 13/8 to 4/3 (RC, DWW).

LEAST GOLDEN PLOVER *Pluvialis fulva*

Paua, 20 in October, 38 Nov, c.100 Dec; 200+ Jan '79; c.100 on 31/3 (ATE, BJB, BB). Great Barrier, 30 on 17/1 (BDH). Port Whangarei, 19 on 2/2 (WJC). Jordan's, 15 on 17/10. Oyster Pt, 28 on 29/1 (AH, JAFJ, RBS). Mataitai, 4 on 6/3 (AH). Manukau,

16 on 5/10, 77 on 20/1 (BB), c.120 on 10/2 (DWW), 14 on 13/4 (AH). F.o.T., c.150 on 5/11, summer census (BB). H.B., Westshore, 6 on 14/10; c.30 on 10/2 (KVT); Rangitikei est., 1 on 18/2 (LJD, BP). Manawatu est., 21 throughout summer (LJD). Waimea est, 5 on 8/1 (JMH), 10 on 8/3 (PMS, JMH). Kaikoura, 1 on 13/1 (JAC). Chatham Is., 2 at Te Whanga Lagoon on 24/11 (MDD, HAR).

N.Z. DOTTEREL *Charadrius obscurus*

Paua, no large post-breeding flocking noted (ATE). Rangiputa, 23 on 23/10 (KLO). Port Whangarei, 52 on 8/7; 11 on 3/3 (MPK), 27 on 28/4 (WJC). Dargaville coast, 45 in 18 km on 23/6 (WJC). Ruakaka, 11 on 23/9, 2 prs guarding territories (AHG). Waipu, max. 18 on 29/7 (TGL). Great Barrier, 10+ on 14/1; Whangapoua 10 (BDH). Mataitai, 24 on 6/3; 22 on 17/4 (AH), 25 on 19/4 (HRMcK, MEMcK). Wiroa Is., 9 on 25/1 and 26/6 (DWW). Karaka, no autumn flock (BB). F.o.T., 9 at gravel pits on 17/6 (TGL, RBS). B.o.P., apparent increase around Sulphur Pt, 10 during winter '78; first chick seen on 17/10; several chicks on 7/1; flock of 20 on 3/5; 16 on 18/6, 5 with buff breasts; 11 grey (KF). A few pairs along coast (PCML). Scattered pairs south to Kawhia and Taharoa (JH & BS). Nelson Haven, 1 in breeding dress on 7/9 (JMH).

BANDED DOTTEREL *Charadrius bicinctus*

Paua, 10 in Sept. '78; 200, Jan-Feb; 1000 in March (ATE). Port Whangarei, none seen Nov. '78 or March '79 (MPK). Great Barrier, 21 on 17/1 (BDH). Oyster Pt., c.250 on 29/1 (AH, JAFJ). Mataitai c.200 on 6/3 (AH). Kawa Kawa Bay, Umupuia, 85 on 19/4 (MEMcK, AJG). Ardmore, 36-50 during Feb. (Peter Coleman). Kawakawa Bay, c.30 on 17/6 (RBS). Manukau winter census 580 (BB). F.o.T., max. c.150 on 4/2 (BB). Bethells, pair bred, running chick on 5/1 (OP). B.o.P. Sulphur Pt, 3 prs nesting 1/10; Kaituna Cut 3 prs breeding, 21/10; 13 (5 juv.) on 31/12; Maketu c.30 on 3/6; Ohope Spit, 4 on 24/9 (PCML). H.B., breeds all large riverbeds and some along coast. Awatoto c.30 on 20/1 (JL & MM). Westshore, c.12 on 10/2 (KVT). New Plymouth airport, 30 on 28/2; 27 on 4/4; Mimi est., 2 on 18/2; Waitotara, 6 on 26/11 (RWW, DGM). Waiongone, 10 on 13/2 (GD). Rangitikei R., Bulls-Tangimoana, 58 on 11/11. Longburn, 25 flying up river on 16/6 (HAR). Manawatu est., c.60 on 17/3 (JL & MM). Ohau, 40 on 27/5 (BDH). Rainbow R., 1 on 20/11 (DGM). L. Tekapo, c.250 wintering in '78 and 350 in '79, mostly at the Godley Delta (RJP). Lynwood block, Te Anau, seen occasionally, max. 12; no sign of breeding (Lionel Woods per MB). Martin's Bay, 4 on sandspit on 13/6 (KM). Southland Lagoons, 20 on 19/8; 85 on 30/12 (RRS). Shag R. Est., 1 on 10/6 (P & KM). Chatham Is. several pairs on rough farmland in SW, Nov.-Dec; 101 on Te Whanga lagoon on 24/11; nest c/3 on 24/11 (TCD, MDD, HAR).

MONGOLIAN DOTTEREL *Charadrius mongolus*

Manukau S., 1, possibly 2, 18/10-4/4 (KJF, AH).

LARGE SAND DOTTEREL *Charadrius leschenaultii*

Manukau S., 1 from 17/10-18/4; 2 from 10/12-18/3, call note *true-eet* (AH, BB, DWW).

BLACK-FRONTED DOTTEREL *Charadrius melanops*

B.o.P., Welcome Bay, 2 on 11/6 and 19/6 (KF). H.B., Ahuriri est. c.80 feeding in grass or on mud at edge of outfall channel on 12/8. Awatoto, 10 on 19/12 (KVT). Tutaekuri est., 3 on 12/1 (MD). L. Poukawa, 25 feeding with Spur-winged Plovers on 11/5 on muddy stubble (BRK). Pahiatua S.P., 2 on 23/8 (SC). Waingawa S.P., 15 on 16/4 (BDH); 29 on 28/5 (MDD). Omanuka Lagoon, fairly regular; 6 on 6/7 (AC); 13 on 27/3; 8 on 18/5 (MD); 199 on three rivers on 11/11; namely Manawatu 117; Rangitikei 66; Oroua 16 (MDD, LJD, HAR). Longburn, max. 65, on 30/7/78; 91 on 19/5/79 (MDD). Otaki S.P., 7 on 24/5, dashing up and down the concrete strip like sanderlings, pursuing the wind-blown waves (BDH, MDD). Marfell beach road, 1 on 10/7 (TJT). Opihi est., 8 ad. and 2 juv. Dec. '78. Wainono, 1 in April '79 (RJP).

WRYBILL *Anarhynchus frontalis*

Paua, 40 in Jan; 50 in March; one feeding on tidal flat chased by Turnstone (ATE). Great Exhibition Bay several; Whangarei Hr., 143 on 8/7, 14 on 4/11; 12 on 24/12; 50 on 2/2; 132 on 3/3 (MPK, WJC). Great Barrier, 1 at Whangapoua on 17/1 (BDH). Jordan's, 12 on 31/10 (AH, SMR), 45 on 29/1; 120 on 18/3 (MJT, RBS). Manukau, Wiroa I. c.350 on 23/9 (RJVC); summer census 6; winter '79, 1758 (BB). F.o.T., c.190 summered; seasonal pattern of rise and fall normal; c.2500 on 21/1 and 3/6 (JH & BS); but only 2011 on winter census (BB). Port Waikato, 6 on 10/9; 5 on 18/3 (AH). B.o.P., a few summered at Sulphur Pt, e.g. 21 on 12/12; then 31 on 16/1; 90 on 29/1 rising to 190 on 12/5 (KF), 106 on 21/2 (BS). Kaituna, present from 15/7 to 26/11; max. 13 (PCML). Rangitikei est., 2 on 18/2. Manawatu est., usually some; max. 31 on 31/8 (JL & MM). Ohau est., 4 on 15/10 (BDH). Nelson Haven, 20 on 24/8; 1 on 1/10 (PM & PH), 1 on 26/3 (JHM). Motueka, 3 on 9/7/79 (KLO). Marfell Beach, 2 on 4/8/79 (PJ, WAC). Ashley est., 1 on 20/5 with full neck band (BS). Waimakariri Gorge, nest c/2 on 3/12 (GG). Cass Delta; begin to arrive early August. One imm. present late June and throughout July-August '79, evidently over-wintering (RJP).

FAR-EASTERN CURLEW *Numenius madagascariensis*

Paua, none in July; 2 on 22/8; 4 on 21/9; 3 or 4 throughout summer till 1/3; none on 31/3 (ATE). Rangiputa, 4 on 23/10 (KLO). Whangarei, 1 on 8/7 (MPK). Manukau, 2 in Dec. '78 (BB). F.o.T., 4 on 9/9 (TGL); 6 in October; 12 on 5/11 summer census; 7 on 4/3; 2 on 24/3 (AH, BB). Maketu, 1 between 21/10 and 6/2 (PCML). Manawatu est., max. 3 during summer till 17/3 (LJD, JL & MM).

ASIATIC WHIMBREL *Numenius phaeopus variegatus*

Raoul Is., one 17/9-7/10/77 (KM). Paua, odd birds Aug-Oct; 33 in flock on 6/11; 20 on 29/1 (ATE, JH & BS). Rangiputa, 2 on 8/11 (JHS). Oyster Pt., c.20 on 29/1 (AH, JAFJ, RBS). Manukau S., one June-September; up to 4 throughout summer; 4 on 19/2 (CRV, BB). F.o.T., one on 9/9; 21 on 5/11 (TGL, DAL). Waimea est., 1 on 9/1 (JMH). Maketu, 1 between 13/8 and 6/2 (PCML).

AMERICAN WHIMBREL *Numenius phaeopus hudsonicus*
Karaka, 1 on 25/10 (MSF). Miranda, 1 on 1/11 (AH).

WHIMBREL sp.
Westshore, Ahuriri, 2 on 24/3 (KVT); 2 on 19 and 21/12 (JL & MM); 1 on 11/5 (MDD, HAR). Petone, 1 on 21/10 (SC).

LITTLE WHIMBREL *Numenius minutus*
H.B., Westshore, one feeding quietly along grassy slope on 28/1 (KVT).

ASIATIC BLACK-TAILED GODWIT *Limosa melanuroides*
Whangarei Hr, one on 2/2, 3/3 and 28/4, probably the bird that overwintered in 1978 (WJC, MPK).

BAR-TAILED GODWIT *Limosa lapponica*
Paua, Sept 600+; October-November 1000; Jan, only 270; March c.100 (ATE). Rangiputa, 3000 on 8/11 (JHS). Mangonui Hr. and Kerikeri Inlet transient parties evidently drifting S, Oct-Nov (ATE). B.o.I., last week Sept, many flying over at night and some seen by day (DC). Whangarei, 270 on 8/7; 2119 on 4/11; 3887 on 3/3 (MPK). Waipu, 77 on 16/12 (TGL), 150 on 1/1 (AHG). Mataitai 350 on 24/10. Port Waikato, 60 on 18/10; 73 on 18/3 (AH). Manukau, 10 652 on 3/12; 1616 overwintering '79. F.o.T., 5292 on 5/11; only 256 on winter census '79 (BB, SMR). Jordan's, much outnumbered by Knots on 29/1 and 18/3 (RBS). B.o.P., Opoutere 230 on 14/1 (BB); Sulphur Pt, c.1100 on 1/10 (PCML); high numbers over summer, 6000+ on 3/12; c.5000 on 3/1; rather few overwintering e.g. 85 on 12/5; 82 on 16/6; possibly disturbed by dredging (KF). Kaituna Cut-Maketu c.260 on 21/10; c.1000 on 31/12 (PCML). Ohope Spit c.500 on 24/9 (MD). Kawhia c.100 overwintering '79 (JH & BS). H.B., Westshore c.130 on 30/9; c.400 on 14/10 (KVT); c.500 on 19/12 (JL & MM); c.250 on 24/3, when at 1630 hrs c.100 passed overhead, stringing out as they went N and out along the coast (KVT). New Plymouth, Bell Block, 2 on 29/10; Waitara est., 6 on 27/11; Waitotara, 10 on 26/11 (DGM, WAC, RWW). Rangitikei est., 33 on 18/2. Manawatu est., max 460 during summer; c.30 overwintering (LJD). Motueka, 49 on 9/7/79 (KLO). Waikouaiti, 62 on 24/2 (MB). Southland lagoons, only 89 on 19/8/78, winter census; 4925 on 30/12 (RRS).

GREENSHANK *Tringa nebularia*
B.o.P., Matahui, 1 on 7/1 with Stilts, probably the same bird as seen at the same place a year before (PCML). L. Wairarapa, 2 on 22/1 and 18/2 (MDD, HAR).

TATTLER (?sp) *Tringa brevipes-incana*
Awatoto, 1 on Tutaekuri on 30/12 (JL, MC). Kaikoura, 2 on 24/12; 1 overwintering at least from 20/4-25/7/79 (JAC).

SIBERIAN TATTLER *Tringa brevipes*
Kidd's Bay, 1 on 20/1, jumpy (BJB, BB, AH, MSF). Awarua Lagoon, 1 on 30/12 (RRS). Chatham I., C. Pattison, 1 on 23/11 (MDD, TCD, HAR).

TEREK SANDPIPER *Xenus cinereus*

A poor year. Karaka, 1 on 7/12; 2 on 4/2 (AH, RNT); 1 staying to overwinter '79 (BB).

TURNSTONE *Arenaria interpres*

Raoul, up to 4, Sept-Oct '77. Paua, 300 in Sept, 500 in Nov (ATE), c.1240 late Jan (BB), c.3000 on 31/3 (ATE) (cf C.S.N. Dec. '78). Rangiputa, 800+ on 23/10 (KLO), 200 on 8/11 (JHS). Whangarei, 5 on 4/11 (MPK). Waipu, 9 on 16/12 (TGL). Kidd's Bay, c.350 on 30/12 and 13/4 (AH). Manukau, 262 on 3/12, summer census; 221 overwintering. F.o.T., 141 on 5/11; 52 overwintering (BB). B.o.P., Sulphur Pt, a few most of year, max. 14 on 15/12; 2 on 16/6 (KF). Kaituna cut, 2 on 19/11. Little Waihi, 4 on 22/12 (PCML). H.B., Westshore, 5 on 30/9 (KVT), 1 on 21/12; Te Awanga, 1 on 17/12. Manawatu est., usually some Oct-Feb, max. 6 on 2/12 (JL & MM); Nelson Haven, 1 on 7/10; 3 on 14/3 (JMH). Motueka, 14 on 9/7/79 (KLO). Marfell Beach, 10 on 15/7; 7 on 25/7 feeding in a wet paddock (TJT). Southland Lagoons, 16 on 19/8, winter census; 1166 on 30/12 (MLB, RRS). Chatham I., Waitangi, 62 on 23/11; Te Whanga, 266 and others elsewhere. SE Island, 9 on 16/12 (MDD, HAR).

KNOT *Calidris canutus*

Raoul, 6 on 21/8/77, up to 4 Sept-Oct '77 (KM). Paua, Aug-Nov. max. 300; only 100 on 3/12; 600 on 29/1; March only c.20 (ATE). Rangiputa, 1000+ on 23/10 (KLO), c.2000 on 8/11 (JH & BS). Whangarei, 410 on 4/11, 2001 on 3/3 (MPK). Waipu, 88 on 16/12 (TGL). Jordan's, 7000+ on 29/1 (AH, JAFJ, RBS). Manukau, 10 535 on 3/12, summer census; 6561 overwintering '79. F.o.T., 7472 on 5/11; c.2000 on 3/6 (JH & BS); but only c. 900 on winter census (BB). B.o.P., Sulphur Pt, 4 on 24/1 and 30/1 (KF), 8 on 26/12 (PCML). Kaituna cut, 4 from 19/11-22/12. Matahui, 30+ on 7/1; 22 on 22/1, most recorded in B.o.P. (PCML). H.B., Westshore, 2 on 30/9 (KVT). Bell Block, 5 on 29/10 (DGM). Mokau, 1 on 27/11 (WFC). Manawatu est., some throughout summer, c.80 on 17/2 (JL & MM); 74 on 18/3, none overwintering (LJD). Southland Lagoons, c.175 on 30/12 (RRS). Chatham I., Te Whanga, 500+ on 24/11 (MDD, HAR).

GREAT KNOT *Calidris tenuirostris*

Kidd's Bay, 1 on 18/3 (BB, MSF, CRV) and 1/4 (BJB, BB, RNT). Feeding in front of Lesser Knots, its larger size and longer bill most apparent; streaked on crown; heavily spotted breast; legs yellowish green; white across rump plain in flight.

SHARP-TAILED SANDPIPER *Calidris acuminata*

Paua, 1 on 31/3 (ATE). Karaka, 4 on 28/11; 1 in autumn (SMR, BB). F.o.T., present throughout summer, max. 23 on 5/11 (BB). Sulphur Pt, 4 transients on 30/11 (KF). Kaituna Cut, 2 from 21/10-31/12 (PCML). Westshore, 7 on 28/1 (KVT). Manawatu est., 2, 17/12-18/3 (LJD). Awarua Lagoon, 5 on 30/12 (RRS).

PECTORAL SANDPIPER *Calidris melanotos*

Miranda, 2 on 10/4 (ARL). Kaituna Cut, 1 on 5/11 and 31/12 (PCML). Tutaekuri est., 1 on 6/12 & 19/12 (KVT); also 22/1 with 2 Godwits and a Turnstone (BRK).

CURLEW SANDPIPER *Calidris ferruginea*

Paua, Nov-Dec, 10; Jan-March, 15-16 (ATE, BB). Karaka, 1 on 1/12; 2 on 30/12 (AH) and 20/1 (BB). Miranda 25+ on 1/11; 20+ throughout summer; 20 on 10/4, all reddened; 5 on 29/4 (ARL); 3 pale on 3/6 in Curlew Paddock (JH & BS). Kaituna Cut, 1 on 21/10 and 5/11 (PCML). Southland Lagoons; 13 on 30/12 (RRS).

DUNLIN *Calidris alpina*

Karaka, 1 on 23/6, in breeding plumage, brilliantly rufous (almost 'carroty') back contrasting with white underparts and large black belly-patch; still present on 22/7 (AH, BB, MSF, JAB, RNT, SMR).

RED-NECKED STINT *Calidris ruficollis*

Paua, 4 on 28/1 (BB), March, 6-10 (ATE). Rangiputa, 1 on 23/10 (KLO), 2 on 8/11 (JHS). Karaka, 6 on 18/8 were probably overstayers; influx in October c.25 on 25/10; but 15-18 over summer; 9 on 4/4, 6 being well 'balaclavad,' calling loudly, often *t-rrr*-ing; also some answering soft calls; 3 pale birds were silent, 6 on 6/5; 5 on 23/6 (AH, BB, DWW). F.o.T., 3 on 15/10 (PW, RNT), max. 6 over summer; 2 on 5/4 (ARL) and 3 on 17/6 (BB, TGL). B.o.P., Sulphur Pt, 2 on 26/12 (PCML); 1 most of summer till May (KF). Rangitikei est., 1 on 18/2 (SEC, RAC). Manawatu est., 3 on 29/10 (JL & MM), 1 on 17/4 and 13/5 (LJD). Grassmere, 1 on 10/7 (TJT). Southland Lagoons, 37 on 30/12 (RRS).

WESTERN SANDPIPER *Calidris mauri*

Paua, 1 on 28/1; bill heavier and larger than in *ruficollis* (4 nearby for comparison), drooped at tip; crown streaky; dark at and behind eye; legs black; otherwise grey above, white below; watched at c.25m through x15-60 telescope (BJB, BB).

PIED STILT *Himantopus leucocephalus*

Paua, increased to 500+ by March (ATE). Whangarei, 374 on 8/7; 181 on 4/11; 943 on 3/3 (MPK). Waipu, 30 on 16/12; Waiotira, 70 inland on damp pasture on 4/6 (TGL). Jordan's, 1000+ on 18/3 (MJT, RBS). Manukau, 562 on summer census; 6561 in winter '79; Papakura, Aug. '78, c.8 prs nesting on a poultry farm. F.o.T., 1101 on summer census; 5918, winter '79 (BB, SMR). B.o.P., Kaituna, 250 on 19/11, c.600 on 3/6; Matahui Pt, 145 on 7/1 (PCML). H.B., abundant c.500 on 12/8 (KVT), c.1000 on 11/5, L. Poukawa, 99 on 11/5. Wairoa est. and Whakaki Lagoon c. 460 on 10/5. R. Manawatu, 41 on 10/11; R. Rangitikei, 76 on 11/11 (HAR, MDD). Manawatu est, c.120 on 30/8 (MD), max. c.450 on 26/5 (JL & MM). Waingawa S.P., 70 on 23/2; Foxton No. 3, 147 on 1/4 (MDD). Taranaki, Bell Block, 66 on 29/10; Opunake, 83 on 21/1 (DGM). Upper Wairau, 2 near Rainbow on 20/11 (DGM). L. Forsyth, 520+ on 7/2/78 (JCH). Katiki Beach, 44 on 10/6 (P & KM). Te Anau, Lynwood Block, average date of return '65-'74, July 26 (Lionel Woods per MLB). Redcliff W.R., present Aug-Feb, max. 161 (RRS). Southland Lagoons, 174 on 19/8; 298 on 30/12 (RRS).

BLACK STILT *Himantopus novaezealandiae*

Few reports of pure 'all-blacks'; several of 'smudgies' showing varying degrees, traces of white on face or underparts. Wiroa I., 1 on

2/5 and 21/6 with some whitish undertail coverts (DWW). Miranda, 1 typical smudgy from 4/3 and throughout winter (AH, TH, ARL). Kawhia, Ope Ope rocks, where some are expected almost every winter, 2 on 12/2, one black, one smudgy; 2 on 14/3 black; 6 on 30/6 (JH & BS). Longburn, 1 smudgy on 14/10 (LJD). Horowhenua, 1 on 24/6 (SC). Grassmere, 1 on 8/4 (BDH, TJT). L. MacGregor, 1 twice disturbed by Harrier on 23/2 (MLB). "The latest count of Blacks is c.20 pairs plus a number of solitary birds, mainly males, mated with pied/hybrids." (RJP). Oreti headwaters, 1 smudgy on 10/10 (S. A. Sutherland per RRS).

SOUTHERN GREAT SKUA *Stercorarius skua lonnbergi*

Chrystall's Beach, 1 on 15/4 (P & KM). Chatham Is. Feb-March, some dozens on Big Mangere and SE Islands. Pitt I., 1 on 7/3 visiting Glory Bay to scavenge dog tucker (RBS).

POMARINE SKUA *Stercorarius pomarinus*

Rangitaiki est., 2 possibles on 4/4 (PCML). Off Clive, 2 on 17 and 20/12 (JL & MM).

ARCTIC SKUA *Stercorarius parasiticus*

Mokohinau, 1on 8/1 (JMc); 7 miles west of C.Colville, 1, dark phase, harassing terns on 23/5, evidently overwintering (TGL). Rangitaiki est., 5+ on 4/4 (PCML). Clive, 10+ on 17 and 20/12 (JL & MM). Awakino, 1 on 3/1 (RWW). Foxton Beach, often seen offshore, Oct-5/5, max. 4 on 5/2 (JL & MM). Petone, 2 on 16/4 (SC). Off Ngauranga, 1 on 5/4 (JL & MM). Tasman Bay, 1 on 3/4 (JMH). Punakaiki, 2 on 20/4 (DJO). Kaikoura, 1 dying 15/11 (JAC). Chatham I., Te Awapatiki, 2 near tern colony on 20/11 (MDD, HAR). Manukau Reef, 1 dark-breasted among terns on 12/2 (RBS).

BLACK-BACKED GULL *Larus dominicanus*

Tauranga, great increase. 'They look a well-fed lot and do not interfere with other birds. 2 pairs nested on Sulphur Pt Island' (KF); 112 (90% sub-adult) on 3/12 (PCML). H.B., c.3000 between estuaries of Ngaruroro and Tukituki (KVT). Ruapehu, c.8000 on 6/2, 3 on snow and ice, feeding presumably off abundant flies and insects (DAL). Waimakariri Gorge, c.1000 on 3/12 at nesting colony; eggs mostly hatched and chicks mobile (GG). Rees Valley, 12 on 1/3 (DGM).

RED-BILLED GULL *Larus novaehollandiae scopulinus*

Rangiputa on 8/11, 300-350 birds, incubating; one nest with small chicks (JHS). Cuvier, Oct '78, c.500 prs nested; but few if any, raised young. By 7/12 few birds remained; there were many abandoned nests and some dead chicks (TGL). Opoutere, Hikinui Is. on 14/1, c.50 prs; only c.10 still at nests (BB). H.B., Ngaruroro c.100 on 22/7 (KVT). Castle Point, 22 nests still with eggs on 1/1; many chicks also present. Onoke Spit on 31/12, 1 nest c/2 in tern colony (MDD, TCD).

BLACK-BILLED GULL *Larus bulleri*

Kelly's Bay, Pouto, 1 with 13 Red-billed on 4/6, the most northerly record (WJC). Kawakawa Bay, 6 on 17/6 (TGL, RBS). Karaka, 1 on 5/10 (BB). F.o.T., 63 on 5/11; 380+ in winter (BB).

Kawhia, 2 on 30/6 (JH & BS). B.o.P., Tarawera Est., 30 on 30/7, 10 on 10/6; Little Waihi, 5 on 3/6 (PCML). Gisborne, Muriwai Lagoon, 131 on 29/9; group of 30 foot-trembling; no Red-billed (AB, JCH). H.B., Ngaruroro est., c.240 on 22/7; c.300 on 5/5; Ahuriri c.130 on 14/10; Tukituki, 30 inland on 7/4 (KVT). Taranaki, Rahotu est., 10 on 9/10 (RWW, DGM). Foxton, c.40 in flooded paddock on 24/5 (MDD, BDH). L. Wairarapa, 55 on 4/2 (BDH).

WHITE-WINGED BLACK TERN *Chlidonias leucopterus*

Farewell Spit, 1 on 3/3 (JMH). Opihi, 1 on 1/2 in full breeding dress with *S. albostriata* (JHS).. One seems to be an annual visitor to Cass Delta, viz. 21/10/77-25/1/78; then 29/10/78-28/1/79. In breeding dress till Jan, when it moults quickly (RJP).

GULL-BILLED TERN *Gelochelidon nilotica*

Kaipara, 1 at Jordan's on 31/7 and Oyster Pt on 31/10 (AH, SMR, KJF, GE).

CASPIAN TERN *Hydroprogne caspia*

Rangiputa bank, 180+ adults, 20-30 chicks, one very small, others half-grown on 8/11 (JHS). Waipu, max. 8 on 19/8 (TGL). Kawa Kawa Bay-Umupuia, 68 on 19/4 (MEMcK, AJG). Mataitai, c.50 on 17/4 (AH). Manukau, 17 on 5/11, summer census; 232 winter '79. F.o.T., 126 on 3/12; 330 on winter census (BB, RBS). When the fishing is good off Karaka, Caspians may join Gannets and Pied Shags. Waikato est., c.160 adults and 20 chicks on 28/11 (AH). B.o.P., size of some coastal roosts well down (PCML). Sulphur Pt, 1 pr c/1 on 4/10; for ten minutes on 24/10, 6 juv. Caspians deliberately annoyed nesting *striata* by dive-bombing or sitting among them and squawking. The noise was startling. Usual winter roosting flock c.40; but 73 on 3/2 (KF). East Clive, 15 on 1/7. Ahuriri, 15 on 26/5 (KVT). Manawatu est., max. 15 during March (JL & MM). Palliser Spit, 26 occupied nests, most with young chicks on 26/11 (JL). Southland Lagoons, 7 on 19/8, winter census; main colony 50+ nests, second colony 14+ nests on 31/12 (MLB & RRS).

BLACK-FRONTED TERN *Sterna albostriata*

B.o.P., Tarawera est., 26 (8 juv.) on 30/7; 7 (2 juv.) on 6/8; 1 juv. on 19/8; 3 juv. on 4/4; 13 on 22/4; 14 on 20/5 (PCML). Gisborne, Muriwai Lagoon, 17 on 11/10/77 (AB, JCH). H.B., Ngaruroro est., 45 on 24/6; 4 on 23/4 (KVT). Manawatu est., 1 on 5/2 and 16/4 (JL & MM). Farewell Spit, 40+ on 3/3 (JMH). Upper Wairau, several on 20/11 (DGM). Dashwood, Awatere, 190+, 30 of which were on the ground (TJT). Kaikoura, Kowhai est., 128 on 21/2; The Point c.60 on 1/6 (JAC). L. Waitaki, 7 mid-May (JCH). Either under-recorded or declining.

ARCTIC TERN *Sterna paradisaea*

Southland, West Plains, 1 found dead on pasture 18/11 (RRS).

FAIRY TERN *Sterna nereis*

Waipu, max. 4 on 16/12 (TGL), 2 pairs on 1/1, one with nest c/2 (AG). Mangawhai, 2 on 17/9; 3 on 19/11; 3 ad., and 2 flying young on 14/1, one adult carrying food; 1 on 16/4 and 23/6 (SMR, MJT).

LITTLE TERN *Sterna albifrons*

Paua, 1 on 29/1 (BB). Rangiputa, 24 on 23/10 (KLO), 37 on 8/11 (JHS). Dargaville coast, 1 dead near Glink's Gully on 20/11 (WJC). Whangarei Hr, 9 on 4/1; 13 on 3/3 (MPK). Rawene, 2 on 20/1 (DJB). Karaka, present all summer, 12 on 3/2 (RNT, RBS). Jordan's, 3 on 31/10 (SMR, GE). Miranda, 6 on 1/11; 4 on 4/3 and 1/4; 1 on 6/5 (BB, AH, JH, BS). Tauranga, 3 arrived c. 3/11; 7 by 21/11; 5+ all summer, 2 still on 29/4 (KF, PCML). Manawatu, 1 on 28 and 29/10 (JL & MM). Dunedin, 1 in the Lower Hr, cross channel on 16/11. Off Dog Island on 21/3/77, 11 on the edge of a flock of feed Sooty Shearwaters. The Little Terns fed by making shallow dives and only half-submerging their bodies. Most southerly record for this species in NZ (JAFJ).

WHITE-FRONTED TERN *Sterna striata*

Aupori pen., hundreds off both coasts in February (NWC). Cable Bay, 400 on 30/1 (BB). Rangiputa, egg-laying not started on 8/11 (JHS). Waipu, one banded 13/1/57 (RBS) found dead at Uretiti on 24/3/79 (A & AG). Cuvier, c.30 prs bred with some success. Remuera, small flights, e.g. 10, 6, crossing the isthmus in October (TGL). B.o.P., Sulphur Pt island, many bred successfully; c.200 adults and first eggs about 10/11; c.1000 adults in Dec., downy chicks still being fed on 15/3. Other colonies at Mt Maunganui and Rabbit Island, Kaituna Cut, 60 on 19/11; Tarawera est., roosting numbers fluctuated 60-200; Rangitaiki est., c.1000 on 4/4 with attendant skuas (KF, PCML). Ngarururo, c.12 on 17/2; Tukituki, c.60 on 22/10; 1 on 7/4 fishing inland c.1 mile (KVT). Manawatu est., c1000 on 6/2 (JL & MM). Oreti est., 62 nests with eggs on 19/12 (MLB). Chatham Is., Manukau Reef c.300 on 12/2; Big Mangere, 60-75 at roost; SE Island, c.150 on 2/3; Pitt Island, c.200 at Glory Bay on 4/3; few juv, seeming to indicate low breeding success (RBS).

SOOTY TERN *Sterna fuscata*

Raoul, Feb '77, all chicks in Denham Bay drowned in gale; Sept-Oct, 500-2000 back (KM). Bayly's Beach, 1 dead on 14/2 (WJC). Waikawa, 1 dead on 18/2, wrecked perhaps by cyclone Henry (SC).

GREY TERNLET *Procelsterna cerulea*

Poor Knights, summer 78-79, 400+ presumed breeding (JH & BS).

N.Z. PIGEON *Hemiphaga novaeseelandiae*

Papakura, 6+ in acmenas on 24/8 (BB). Gisborne, 1 in garden, 11/5-7/6 (AB). Maraetotara, 5 on 6/2; Tutira, 3 on 16/12 (KVT). Makarora, 15+ near school on 3/3 (DGM).

CHATHAM ISLAND PIGEON *Hemiphaga chathamensis*

Tuku Valley, 5 sightings 16/3-3/4; once 2 together (PCML); 2 feeding on green berries and tips of shoots of *Hymenanthera chathamica* (HAR).

WHITE COCKATOO *Cacatua galerita*

Flocks frequently disperse across the Waikato estuary to feed in Waiuku State Forest (AH, BB).

KAKA *Nestor meridionalis*

Awanui, Aug '78, 3 in puriris (DV). Raetea Forest (KB). Russell, 1 in Nov '77 (GC) and 1 in Oct '78 (LDS). Tamaterau, 2 in Nov '78; 1 late June '79 (CWD). Mokohinau, 1 on 23/5 flew over from Fanel (JMcC). Great Barrier, commonly seen or heard at Pt Fitzroy and Shoal Bay (TGL). Coroglen, Rangihau Rd 22/10 (BB). Tarawera est., 1 dead on beach 30/7 (PCML). Waitara, 1 at Tikorangi Aug-Sept '78 and 14/4 (RWW). Mt Humphries, 2, 28 and 29/12/77 (RWW, GD). Nelson Lakes, Rotoiti, several wintered near Buller Gorge; Travers Valley present on 1/12 (PJ).

KEA *Nestor notabilis*

St. Arnaud, ringed bird filching fat put out for Wax-eyes, winter '78 (PJ).

EASTERN ROSELLA *Platycercus eximius*

Orere, c.35 on 8/4 (HRMcK). Advancing Hunua and Colville Ranges. Pirongia foothills S to Oparau (BB, BS). Waipori Falls, 5 on 15/4 (P & KM).

RED-CROWNED PARAKEET *Cyanoramphus novaezelandiae*

Waipoua, present (KLO). Cuvier apparently thriving after introduction (TGL).

CHATHAM ISLAND RED-CROWNED PARAKEET *C. n. chathamensis*

Flock of 10 feeding on young tips of *Dracophyllum*, 7/12 (MDD, HAR). Abundant on Big Mangere and SE Island (RBS).

YELLOW-CROWNED PARAKEET *Cyanoramphus auriceps*

Cuvier, odd birds present, Feb-Aug '79. Recent invaders? (TGL). Taranaki, Mt Humphries, 1 seen; parakeets heard on several occasions (RWW). Mt Richmond F.P., 1 pr on 7/6. Big Bush S.F., 1 pair in forest of red and silver beech on 28/6 (KLO). Preservation Inlet, Cromarty, 1 on 7/9 (KM).

ORIENTAL CUCKOO *Cuculus saturatus*

Ponatahi, 1 frequenting a willow grove beside Ruamahunga R. from at least 28/12/77-1/1/78 (MDD, BDH, MLF).

SHINING CUCKOO *Chrysococcyx lucidus*

B.o.I., many heard passing over at night, first week Sept (DC). First song: Ponui 13/9 (PC), Clevedon, 2/10 (MEMcK), Ward, 14/10 (TJT), Dunedin, 18/10 (MLB), Punakaiki 27/9; frequent by 5/10 (DJO). Cuvier, common Nov '78; 1 as late as 17/5 'tsiuing' (TGL). Tauranga, 1 at the Mount on 7/11 chased by 3 Grey Warblers (KF). Otanewainuku, 2 heard on 15/10; 6 seen on 23/12 (PCML). L. Alexandrina, 2 in pines on 20/8/77 with 2 Long-tailed; no further occurrences till Nov (RJP).

LONG-TAILED CUCKOO *Eudynamys taitensis*

Cuvier, 1 picked up exhausted Oct; 1 seen Nov '78; 1 calling 7/2 (TGL). Otanewainuku, 3 on 15/10 (PCML). Punakaiki, 1 on 1/11; several by 4/11 (DJO). Kaikoura, Kowhai Bush, 1 on 7/3 (RP). Catlins S.F.P., quite common (P & KM). L. Alexandrina, 2+ in pines on 28/8/77; 1 on 23/12 and 25/12/77 (RJP).

MOREPORK *Ninox novaeselandiae*
Mokohinau, 2 on 23/5 (JMcC). Clevedon, pr and 2 flying young on 1/1 (PF, BJB, HRMcK). Foxton Beach, 1 on 12/8, our first local record (JL & MM).

SPINE-TAILED SWIFT *Chaetura caudacuta*
Bayly's Beach, 1 dead on 15/12 (WJC). Karamea, 1 found dazed in Dec. Waikawa, Catlins S.F.P., 1 on 16/11 (TC). Tautuku Lodge, 60+ on 16/2, overcast with light rain. By far the biggest flock seen in New Zealand (PM). Stewart Is., 12+ around Bob's Pt on 5/1 (GE & HW).

N.Z. KINGFISHER *Halcyon sancta*
Henderson Valley, stealing worms from Song Thrushes (DWW). Ward, Feb, 1 with 2½" fish in bill (TJT). L. Alexandrina, 1 seen mid-winter '78. Regular sightings in summer; but population small (RJP).

RIFLEMAN *Acanthisitta chloris*
L. Rotoiti, fair numbers in bush at SE end (TGL). Waitara R. headwaters, 8+ April (RWW). Tararuas Field's Track, c.50 on 9/6 (MD). Leatham Valley, 20+; Gordon Valley 10+; Molesworth, Elliot Hut often in willows and introduced trees, Feb (AC). Widespread, especially in beech forest. Travers Valley, flying young both being fed and foraging for themselves on 29/10 (PJ). Noted at Mt Aspiring N.P.; Diamond Lake, Dart Valley, Haast Pass, early March (DGM).

ROCK WREN *Xenicus gilviventris*
Saxton Saddle on 19/2 (AC).

SKYLARK *Alauda arvensis*
45 miles WSW of C. Reinga, 1 flying round ship on 19/9 (NGC). Cass Delta '78, first singing on 18/7; '79 imperfect song on 19/7, full song on 21/7. By 3/8 most birds on territories; but on 9/8 when 10 cm of snow lay, birds apparently left territories and up to 1500 gathered where hay was being fed out to sheep. By 15/8 most birds had reoccupied territories. A few small flocks persisted into September (RJP).

AUSTRALIAN TREE MARTIN *Hylochelidon nigricans*
Miranda, after storms and high winds, one flying along ditch on 18/2 (BB). Farewell Spit, 1 on 3/10 (Dr M. Harris per JMH).

WELCOME SWALLOW *Hirundo neoxena*
Raoul, June-Nov '77, seen widely; 23 on 7/8/77 (KM). 'Widespread throughout,' applies to most N.I. lowlands. Post-nuptial flocks, sometimes of 100+, often noted hawking over water or among cattle, e.g. late May, 300+ at Karaka circling high near water's edge in fine weather; many more than usual for more than a fortnight (G & JU). Occurs now on many offshore islands, e.g. Mokohinau, 2 on 21/5; Karumurumu, 2 on 20/1 (JMcC); Cuvier, breeding (TGL). Chatham Island, airport and Te Whanga Lagoon (BDB, RBS). Kerikeri, 20/7, pr twittering and sitting on fence wire near site where two broods were raised last season (ATE). Waiotira, nest used for some years on top of meter-box; adults dive-bomb cat as need arises (TGL). AMDB, at artificial nest-box, 4 chicks in Sept; 3 in Nov; third brood

deserted (SMR). Diving repeated on shags swimming in farm pond (ET). Karapiro, albino on 29/12 (TT). Ward and Kaikoura, still increasing and flocking after summer (JAC, TJT). L. Tekapo, 2 on 16/3; 1 on 27/5 (RJP). Te Anau, 2 on 26/4 (L. Woods per MLB). Southland, still few summer sightings. Redcliff W.R., present over winter. L. George, pr raised two broods (IAM, RRS).

N.Z. PIPIT *Anthus novaeseelandiae*

C. Reinga, pr and used nest; Spirits Bay, 2-3 prs, 28/1 (BB, BJB). Waiotira, uncommon, 1 on 13/1. Cuvier, 1 on 14/5. L. Rotoiti, seen occasionally on rough forest clearings (TGL). Sightings at Pakiri on 19/5, Waiwera, 20/5, Muriwai, 26/5 (MJT). Hunua hill roads, 5 on 16/6 (HRMcK, BJB). Karaka, 2 on 10/2; first seen here by BB. Miranda coast, now scarce; mainly in autumn; 1 on masonry of old limeworks on 17/3; Awhitu outer beaches, not uncommon May-December (DAL, RBS). Kapiapia, 6 on 8/8; Coroglen and summit of Kopu-Hikuai Rd, a few (BB). B.o.P. coast, scarce winter visitor seen between April and July. Papamoa, recorded only once in summer (PCML). H.B., Fernhill, 3 on 23/7; Tukituki, 1 on stony bank 7/4 (KVT). Ward, 1 briefly chased by Yellowhammer on 23/1 (TJT). Mt Robert, near top of ridge. Travers R., none seen below the bridge (PJ). Cass Delta, first song-flight for '79 on 22/8 (RJP). Preservation Inlet, Cording I., 1 on 16/7 (JVM, KM). Apparently becoming more and more a bird of the wilderness.

DUNNOCK *Prunella modularis*

N. Wairoa and Pouto pen, seen and heard widely; song from late May (WJC). Cuvier, inconspicuous Feb-March, common and singing in May (TGL). Auckland west coast, Muriwai to Kapiapia, fairly common; also inland in the hills (BB). Tahuna Torea, 1 surviving in suburbia and singing on 12/6 (RBS). Cass Delta, singing starts in July, viz. 27/7/78; part song on 2/7/79 and full song on 6/7 (RJP). Fiordland, basin NW of Mt George, nest c/5 on 5/12 (KM). Chatham I., common at the bush edge, Tuku (HAR). No song heard 13/2-10/3 on Big Mangere, SE and Pitt Is. (RBS).

FERNBIRD *Bowdleria punctata*

Waikuku, North Cape, Jan '79, 35 counted (VHH). Paua, nest c/4 on 6/11, just hatching (JHS). Pouto pen., locally common, e.g. 10+ at Tawhara Ck on 3/6; 3 Omamari on 14/6 (WJC). Whangamarino Swamp, many in wiwi and manuka on 1/4 (DAL). Ruku block, Hamilton, surviving in peatlands (LB). Taihape-Napier Rd, Long Swamp 6+ heard on 1/5 (BRK). Totaranui, several calling on 19/11 (DGM). Motueka S.F. 3; Tasman Bay, Marahau Inlet, pr seen on 5/12 (KLO). Fiordland N.P., 2 on 14/10 at Henry Ck. Martin's Bay, some calling on 14/6, 25/6 and 20/12 (KM, JVM). Redcliff W.R., can be heard most months (RRS). Invercargill, pr nest-building on 28/10; 29 visits with 'straws' to nest-site in 31 minutes (MLB).

BROWN CREEPER *Finschia novaeseelandiae*

Ward, present in farm gully among willows and wild plums (TJT). Mt Robert, flocking by 13/12, some singing by mid-August (PJ). Akaroa, 2 on 6/4 (GG). Mt McLean, common above 400 m

(HAR). Haast Pass, 12 on 3/3 (DGM). Waitahuna Hill, c.10 on 15/4; Chrystall's Beach, c.10 on 16/4 (P & KM).

WHITEHEAD *Mohoua albicilla*

Otanewainuku, always present, more audible than visible, c.10 on 15/10 (PCML). Rotoiti, small numbers 25/3 (TGL); located, but not easily, August '78 (RBS). H.B., Woodstock, c.10 on 10/12 in remnant of bush ringing with their song (KVT). Mt Bruce, small noisy flock in bush on 5/4 (RBS); 4 on 7/7; Harris Ck, Tararuas, 9 on 23/6 (AC). Field's Track, 2 on 9/6 (MD). Matemateonga Ranges, numerous (RWW).

YELLOWHEAD *Mohoua ochrocephala*

L. Manapouri, George Bay, 2+ on 2/1. Mt Luxmore Track, small flock on 5/1 (JVM). Catlin's S.F., Rata Range, some (P & KM, TC, PB, NH).

GREY WARBLER *Gerygone igata*

H.B., Tutira, 12 on 16/12; Elsthorpe, Paeroa Stn c. 20 on 6/5 (KVT). Cass Delta: snippets of song on 3/8/78; in July in mild winters (RJP). Mt Aspiring N.P., Diamond Lake, Dart Valley, Haast Pass, Rainbow R.; not noticeably common (DGM).

CHATHAM ISLAND WARBLER *Gerygone albofrontata*

Tuku, fair numbers (PCML, HAR). SE Island, numerous after a good season; many greenish 'juv,' quite distinct from adults, in Feb-March (RBS).

FANTAIL *Rhipidura fuliginosa*

Mokohinau, 3 on 21/5; Tarahiki Is, 4+ on 11/11 (JMcC). H.B., Tutira, 12 on 16/12; Elsthorpe c.18 on 6/5 (KVT). Akaroa, many pied and one black on 6/4 (GG). Diamond Lake, Dart Valley, Haast Pass, several, March '79 (DGM). New Plymouth, 1 black in suburban garden, Mar-August and 20-29/10 (RWW).

PIED TIT *Petroica macrocephala toitoi*

Northland, more widespread than had been believed; recorded in 37 map squares (ATE). Tutamoe Track, 5 heard on 23/11; Whau Valley Dam 10/6 (WJC). Otanewainuku, 5 males on 14/11 (DWW). Rotoiti, moderate numbers (TGL). Coroglen, small numbers (BB). Pirongia foothills, persisting (RBS). Matawai, pure albino on Koranga Stream (AB).

YELLOW-BREASTED TIT *P. m. macrocephala*

Present Mt Aspiring N.P.; Diamond Lake, Dart Valley, Haast Pass, March '79 (DGM). Te Anau, Ivan Wilson Park, male singing 6/4 and 24/4 (JVM).

CHATHAM ISLAND TIT *Petroica chathamensis*

Possibly now missing on the main island (HAR). Thriving and inescapable on SE Island (RBS). Pitt I., persisting in Glory Block (RNT).

N.I. ROBIN *Miro longipes*

Otanewainuku, 6 seen and more heard on 23/12 (PCML). Rotoiti, 1 on 25/3 (TGL). Matemateonga Range, fair numbers (RWW, GD).

S.I. ROBIN *Miro australis*

St Arnaud, often seen and heard (PJ). Upper Glenroy, several on 20/11; Routeburn, Mt Aspiring N.P., Dart Valley, fair numbers (DGM). Manapouri, South Arm, 1 on 9/7; MacKenzie Basin (915m), 1 sang all day 2/11; no sign of it over next 9 days (JVM).

SONG THRUSH *Turdus philomelos*

Waiotira, faint song on 22/4 (TGL). Auckland, autumn song, slow to start; little before May (RBS). Cass Delta, singing becomes evident second half of July (RJP). Penrod oil rig, 40 miles offshore, 1 on 18/8 (RRS).

BLACKBIRD *Turdus merula*

Waiotira, fairly strong song by 22/6. Waipu, full song on 29/7 (TGL).

SILVEREYE *Zosterops lateralis*

Remuera, seeking nectar on flowers of *Rondeletia* in Sept (RBS). Tauranga, large winter flocks favour acacias which start flowering in June (KF). Blenheim, mutual preening by pair in garden (PJ). Chatham I., the commonest bird in the forest remnants (HAR).

BELLBIRD *Anthornis melanura*

Northland, sightings at 7 places on east coast between Helena Bay and Pataua (A & AG). Cuvier, the most numerous passerine (TGL). Tutira, 1 on 16/12, singing for more than 5 minutes without a stop (KVT). Ward, 1 chased a Waxeye at high speed for 80 m till out of sight behind trees. Bellbird returned with feather in bill (TJT). Above Heathcote-Avon estuary, increasing numbers, April-September, attracted by flowering gums. Craigieburn F.P. common (GG).

TUI *Prosthemadera novaeseelandiae*

Hunua Hills, 12 on 8/4 (HRMcK). Cuvier, normally a rare straggler but during May-June, there was a minor invasion; the flowering of kohekohe seems to have been the attraction. Rotoiti, less common than Bellbirds (TGL). St Arnaud, numbers vary, 3 ad. on 6/1 ' going mad,' but unable to stop stoat from raiding nest and killing young (PJ). Makarora, common March '79 (DGM). Between Haast and Arawhata only one seen 27/3 and 1/4 (HAR). Preservation Inlet, 2 taking Fuchsia nectar at Cattle Cove on 10/9 (KM).

CHATHAM ISLAND TUI *Prosthemadera n. chathamensis*

Rare (HAR). Tuku Valley and forest, not common (PCML). SE Island, a mere handful (RBS).

YELLOWHAMMER *Emberiza citrinella*

Foxton Beach, c.500 on 3/6 in one flock (JL & MM). Cass Delta, first full song on 22/8 (RJP). Chatham I., Tuku, 2 seen Dec '78 (HAR).

CIRL BUNTING *Emberiza cirlus*

Gisborne, 2 on 19/5 and 28/5; 1 on 26/9 (JCH). Wanganui R., 1 at Kaiwhaiti on 18/7 (AC). Nelson, lower Maitai, 2 males

feeding on lawn seed on 6/10 (KLO). Ward, pr on 10/12 with 2 flying young; earliest nesting I have recorded; female giving quiet alarm call similar to soft territorial call of male. Marfell Beach Road, 4 on 25/7 (TJT). Cattle Creek, 14 on 25/12; L. Hayes, 3 on 9/3; Arrowtown, 2, Kawarau Gorge, 1 on 10/3; L. Hawea, 5 on 10/3 (JCH).

CHAFFINCH *Fringilla coelebs*

Oparau on 20/8, four times one hovered and pecked at reflection; then flew to another window to repeat performance; finally perched and sang strongly (MJT). Cass Delta, in a mild winter, singing may be expected towards the end of the third week of July (RJP).

GREENFINCH *Carduelis chloris*

Cuvier, c.60 on 9/8 (TGL). Preservation Inlet, July '78, noted at Weka Island, Cording Island, Kisbee Bay, Resolution Bay; Chalky Inlet, Fisherman's Bay on 21/7 (JVM, KM). Invercargill, 20/12, feeding at flax flowers; fronts and crowns golden with pollen (MLB).

GOLDFINCH *Carduelis carduelis*

Mokohinau, 20 on 20/5 (JMcC). Remuera, mid-winter, feeding daily on prickly liquid amber bobbles, sometimes on lavender heads (RBS). Pukekohe, 2 fledglings still in nest on 11/3 (DAL). Big Mangere Island, a few in Feb (RBS). Preservation Inlet, small flocks in July; Chalky Inlet, 35+ at Fisherman's Bay on 21/7 (JVM, KM).

REDPOLL *Carduelis flammea*

Cuvier, odd birds (TGL). Papamoa, hundreds in July-August after poa seeds on lawns with Goldfinches (PCML). H.B., Kuripuponga, 10 on 15/10; Woodstock, c.10 on 10/12 (KVT). Ward, 30+ Nov. '78 (TJT). Widely noted, Mt Aspiring N.P.; Dart Valley; Makarora, Haast Pass, Wairau; St Arnaud (DGM). SE Island, abundant (RBS).

STARLING *Sturnus vulgaris*

Te Anau, Lynwood Block, 1965/66, huge flocks; paddocks black with them; nothing similar seen since (Lionel Woods per MLB). SE Island, often feed on green mats of algae in typical 'Thinornis country.' There is also a big roost, augmented by hundreds of birds which come from Pitt Island and return to Pitt soon after day-break. Harriers show some interest as the Starlings settle in for the night (RBS). Ward, noted as imitating calls of California Quail, Black-backed Gull, Little Owl, Paradise Shelduck, Black Swan, Oystercatcher and Blackbird alarm-notes (TJT).

MYNA *Acridotheres tristis*

Whitford, c.600 at rubbish tip on 27/10 (AJG, MEMcK). Blenheim, 2 at Riverlands, February '78 (TJT).

N.I. SADDLEBACK *Philesturnus carunculatus rufusater*

Middle Chicken, many in song audible from Starfish Bay on 28/10. Cuvier, thriving; population perhaps now 400 (TGL).

N.I. KOKAKO *Callaeas cinerea wilsoni*

Raetea S.F., 1 on 16/1, apparently young (KLO). Kohukohunui, 2 on 3/9 (TGL). Mt Maumaupaki, pr. near previous nest-site; court-

ship feeding on 23/10 as they 'talked' softly; seen to eat unripe supplejack berries and young fern leaves (BB). Otanewainuku, 2 heard on 15/10; 2 seen on 23/12 (PCML). Rerekapa, at least 3 on 14 and 15/4 (RWW).

BLACK-BACKED MAGPIE *Gymnorhina tibicen*

Waiotira, 1 on 4/6; Kawakawa Bay, 1 on 17/6 (TGL, RBS). South Auckland region, becoming commoner, especially in west (BB).

WHITE-BACKED MAGPIE *Gymnorhina hypoleuca*

B.o.P., still scarce but becoming entrenched (PCML). Ureweras, Kaipo Lagoon, 4 on 17/5 (MDD). Mt Robert, 1 above bushline on 17/3 (PJ). Ward, 14 on 29/7 (TJT). Eglinton Valley, Smithy Ck, 1 on 13/7 (KM). Te Anau, first seen Lynwood Block, 28/9/77; resident since (Lionel Woods per MLB). Ivan Wilson Park, 6 on 5/9 (JVM).

ROOK *Corvus frugilegus*

F.o.T., some evidence that small breakaway rookeries are being formed (BB, RBS). Gisborne, occasional sightings (JCH). Taranaki, 1 at Huiaroa, May '78 (JM). Ward, 1 seen twice Sept '78 (TJT). Balclutha, small new rookery, 2 nests, 5+ birds on 12/9 in tall blue-gums. Rooks also reliably reported from Te Houka and Clydevale (GG).

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SHORT NOTES

HARRIER IMITATING OSPREY

At Hood's Landing in the Waikato River estuary on 29 April 1979, I saw a Harrier *(Circus approximans)* flying downstream about 4 metres above the water. Suddenly, it doubled back and picked up a fish with its feet, which disappeared under the surface. The Harrier did this without any difficulty. I could not tell whether the fish was alive or dead.

It then flew off with the fish in its talons, presumably to some roost or plucking-place where it could eat its catch at leisure. I did not see the Harrier alight; but shortly afterwards I saw it being pursued by two other Harriers. It still had the fish in its talons. When they left, the Harrier flew back towards what was evidently its intended destination.

A. HABRAKEN, *Harrisville Road, R.D. 2, Pukekohe.*

SHORT NOTE

HOUSE SPARROWS EXCAVATING FOR NESTING SITES

Our house is fitted with two window-boxes that are 5.5 m from the ground. In each box are flower pots 18 cm in diameter, in which I grow geraniums.

On 1 November 1977, I noticed some earth had been removed from one flower pot, leaving a depression about 8 x 3 cm. On the morning of the 3rd, a pair of House Sparrows *(Passer domesticus)* was removing earth from another pot in the next box, using bill and claw to do the earthworks, dropping the earth removed into the window-box. Working intermittently, they had dug a 9 x 5 cm hole by the middle of next day. The hole was lined with straw. A low branch of geranium was included in the roof construction by having straw woven over it, and a little " run-in," a tunnel, was made directed to the back of the box. This was useful for observation as it enabled me to look directly into the nest.

One egg was laid on each of 7, 8 and 9 November. Both adults incubated. Two eggs were hatched on 22 November and the chicks were seen to be fed that morning. The third chick was hatched next morning, but this chick did not survive, probably being trampled by the two larger chicks. The dead chick was removed by the adult male to the lawn about 6 m away. From 0630, the two remaining chicks were fed at ½-2 minute intervals for one hour. Then they were fed occasionally until about 1100, even though the parents appeared frequently at the nest. Between 1100 and 1300, feeding was more constant, though less concentrated than earlier. After this, they were fed only occasionally until dusk, when both adults settled on the nest.

Both adults fed the chicks and both helped with nest maintenance, repairing or adding more material regularly. Either adult would remove faecal sacs, which were sometimes swallowed immediately but occasionally were put on the sill until nest work was done and then taken to the lawn out of my sight. I marked one chick with a brush and ink.

As soon as feeding periods were over, the adult birds cleaned the faces of the chicks, especially around the eyes and bill, by using a light pecking and scraping action. The chicks were alerted to the approach of the adults by a signal that I could not pick up immediately. Usually one chick only came to be fed and each was fed alternately. Should one chick solicit food out of turn and persist at the front of the nest, the adult would thrust its bill and food into the gape, shake it about and withdraw. This always had the effect of causing the offender to retire and let the right chick come forward. There seemed no doubt that the adults " called " the chick due to be fed and that each chick got to know its signal, though they did not always obey the rules. However, I may have misinterpreted the chicks' behaviour.

During the most intensive feeding periods, one or other adult would settle and brood the chicks for 2-3 minutes, but once demands had lessened, they would brood the chicks for shorter intervals.

Both chicks left the nest on 5 December. They were fed regularly for a day and occasionally for the following day. The work of keeping the nest in order continued.

On 9, 10, 11 and 12 December, eggs were laid in the nest. Two young were in the nest on 25 December and a third hatched later the same day. The fourth egg was left until 27 December when it was removed to the lawn. Three sparrows left the nest on 9 January 1978 and the nest was abandoned. During this second clutch, I twice saw a second female appear at the nest and feed the chicks. I wondered if it could have been a chick of the first clutch.

On 5 November 1978, I found that earth had been removed again from two plant containers in the window-boxes. Already straw had been placed in one hole and a pair of House Sparrows was actively excavating earth from the second flower pot. I discouraged their tenancy and after three days of harassment they went elsewhere.

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NOTICE TO AUTHORS

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