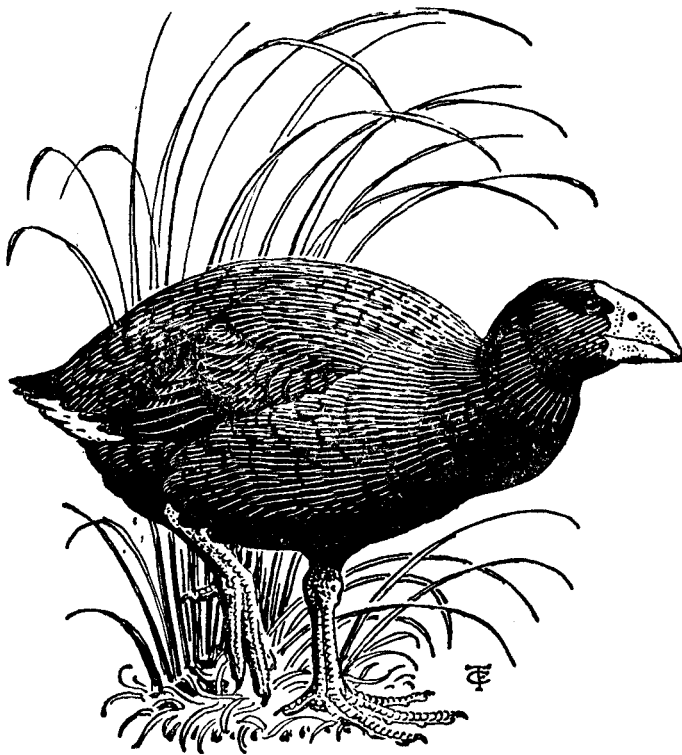


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BIRDS OF THE WASHDYKE LAGOON AREA, SOUTH CANTERBURY

By P. M. SAGAR

ABSTRACT

A count was made of birds in the Washdyke Lagoon, South Canterbury, monthly from January 1966 to December 1972. Thirty-five species were seen regularly and a further eleven species were rare visitors. Numbers are correlated with seasonal movements and breeding cycles. Previously published observations, recorded here, show a reduction in the number of breeding species since the late 1940s. As increased urbanisation may affect bird populations, a continued monitoring programme is warranted.

INTRODUCTION

Several papers of extensive ornithological observations on coastal New Zealand areas have already been published (e.g. Wodzicki 1946; Andrew 1967; Tunnicliffe 1973). However, with the exception of the Waikanae estuary (Wodzicki 1946), these observations were made in areas of large bird concentrations atypical of the New Zealand coastline as a whole. This study deals with a small shallow-water lagoon, the Washdyke Lagoon, typical of coastal southern New Zealand. Cunningham (1947) visited Washdyke Lagoon and thought it worthy of a regular study.

The results of this survey are found to show species composition, numbers and seasonal fluctuations from January 1966 to December 1972. Previously published sightings have been recorded where relevant. Nomenclature follows the *Annotated Checklist*.

STUDY AREA AND METHODS

Washdyke Lagoon Wildlife Refuge (44°22'S, 171°15'E) (Figure 1) is situated inside the Timaru City boundary and occupies about 150 ha. The eastern boundary is formed by a 120 m wide greywacke shingle beach which rises 3 m above mean high tide. Volcanic basalt rockpools extend 50 m offshore to the southeast. A 3 m high stop-bank forms

the western boundary whilst an access road to the north separates the lagoon from a series of shallow brackish ponds. Steep clay cliffs, 15 m high, form the southern boundary. A freezing works beyond the cliffs discharges waste into a bay immediately south of the rockpools.

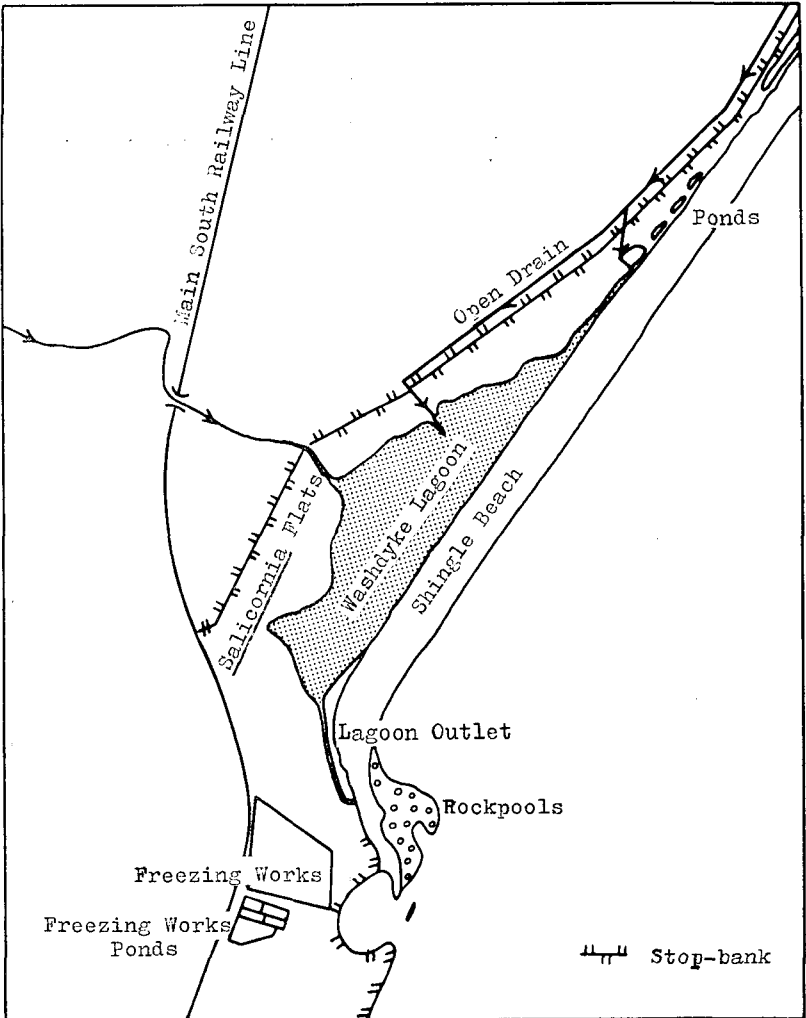


Figure 1. Washdyke Lagoon area, showing localities referred to in text

The lagoon is fed by outflow from the brackish ponds and from a large open drain which discharges fresh-water at two sites along the western side. High seas occasionally flow over the shingle bar into the lagoon.

When the lagoon was visited more than once a month the maximum count for each species was recorded. All counts were made from the shingle bar, from which there was a clear view of the lagoon and disturbance to the birds was avoided. The ponds to the north were not included in the count, as vegetation provided too much cover for birds.

The flat nature of both the terrain and vegetation enabled a direct count of all birds to be made. For the purpose of the count, the lagoon was divided into four areas. Approaching the lagoon from the south stops were made at specific points and counts made of all birds within a given area. Birds moving into or out of the area during the count were not included in the total count for that species. This resulted in the total counts probably being under-estimates of the actual numbers present. Returning along the high water mark counts were made of offshore seabirds and birds associated with the rockpools. The results (Table 1) are the counts, for each month, from the four lagoon areas, the sea and the rockpools for the 7 year study period.

RESULTS AND DISCUSSION

The Giant Petrel (*Macronectes giganteus*) was most frequently observed in the bay into which freezing works waste was discharged. Cape Pigeons (*Daption capensis capensis*) were sometimes seen settled on the ocean 100 to 300 m offshore.

Of the three shag species recorded, the Black (*Phalacrocorax carbo novaehollandiae*) and Little Shags (*P. melanoleucos brevirostris*) frequented the drain outlets, while Spotted Shags (*Stictocarbo punctatus punctatus*) either swam offshore or loafed on the beach. Whilst Black and Spotted Shags were seen throughout the year Little Shags only occurred in small numbers, except during their breeding season (September to February).

White-faced Heron (*Ardea novaehollandiae*) have been visiting the lagoon in greater numbers since 1970. They frequented the northern end, where the ponds drained into the lagoon. The White Heron (*Egretta alba modesta*) was a regular winter visitor, and commuted between the lagoon and the ponds at the nearby freezing works.

As the area is a wildlife refuge, waterfowl numbers increased sharply during the April-May shooting season. At other times, waterfowl numbers were generally low, although flocks of Canada Geese (*Branta canadensis*), 76 in December 1969, and Black Swan (*Cygnus atratus*), c. 300 on 13 November 1951 (J. M. Cunningham pers. comm.) and 378 in October 1972, were occasionally present. Black Swans were recorded by Pennycook (1951) as breeding in 1949 and 1950, though breeding was not recorded during this study. In March 1976 six Black Swans were observed on nests near the northern end of the lagoon and in June 1976 20 downy chicks were seen on the lagoon (compare my comments on pages 3 and 7). Paradise Ducks (*Tadorna variegata*) visited the lagoon less frequently from 1969 to 1972 (total 198) than from 1966 to 1968 (total 469). This may be due to reduced numbers of this species in the surrounding high country.

Table 1. Total Counts of Birds made at Washdyke Lagoon, January 1966 to December 1972.

	Janu- ary	Febru- ary	March	April	May	June	July	August	Sep- tember	Octo- ber	Novem- ber	Decem- ber	Total
<i>Macronectes giganteus</i>	-	3	1	-	-	1	2	6	2	2	-	-	17
<i>Daption capensis capensis</i>	100+	-	-	-	-	-	-	-	20	1	-	9	130+
<i>Phalacrocorax carbo novaehollandiae</i>	17	32	32	29	14	18	1	7	16	25	18	12	221
<i>Phalacrocorax melanoleucos brevirostris</i>	1	4	15	34	64	63	33	21	1	1	2	5	244
<i>Stictocorbo punctatus punctatus</i>	15	8	9	11	27	2	8	34	14	27	13	11	179
<i>Ardea novaehollandiae</i>	4	4	4	12	8	2	5	2	1	5	1	1	49
<i>Egretta alba modesta</i>	-	1	1	2	5	5	6	5	3	2	-	-	30
<i>Cygnus atratus</i>	127	86	276	728	386	79	25	92	11	593	24	144	2571
<i>Branta canadensis</i>	56	282	811	2213	2300	484	122	73	-	6	-	103	6450
<i>Tadorna variegata</i>	40	29	95	224	76	116	34	19	-	2	1	31	667

The most common ducks on each visit, at least 200 present in each month.

*Anas platyrhynchos platyrhynchos/
A. superciliosa superciliosa*

<i>Anas rhynchotis variegata</i>	85	42	100	345	152	153	135	180	90	20	20	88	1410
<i>Circus approximans approximans</i>	8	4	5	9	3	6	5	6	5	9	7	7	74
<i>Porphyrio porphyrio melanotus</i>	1	-	4	-	6	4	2	-	4	-	-	2	23
<i>Haematopus ostralegus finschi</i>	161	126	189	210	195	251	240	209	64	67	6	59	1777

	Janu- ary	Febru- ary	March	April	May	June	July	August	Sep- tember	Octo- ber	Novem- ber	Decem- ber	Total
<i>Haematopus unicolor</i>	1	3	5	2	6	9	1	9	6	5	-	2	48
<i>Charadrius bicinctus</i>	122	99	96	167	137	88	63	64	19	45	25	44	969
<i>Anarhynchus frontalis</i>	3	-	1	-	-	-	-	19	6	14	1	1	45
<i>Limosa lapponica baueri</i>	13	3	8	-	-	-	-	-	3	70	1	3	101
<i>Himantopus himantopus leucocephalus</i>	607	1286	809	382	348	394	193	94	70	342	154	397	5276
<i>Larus dominicanus</i>	The most common gull on each visit, at least 400 present in each month.												
<i>Larus novaehollandiae scopulinus</i>	846	524	1126	801	721	675	638	705	342	313	386	371	7448
<i>Larus bulleri</i>	21	47	94	36	56	65	67	53	11	4	-	2	456
<i>Chlidonias hybrida albostratus</i>	4	8	35	42	55	27	2	1	-	6	-	-	180
<i>Hydroprogne caspia</i>	11	15	2	-	-	1	-	12	1	4	2	6	54
<i>Sterna striata</i>	28	18	20	48	4	12	4	1	-	15	31	5	186
<i>Halcyon sancta vagans</i>	-	-	-	5	8	7	7	2	-	-	-	-	29

Gorby (1959) reported 400+ Paradise Ducks on 18 March 1958. Shoveller Ducks (*Anas rhynchos variegata*) were regularly present in small flocks and Mallard/Grey Ducks (*A. platyrhynchos platyrhynchos*, *A. superciliosa supersiliosa*) bred in the vegetation surrounding the lagoon. Mr. J. M. Cunningham (pers. comm.) noted "probably 200 ducks mostly mallard" in the flooded lagoon on 13 November 1951.

Harriers (*Circus approximans gouldi*) were often flushed from bird carcasses on the shingle beach.

Pukeko (*Porphyrio porphyrio melanotus*) were never common and the last (4) were seen in March 1968.

South Island Pied (*Haematopus ostralegus finschi*) and Black Oystercatchers (*H. unicolor*) frequented the lagoon outside of their breeding season (September to February). Favoured feeding sites were the rockpools and the muddy areas at the south of the lagoon. Although Pennycook (1951) recorded the South Island Pied Oystercatcher as breeding none were recorded during this study.

Three or four pairs of Banded Dotterel (*Charadrius bicinctus*) regularly bred along the inner shingle bar (September to November) and flocks were common at other times. "Rather few . . . less than 12" were seen on 13 November 1951 by Mr J. M. Cunningham. Wrybills (*Anarhynchus frontalis*) occurred mostly from August to October, all in breeding plumage and presumably migrating to their riverbed breeding areas. Bar-tailed Godwits (*Limosa lapponica baueri*) were irregular summer visitors. They were always flighty and did not settle for long. Pied Stilts (*Himantopus himantopus leucocephalus*) occurred in large numbers (507, March 1968), especially from January to March when many juveniles were present. Mr J. M. Cunningham noted "a few stilts, less than 50" on 13 November 1951. A small breeding colony (10 to 15 pairs) was present alongside the ponds north of the lagoon. Pennycook (1951) also recorded this species as breeding.

Large flocks of loafing Southern Black-backed Gulls (*Larus dominicanus*) and Red-billed Gulls (*L. novaehollandiae scopulinus*) were common. The Southern Black-backed Gulls loafed on an area of *Salicornia* at the south end of the lagoon and were often seen flying over the freezing works. Red-billed Gulls loafed on the shingle beach and were often seen in the running water at the north end of the lagoon. Small flocks of Black-billed Gulls (*L. bulleri*) commonly fed around the lagoon margin. Mr J. M. Cunningham (pers. comm.) saw "100 or so" Black-billed Gulls on 13 November 1951 with "a few" Red-billed Gulls. Black-fronted Terns (*Chlidonias hybrida albostratus*) were normally seen alone or flying in small groups along the shoreline or over the lagoon. Occasionally they were in a flock of White-fronted Terns (*Sterna striata*). Pennycook (1949) recorded a Caspian Tern (*Hydroprogne caspia*) breeding colony (55 birds, 80 eggs on 4 October 1947) on the shingle bar near the lagoon in 1947 and 1948. However, all nests were washed away by high seas in 1948, and although some birds re-nested these were also washed away. Although Caspian Terns

were present in small numbers during their breeding season (September to January) none were known to have nested during this study. This was probably a result of high seas washing over the shingle bar at least once a year. The White-fronted Tern breeding colony recorded by Pennycook (1948) probably met with the same fate, as it too was not recorded during this study. The White-fronted Terns seen were probably from the large breeding colony at the Opihi river mouth 13 km to the north. During the breeding season these birds were often seen flying north with small silver fish in their bills.

At least one Kingfisher (*Halcyon sancta vagans*) was regularly seen at the rockpools from April to July.

Passerines:

Only the presence of these species was recorded. Skylarks (*Alda arvensis arvensis*) occurred both on the beach and on the *Salicornia* flats. Greenfinches (*Carduelis chloris chloris*), Chaffinches (*Fringilla coelebs gengleri*) and Yellow Hammers (*Emberiza citrinella sylvesteris*) fed along the inner shingle bar, while mixed flocks of Goldfinches (*Carduelis carduelis britannica*) and Redpolls (*Acanthis flammea*) fed on the seeds of marram grass which grew on the shingle bar. Starlings (*Sturnus vulgaris vulgaris*) foraged in the *Salicornia* and wrack-zone.

Rare visitors:

An Australian Bittern (*Botaurus stellaris poiciloptilus*) was flushed from some raupo in March 1966. Two Grey Teal (*A. gibberifrons gracilis*) were seen on the lagoon in April 1972. Subsequent sightings of flocks up to 18 birds suggest that numbers of this species are increasing in the area. Spur-winged Plovers (*Lobibyx novae-hollandiae*) were seen in March 1966 (5) and May to October 1971 (2); none have been seen since. Pearce (1972) recorded a Black-fronted Dotterel (*C. melanops*) in May 1972, and I recorded another in May 1975. This species may become a more frequent visitor if the population breeding at the Opihi riverbed (Pierce 1971) expands. A Greenshank (*Tringa nebularia*) was seen at the lagoon from 6 to 10 May 1967 (Keeley & Sagar 1967). A Turnstone (*Arenaria interpres interpres*) in winter plumage fed along the seaward lagoon shore in December 1967. Crockett (1961) recorded a Red-necked Phalarope (*Phalaropus lobatus*) in a pond north of the lagoon. In April 1971 two Arctic Skuas (*Stercorarius parasiticus*), one light and one dark phase, were seen chasing White-fronted Terns. One dark phase bird also was seen in April 1972. On both occasions the terns were forced to regurgitate what appeared to be fish.

CONCLUSIONS

The status of some birds at Washdyke lagoon has changed since the late 1940s. Black Swan, South Island Pied Oystercatcher, Caspian Tern and White-fronted Tern no longer breed there and no new breeding species have been recorded. There was also a decline in

the numbers of Pukeko and Paradise Duck during the period of this study. However, species new to Washdyke Lagoon include Spur-winged Plover and Black-fronted Dotterel. With the recent urbanisation of land surrounding the lagoon more changes are probable and this study will serve as a record of the status of the birds from 1966 to 1972 with which future records may be compared. More data are now needed on the distribution of birds on the lagoon and their specific food and feeding habits.

Appendix 1: Sightings of bird species new to the lagoon since 1972. Sharp-tailed Sandpiper (*Calidris acuminata*); 10 on 16 November 1973. Pectoral Sandpiper (*C. melanotos*); 1 in February 1973 (Child 1973). Welcome Swallow (*Hirundo tahitica neoxena*); small flocks (c. 10) in May 1974 and May 1975. The distribution of this species is expanding in South Canterbury, and more sightings at the lagoon are probable.

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WEKA LIBERATION IN NORTHLAND

By D. B. ROBERTSON

ABSTRACT

A colony of North Island Wekas (*Gallirallus australis greyi*) has been successfully established at Rawhiti, Bay of Islands, as a result of five liberations in the summers of 1966-1971.

This account is written mainly to help other amateurs who may consider obtaining wekas from the Wildlife Service and trying to establish colonies elsewhere. The number of birds required is discussed as well as details concerning the construction of the cage, time in the cage, and feeding.

The account describes the effect of predators on the birds and the effect of wekas on other wildlife and the neighbours. It includes a map of the area illustrating a weka count in the Rawhiti area during January 1976. Most of the wekas counted at that time were bred in the area.

This contribution describes the planned establishment of a colony of North Island Wekas (*Gallirallus australis greyi*) at Rawhiti, Bay of Islands, during the period January 1967 to January 1976 (Fig. 1). As the birds from this colony are breeding and spreading over an increasingly large area and growing in number, it seems important to describe at this stage the methods used and results to date.

The North Island Weka, according to Falla, Sibson & Turbott (1970), was common in Northland until the 1930s; by 1940 they had disappeared from there and most other parts of the North Island except the Gisborne area. It has been suggested that some disease passed through North Island populations but missed the Gisborne area. My own observations of the rate of breeding and ability to escape from abundant cats and dogs, give some support to the view that disease rather than predators is likely to have caused their disappearance.

In 1966 I obtained permission from the Wildlife Service of the Department of Internal Affairs to try liberating this species and the Department supplied me with five lots of birds as follows:

December 1966 — 32 birds; December 1967 — 32 birds; 1968 — nil; December 1969 — 32 birds; December 1970 — 37 birds; December 1971 — 16 birds.

All birds had been banded before delivery; unfortunately it was not possible to sex them accurately although the exceptionally large-billed individuals were tentatively listed as males.

The Wildlife officers caught the birds in the Gisborne area on each occasion between October and December and in December put

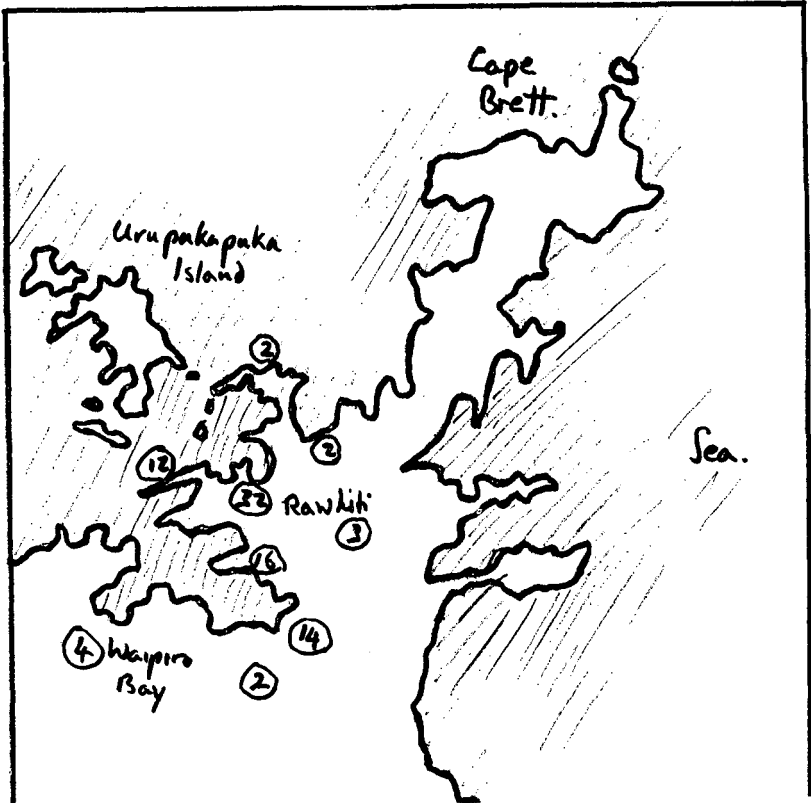


FIGURE 1 — Rawhiti area, Bay of Islands. Estimated weka numbers in January 1976 in circles.

them in boxes for transport. The first two lots were flown to Auckland by National Airways Corporation and I collected them at Auckland Airport, fed them that evening, and next day packed the boxes into the back of a station wagon and set off on a hot (smelly!) trip to Rawhiti. After 1968 N.A.C. refused to carry birds on passenger planes, so they were delivered to Hamilton by road and I drove them from there the 426 km to Rawhiti. Thirty-two birds at a time proved to be quite a convenient number, and more would certainly be difficult to handle. They travelled well, although one died by becoming wedged to the slats of one box. During the trip they made occasional squeaks but never their loud call. The boxes, designed by Mr Fisher of the Wildlife Service, proved very satisfactory and allowed easy feeding during transit.

On arrival at Rawhiti in the evening the boxes were carried down a hill and the birds released in my prepared cage. The boxes were scrubbed out and later returned by rail to Gisborne.

One happening of some interest while the birds were being moved from Gisborne to the Bay of Islands was the escape and recapture of one of the banded birds: in December 1967, while feeding the birds in Auckland during the overnight stop in my garage in Remuera, two of the more slender birds wriggled through the slats of their boxes and escaped. One was caught, but the other disappeared into the darkness and was lost amongst the oxalis and other plants in my garden. I told Mr E. G. Turbott at the Auckland Museum about this escaped bird, and, much to my surprise, six weeks later he telephoned me to say that a farmer about 72 km south of Auckland had caught the bird and read the number of its band (15218) before releasing it again. This weka must have negotiated the busy areas of Greenlane, Ellerslie, Penrose, Otahuhu and beyond before reaching open country. This illustrates the tendency of wekas to travel for long distances if released in a strange area, a phenomenon noted in the case of previous releases, and the main reason for my decision to keep my birds in cages for some time before release.

AREA USED FOR LIBERATION

The Rawhiti district of the Bay of Islands is situated near the base of the Cape Brett peninsula and fronts on to the Bay of Islands at the south side of the Albert Passage. In 1966 there was no road into the area but since 1967 the Rawhiti Road has been extended about 8 km and passes right through the area used for liberating the birds (Fig. 2). The country is hilly, and is covered mostly by patches of manuka, some second growth bush, and quite large areas of partly grazed grass containing smaller areas of manuka. There are a few streams which almost dry up in the summer, as do the small swampy areas. The whole area is usually very dry in January and February. The coastline is typical of the east coast. In 1966 there were about three farmers' families and four other permanent residents in the district. Now a large number of people come to camp in January at a motor camp by the old Rawhiti school, but from March to December there are few people in the area. There is plenty of natural cover for the birds and most of the Rawhiti area has a wilderness character apart from the farms about Parakura Bay and Whangamumu Harbour.

I live in Auckland, but while the birds were in the pre-release cage, my family and friends arranged holidays at Rawhiti to feed them. We have been at Rawhiti for weekends and holidays frequently between 1966-1976.

THE CAGE

As mentioned above, previous experience suggested that it would be best to keep the wekas in a cage for at least six weeks before liberating them. The cage or enclosure was built like a tennis court 40 feet by 25 feet (12 x 7 m) on a hillside beside a stream and near the sea. One end of the enclosure contained grass, and the other end was covered in 3 foot (0.9 m) high manuka at first — this grew



FIGURE 2 — Habitat in area of release.

Photo: D. Robb

to a height of 12 feet (3.6 m) in later years. Two rough shelters were made of dead manuka, and two small wooden boxes were left inside.

The wire-netting fence was 6 feet (1.8 m) high and consisted of 2-inch (50 mm) wire-netting held up by steel stakes (half inch deformed steel reinforcing rods, 7 feet (2.1 m) long), hammered into the ground and supported by occasional guy ropes. Manuka was cut back from inside the wire to stop the wekas climbing up and jumping over (important as accounts of previous attempts to cage the birds indicated that they could escape readily in this way).

As the hillside had an uneven surface I found it easier to use 3 ft (0.9 m) rolls of netting, one above the other, rather than 6 ft (1.8 m) rolls as the shorter could be fitted more easily into the bumps on the ground. The netting was fixed to steel posts with wire and stapled firmly into the ground all round the bottom. The staples were made of No. 8 fence wire bent to U shape, six inches (150 mm) long, and fixed the netting to the ground.

A small door was made for access through the wire-netting and a small concrete water trough put inside, near the wire, so that it could be filled more readily from outside. Wekas drink quite a lot of water and use even more for bathing. They frequently get into the drinking trough 3 ft x 1 ft x 5 in deep (0.9 m x 0.3 m x 127 mm), put their heads under water and then stand up so that the water runs down over their backs; after this there is much vigorous jumping up and down and flapping of wings, and all this activity half empties

the water trough. This may occur in pouring rain just as often as in dry weather. I still keep a few water troughs about 5 inches (125 mm) deep about the property and they are used frequently. I think the only wekas to escape from the cage did so in the later liberations when the manuka was taller and some were able to climb up and jump over the wire.

The manuka gave shade and cover during hot afternoons and the wekas often perched about five feet from the ground on the manuka branches, especially in the afternoons. The enclosure described is of about the right size for about 32 birds.

TIME IN THE CAGE

The wekas did not appear to enjoy their stay in the cage, and after a month the 32 birds had worn out the grass through their continual pacing up and down; they were particularly prone to go round and round just inside the wire. Thus with most of the groups, after four weeks had passed I let out two or three every few days and put food and water outside, keeping only 8-10 birds for the whole six weeks. This timing seemed effective, probably because the liberated birds stayed reasonably close to those still in the cage.

FEEDING

The water trough was kept full for drinking all the time (see above). The birds were fed twice a day. Bread seemed the most popular food, but meat and meat bones and all food scraps, and piper and sprats caught in the net, were popular and helped when other food was not available. I tried some fowl mash and put some in the cage each night; it was a week or two before they began to eat this, but finally they would eat most of it. They seemed to be prepared to eat any animal, vegetable or insect food except lettuce and cabbage.

PREDATORS

Only one weka died in the cage and that was after being attacked at night, I think by another bird. There was remarkably little fighting in the cage.

During the past ten years I have used opossum traps to catch feral cats which are common at Rawhiti; I catch more wekas than cats now, but of course the wekas are released. Two stoats have been shot. Opossums arrived in the Rawhiti area in 1974.

Dogs are actively discouraged from the area. Most of the dogs there come with people illegally shooting on the property. I requested the Bay of Islands Acclimatisation Society to declare the area a "Closed Game Area" because shooters ignore the "No Shooting" signs when I am not there, but without success. The shooters' dogs have been a nuisance since the weka begins breeding during the shooting season.

There are still plenty of predators about, but the wekas are increasing and are helped by the natural cover through which they can run so fast.

Without prior notification the local rabbit board spread poison liberally in 1975 on an adjacent property and I suspect that this killed some birds. Incidentally, there are very few rabbits in the area. I have seen a weka chasing a young rabbit, and it seems likely that the presence of wekas will finally have a deterrent effect upon rabbits.

I have found nests of Pheasants, Californian Quail, Skylarks and Pipits in the area, and during the past ten years since the liberations began the number of Pheasants and Californian Quail seen with broods appears to have increased; families of these species have been watched as they have matured, indicating good breeding success. I have twice seen feral cats eating recently caught hen pheasants. Pipits seem fewer in number than before, but the Skylarks are plentiful.

NUISANCE EFFECT AND RELATIONS WITH NEIGHBOURS

The few neighbours were keen about this project but one farmer had reservations when he found one weka pecking at a kumara in his shed! I am sure that in large numbers their curiosity may make them a nuisance at times, and they may scratch out plants in the vegetable garden when looking for insects; they may peck tomatoes and sometimes grapefruit lying on the ground. In spite of this I consider that any harm they cause is much more than compensated for by the good they do in eating insects and larvae, and in cleaning up dead animals and catching rats and mice. It might be added that some of the damage to crops attributed to wekas is certainly caused by pheasants.

NUMBER OF WEKAS NEEDED TO MAKE A PERMANENT COLONY

I believe in view of my experience as described above that it would be a waste of time to liberate one batch of wekas and not repeat this in the following years. This is supported by the following comparison of my own and other liberations. During the last ten years the Wildlife Service has supplied wekas as follows:—

1. One batch of 32 birds to the Russell Forestry Unit in 1967 in an area 20 miles south of Rawhiti.
2. Two batches of 32 to Mrs Cochrane of South Kaipara Head in 1968 and 1969.
3. Five batches of about 32 birds to me at Rawhiti between 1967-1972 as above.

The one lot to the Russell Forestry Unit were set free after six weeks, and an informant there told me that they did not see or hear them again after three months.

The two batches supplied to Mrs Cochrane at Kaipara South Head were carefully locked after in a cage for six weeks. The first were freed near a young pine forest and the second on their own farm. Within a month or two dead wekas were found about the area, probably as the result of the large amounts of rabbit poison laid in the district. Mrs Cochrane has informed me that the only evidence

of any survivor came in 1974 when she saw a pair with two chicks on the road 16 km from their farm.

Details of my experience with the five lots of about 32 wekas each liberated at Rawhiti are as follows:—

In December 1967 and December 1968 there were two consecutive liberations. In December 1969 there were no liberations so that it was possible to ascertain whether the earlier ones of the two previous years had survived. In the winter of 1969 a number were heard calling. In March 1970 I saw the first unbanded bird (born locally) and in May 1970 saw a pair with two young chicks.

My impression, at present, is that the weka population in the narrow 10 mile (16 km) strip from Cape Brett to Whangaruru North Head is more than 95. I expect there are unrecorded wekas on Cape Brett now, but so far I have not been able to carry out observations in this area. The increasingly loud chorus of calls in the evenings at Rawhiti indicates a thriving colony. Luckily the loud call of the weka can be heard a long way and this helps counting in inaccessible places.

Wekas have three call notes. The first is the short squeak, and is the alarm call when suddenly disturbed. The second is the "boomp boomp boomp" noise common to some rails, heard when they are scratching about for grubs. Thirdly, the loud "cooee cooee" call upon which my counts are based, heard mainly at sunset, but also at any time of day or night; this seems to be a contact call.

I have five wekas that I can recognise about the house, but when making these counts there were either no calls or just one from this group of five. It is thus very probable that there are many more wekas in an area than those heard calling.

Apart from the newly restored wekas, there are kiwis throughout the area shown on the map.

Now that these wekas are breeding so well no further liberations seem necessary to support them, and in about five years' time I hope to write a short report about the state of this colony.

ACKNOWLEDGEMENTS

I would like to thank the Wildlife Service for supplying me with the wekas. I would like also to thank Mr R. B. Sibson and Mr E. G. Turbott for advice about the birds and for help with this report. My family and friends helped to look after the birds when in the cage. I am also grateful to several neighbours, especially Miss Kura Beale and the late Sir Douglas Robb, for their interest and care of the wekas which came to live on their properties. Sir Douglas kindly supplied the photograph.

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A BUSHMAN'S SEVENTEEN YEARS OF NOTING BIRDS

PART C — NORTH ISLAND RIFLEMAN, WHITEHEAD
PIED TIT AND NORTH ISLAND ROBIN

By R. St. PAUL

(Edited by H. R. McKenzie)

NORTH ISLAND RIFLEMAN (*Acanthisitta chloris granti*)

STATUS AND HABITS

Habitat

The North Island Rifleman prefers beech forest up to more than 1300 m (4000 feet). It is also to be expected in any type of heavy bush, and, at times, in heavy scrub or high tea-tree. Stidolph (1971: 100) gave instances of its being found in the Wairarapa area in very small patches of light bush which are separated from its usual habitat by miles of open grasslands. Rarely has it been reported in quite open country. H. W. Axbey (pers. comm.), when stationed at Queenstown, saw, during a very severe drought, Riflemen about half a mile away from the bush working their way along old fence posts and feeding on spiders. Other bird species had also been forced into the open by the extreme dryness of the bush.

Flight

The flight is so weak that it cannot fly upwards to any extent, nor does it make level flight from tree to tree. Its usual habit is to work up the trunk of one tree, then fly down from the branches to the base of another and climb up again. Both while climbing and when on the ground it flaps its wings convulsively and continuously as if to assist its balance.

Nesting

The nest may be found in a cavity in a dead or living tree, a stump, a prostrate log or a bank. The entrance is sometimes so small that the bird has to squeeze through it sideways. This must help it to escape some predators. The nest itself is rather bulky and is something like that of the Grey Warbler. It may be just a cup when there is no room for a dome. Because of its internal siting it is seldom visible from the outside. The site is usually at low levels but occasionally it may be found in quite high positions.

With rough weather coming on I have twice seen a Rifleman go into a hole in a beech tree to sleep at night, one on an exposed ridge and one in more solid bush.

Food

It seems that this busy little bird is never still. It industriously seeks food in the bark of tree trunks and among the branches. Where old timber is lying on the ground it will explore it, even to the extent of going quite a distance through a hollow log or root and coming out at the other end. It must suffer casualties from vermin when feeding very low down. In ordinary feeding it takes small life of various kinds, with larvae and eggs, though parents are often seen taking quite long-legged insects to the young. In my experience it is almost entirely an insectivorous feeder.

Song

The song, or perhaps it should be styled its call, is so weak and high pitched that it can be heard only at very close quarters. It is sometimes described as "zee-zee." I liken it to the winding of a watch, a "pit-pit." Stidolph (1971: 102) described the call of a nesting pair as "ticking."

Washing

Little pockets of water on the tops of tree-fern leaves are used. It seldom washes after 1300 hours, but one washed as late as 1500, fluttered its wings and went into a three inch hole in a big tree.

ANALYSIS OF MONTHLY CHARTS

(Brackets = total birds seen plus estimate of birds heard only).

Proportion seen to heard: 10 seen to 1 heard and not seen.

TIHOI

The total of birds seen from May 1944 to April 1946 was 1304 (1434).

Count days per month for 24 months averaged 21.6; days seen 10.7; days not seen 10.9.

Daily counts of birds ranged from 0 to 18.

Count days totalled 519 and the total birds seen 1304, giving an average of 2.5 (2.75) per count day.

Notes on Analysis

Tihoi averaged 101 per month for the 11 months spent there and Arataki 15 for 13 months. I can give no definite explanation for the difference as the bush and conditions were similar.

MINGINUI

The total of birds seen from part 1946 to part 1961 was 642 (706).

Count days per month for 170 months averaged 20.5; days seen 1.4; days not seen 19.1.

Daily counts of birds ranged from 0 to 16.

Count days totalled 3487 and the total birds seen 642, giving an average of 0.18 (0.2) per count day.

Notes on Analysis

1946. From May, when I went to Minginui, to November the average per count day of birds seen was 1. December had 0.

1947. From January to June the average was 2.1, then July to December 0.2.

1948. From January to April the average was 1.4. I was away from May to September inclusive. October and November had none. December had 2.5.

1949 had 0.1 and 1950 dropped to 0.025. Then came a complete blank for 122 months, from 1951 to 1961.

It is to be noted that the Rifleman, in the few years that it was present, was in larger numbers from January to April, then faded, whereas the other birds in Part C, Whitehead, Pied Tit and North Island Robin, kept fairly even numbers throughout each year.

The figures given above for Tihoi and Arataki could perhaps indicate a progressive decline which may eventually have reached the same result as at Minginui.

WAI AU

The total of birds seen on hunting trips for parts of 47 months (from 1 to 24 days per month) was 1783 (1961).

Count days per month averaged 5, days seen 5.

Daily counts of birds ranged from 0 to 70.

Count days totalled 234 and the total birds seen 1783, giving an average of 7.6 (8.36) per count day.

Notes on Analysis

April was the best month, with figures on long trips up to 382 but it dropped by 1954 and then faded right out. This was largely the favoured beech country so it is very difficult to account for it. My weather charts do not seem to indicate anything unusual. A local freak storm in the back country could possibly partly account for it, but not wholly. In 1956 G. E. Sopp and H. R. McKenzie (pers. comm.) reported a snowstorm in the Aniwaniwa Valley, Lake Waikaremoana, which almost wiped out the Rifleman. However, it recovered there but in the Waiau there were none seen at all from 1954 to 1961. Some factor other than the weather must have been responsible, or mostly responsible, both in Minginui and Waiau. Timber-getting at Tihoi and Minginui must, of course, have had a serious effect on the population but this did not obtain in the beech forest of the Waiau where the fade-out occurred four years later than at Minginui.

The above is the story up to April 1961 for Minginui and Waiau. Inquiry has been made to ascertain the position of the Rifleman at the beginning of 1976 and also for earlier years. R. T. Collins, Chief Forestry Ranger, Minginui (pers. comm.), stated that he has been resident in the area since 1962 and can recall observations of Riflemen as far back as 1967 or 1968. All the sightings since then

have been in the Upper Whirinaki watershed, part of what is described in the text as Waiau. Three of his staff who have been with him for nine years have been consulted. All agree with him that sightings are infrequent but regular and that the numbers seem to be low. Most of his work has been in this area but he also works the large area eastward to the Huiarau divide wherein it has not been noted. Though the Rifleman has not been seen in that area it is not claimed that it is absent. He stresses the fact that he and his staff are not dedicated students of ornithology but are interested and take notice of birds. Mr Collins has seen the Rifleman in thinned and pruned exotic pine forest. He has not seen it in unthinned pine or in Douglas fir, but questions whether this may be due to difficulty of sighting in the thicker foliage.

What happened between the fade-out from 1954 to 1961 will probably never be known. There could have been a small remnant missed by me or there could have been a movement from the direction of Lake Waikaremoana. The report by Mr Collins would seem to indicate the former to be the more likely. The area is so vast that I could easily have missed a small remaining population which has perhaps since expanded somewhat.

WHITEHEAD (*Mohoua albicilla*)

STATUS AND HABITS

Habitat

The Whitehead is definitely a bird of the forest. Of recent years it has even spread from native to adjoining exotic forests. Small numbers are, however, quite happy in light and sometimes scattered cover. This account deals only with the native forest where I worked and hunted. I found the beech forest to be preferred by the Whitehead but not much more so than the heavy timber. Like the Rifleman and some others, it is common up to more than 1300m (c4000 feet).

Flight

The Whitehead usually makes only short flights but they are not laboured. The belly hangs down, more so than with the Bellbird. In flight it is easy to note the strongly down-curved latter part of the tail, which is similar in varying degree to Brown Creeper, Yellowhead, Tui, Saddleback, Huia, Kokako and Piopio.

Nesting

Classed as a warbler, the Whitehead's nest, however, resembles that of a finch. In this area it builds up to 12m (c40 feet) or more, but most commonly quite low down, often on top of a tree fern frond. Other favourite sites are thick tight bushes or other shrubby growth. In the North Island it is the main victim of the parasitic Long-tailed Cuckoo.

Food

Its main food is insects, moths being favoured, but it also takes small fruits. It takes particular interest in searching the undersides of leaves and branches, very frequently doing this while hanging upside down. It also works on the bark of large trees for insects, larvae, etc. Flocks or parties move through the bush very fast. Fan-tails and parakeets often follow flocks of Whiteheads for insects disturbed.

Song

The main song is a very strong high-pitched descending warble. As the Whitehead is particularly vocal the result is that many more are heard than seen, even though this bird is by no means difficult to see. The estimate of 1 seen to 20 heard, given below, was made after careful consideration of this feature. Besides the main song it has a variety of lesser calls. It answers very readily to an imitation of its notes and approaches its caller closely.

Flocking

In summer small parties of up to 8 or more are common. In the non-breeding part of the year flocks are often of 40 or more. Such flocks here are composed of loose groups, the whole flock often a mile or more from the next one.

ANALYSIS OF MONTHLY CHARTS

(Brackets = total birds seen plus estimate of birds heard only).

Proportion seen to heard: 1 seen to 20 heard and not seen.

TIHOI

The total of birds seen from May 1944 to April 1946 was 5032 (105,672).

Count days per month for 24 months averaged 21.6; days seen 19.2; days not seen 2.4.

Daily counts of birds per month ranged from 0 to 50.

Count days totalled 519 and the total birds seen 5032, giving an average of 9.7 (203.7) per count day.

Notes on Analysis

Unlike the Rifleman, which inexplicably was more abundant at Tihoi than at Arataki, the Whitehead was in similar numbers in both places.

MINGINUI

The total of birds seen from part 1946 to part 1961 was 79,229 (1,663,809).

Count days per month for 170 months averaged 20.5; days seen 17.9; days not seen 2.6.

Daily counts of birds ranged from 0 to 150.

Count days totalled 3487 and the total birds seen 79,229, giving an average of 22.7 (476.7) per count day.

Notes on Analysis

Throughout the 170 months covered at Minginui from 1946 to 1961 Whitehead numbers held fairly well, counts varying frequently, but not to the extent of the Silvereye (St. Paul 1975: 281) and the Rifleman. Table 1 shows the averages of Whiteheads seen per count day for each calendar month for the whole of the observations. It indicates lower numbers for the winter months, then a rise in spring. This seems hard to account for as there could be no young to be added in September and October and few in November. It is, perhaps, possible that there was a partial winter movement to some native forest in lower country or to the lower exotic forests. More likely though a lessening of song during the winter months would account for the drop, the birds being present but quieter.

TABLE 1 — Monthly averages of birds seen per count day

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
22.3	22.7	27.0	31.4	16.5	18.0	18.1	19.4	28.1	24.0	24.6	21.4

This table does not indicate, however, the changes in yearly and seasonal counts as shown in Table 2. 1952 and 1953 were very poor years for the Whitehead, also for the Pied Tit and other species, while September 1954 to March 1956 was particularly good. Table 2 shows the range of fluctuations, some years or periods being lumped together when counts were similar.

TABLE 2 — Averages of birds seen per count day for the periods shown.

May 1946 to Dec 1947	23.2
1948 - 1950 (complete years)	28.5
1951 (complete year)	14.3
Jan 1952 to Aug 1954	2.5
Sept 1954 to Mar 1956	40.0
Apr 1956 to Dec 1959	24.9
Jan 1960 to Apr 1961	14.7

It is hoped that 1960-61 did not represent the setting in of a general decline after I left the bush in April 1961. The Whitehead would have an advantage in regard to survival in that when the heavy timber bush is destroyed it will still do well in lesser numbers in the beech forest and if the beech is eventually cut down for commercial purposes this bird has already shown that it adapts well to exotic forest.

WAI AU

The total of birds seen on hunting trips for parts of 47 months (from 1 to 24 days per month) was 25,196 (529,116).

Count days per month averaged 5; days seen 5.

Daily counts of birds ranged from 0 to 400.

Count days totalled 234 and the total birds seen 25,196, giving an average of 107.6 (2,259.6) per count day.

Notes on Analysis

The very high rate of 107.6 seen per count day was due to my doing nearly all of my hunting in the flocking season, from January to May, when I would encounter several flocks in a day. When working at Minginui I would not be moving about and would see perhaps only one or two flocks or just some odd small lots.

PIED TIT (*Petroica macrocephala*)

STATUS AND HABITS

Habitat

This species prefers to live mostly in either heavy or light bush but can also be found in second growth, in scrub and in plantations of exotic forest. The beech is somewhat less favoured than the heavy podocarp forest. Those living in the higher country prefer the main, more open streams where the vegetation of the banks is more dense. In such streams I have often seen it standing on a stone out in the rushing water and catching little flies. When living at the edge of cover it will fly as far as 100 m or so out into the open for food, especially when feeding young.

Flight

Flight is usually for short distances, with movements quick and sharply darting. To satisfy its curiosity it will flit from tree to tree, clinging to vertical trunks and looking to all sides of a human visitor.

Nesting

Others of its own kind are kept at a distance from the nest and both birds display and try to lure intruders away. This is not effective, however, with the stoat, which I consider to be mostly responsible for a serious decline in this species. Introduced rats are also to blame. Either of these pests will take the parent as well as the eggs and young.

In different seasons the Pied Tit seems to nest here at different heights, in big trees 9 m to 12 m up in a wet season and close to the ground in an old stump, or a bank, in a dry season. One pair built a nest under the eaves of my hut. A gale blew it down so I replaced it and propped it up with a board. The bird promptly occupied it. Once the hen is incubating the cock brings all her food. He calls as he approaches, the hen leaves the nest and he feeds her at up to 6 m away from it. She then returns by a roundabout route. You would wonder how he can make the approach call, when, as I have seen him, with a row of ants right out to the tip of his bill, 11 or so,

and he made the full warbling call as usual. Normally he feeds her all the time she is sitting except when she leaves the nest for a wash or preen. At such times he stands guard until she comes back.

Food

As with other insectivorous birds it feeds on insects, ants, worms, grubs and other small life, working diligently on tree trunks and branches and often on the ground. Often a pair would stay with me most of the day for the food I disturbed. Logs being hauled over dirt tracks also disturbed a rich source of food.

Song

The full song of the male is something like "weedle-weedle-weedle," high pitched and descending. I think it is the female which mostly gives the single sharp high-pitched note but the male does it too:

ANALYSIS OF MONTHLY CHARTS

(Brackets = total birds seen plus estimate of birds heard only).

Proportion seen to heard: 1 seen to 3 heard and not seen.

TIHOI

The total of birds seen for the two years, May 1944 to April 1946 was 3,223 (12,892).

Count days per month for 24 months averaged 21.9; days seen 21.7; days not seen 0.2.

Daily counts of birds ranged from 0 to 18.

Total count days were 519 and the total birds seen 3223 giving an average of 6.2 (24.8) per count day.

Notes on Analysis

It is to be noted that Tihoi had a daily average of 6.2 while Mingingui had 2.6. This is hard to understand as there was no noticeable difference in the nature of the respective habitats.

MINGINUI

The total of birds seen from part 1946 to part 1961 was 9,047 (36,188).

Count days per month for 170 months averaged 20.5; days seen 16.9; days not seen 3.6.

Daily counts of birds ranged from 0 to 12.

Total count days were 3487 and total birds seen 9047 giving an average of 2.6 (10.4) per count day.

Notes on Analysis

From 1946 to 1961 at Mingingui the Pied Tit, compared with some other species, did not show great variation in numbers. Table 1 gives the average numbers per count day for each calendar month for the full period. It shows a proportionately rather large increase in the winter months whereas the Whitehead shows a drop, but over the

summer the Pied Tit drops while the Whitehead holds well. This would seem to indicate that the Pied Tit of the higher beech country makes a partial movement down to the podocarp forest in autumn and winter, returning in spring for breeding. The counts for the Waiau area tend to confirm such a movement but are too sparse to confirm it fully.

TABLE 1 — Monthly averages of birds seen per count day

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.5	2.6	3.0	2.8	3.0	2.9	3.3	3.0	3.1	2.3	1.6	1.4

The yearly figures are shown in Table 2. Again there is a serious drop in 1952 and 1953 as with other species. This is followed by a partial recovery for the next four years, a peak in 1958, quite good figures for 1959 and 1960, then a dismal showing for the first four months of 1961 (to the end of the period). As this species does not flock it does not show part year variations to the extent of those of the Whitehead.

TABLE 2 — Averages of birds seen per count day for the periods shown

May 1946 to Dec 1947	4.00 (4.00, 4.00)
1948	4.30
1949-1951	3.37 (3.30, 3.70, 3.10)
1952-1953	1.05 (0.50, 1.60)
1954-1957	2.12 (2.40, 2.20, 1.90, 2.00)
1958	3.40
1959-1960	2.85 (2.80, 2.90)
1961 Jan to Apr	1.20

The 1961 figure looks ominous but I would expect that the species will have recovered as it did after 1952-1953.

WAIUAU

The total of Pied Tit seen on hunting trips to the Waiau, i.e., the back country bush, for parts of 47 months was 3325 (13,300).

Count days per month averaged 6; days seen 5.8; days not seen 0.2.

Daily counts of birds ranged from 0 to 32.

Total count days were 234 and the total birds seen 3325, giving an average of 14.2 (56.8) per count day.

Notes on Analysis

Compared with 6.2 per count day at Tihoi for its whole period and 2.6 at Minginui the higher figure of 14.2 at Waiau was to be expected as it was relatively undisturbed country and I was on the move so much in the bush.

NORTH ISLAND ROBIN (*Petroica australis longipes*)

STATUS AND HABITS

Habitat

In the Urewera Bush the Robin prefers dark gullies and well sheltered localities. It does not leave heavy cover here as it often does elsewhere. It is not plentiful in the higher forest, though some can be found in gullies right to the mountain tops. In one dark gully running right down to the Waiau Stream I saw c20 in a stretch of less than a kilometre. I had to take care not to double count because in following you for food exposed by your feet it can easily get in front of you in anticipation of your next step. The best method of circumventing this forward movement is to rake or kick up leaves and move on while the Robin is busily engaged in feeding on the disturbed small life.

Flight

The flight is similar to that of the Pied Tit. It has the same habit of flying closely from tree to tree to inspect the newcomer. No flight is made above cover. It can move very fast when chasing another bird out of its territory. At such times of excitement it shows a white patch just above and even right round the eye. This is not connected with the white patch above the bill. Another feature, incidentally, is that it has a little pinkish stripe running from the bill right back over and down to the upper wing coverts like the New Zealand Pipit (*Anthus n. novaeseelandiae*) and the Fernbird (*Bowdleria punctata*). It can still fly well when its tail has been lost in the February moult.

Nesting

The nest is usually in the fork of a live or dead tree, in a hollow stump or broken off branch, or on a ledge on the trunk of an old tree where it is hard for most predators to reach. The stoat of course can reach it anywhere. Nesting territory as a whole is fiercely defended against its own kind or others. A human visitor will be almost struck and the parent will use the "broken wing trick" to lure him away. Sometimes it will go down on the ground and slowly wave its wings up and down like a huge dark butterfly, looking so pathetic that it arouses a feeling of guilt in the human intruder.

Food

The food is mainly insects and larvae, and, rarely, berries. It is very fond of butter and cake so was sure to turn up at my lunchtime. This familiarity has led to this little bird being a most engaging companion to the bushman. When I was splitting posts at the edge of the bush or along the timber tracks one would nearly always be in attendance, probably not the same one if I had moved some distance, as it is strictly territorial and one would not be allowed to move into

the domain of another. There is no pair bond outside the nesting season. When trimming a log and cutting or splitting it I had to watch that I did not step on the bird or drop a post on it. If old rubbish was being cleared off a prostrate log it would be right in on the job, coming to within six inches of my hands for the live food. However, when I picked up the camera it would give a "twit" and be off, though sometimes I could not get a photo because it came too close. Once when I turned over a log for cutting, my pet one gathered up the grubs, insects, earthworms, millipedes, etc., put them all along the top of the log, then took all except the millipedes up onto the moss on the large branch of a tree. Soon I saw it looking up at its cache from 8 to 9 m away and one of the worms was coming down through the moss. It flew up, picked it up, pinched it and put it back on the top. It then returned to the millipedes, hit them this way and that in sudden little jerks and, apparently in scorn, scattered them far and wide into the bush. Perhaps it considered them to be second class food. The species certainly has intelligence but some of its actions are hard for the human to interpret. One bright one went along the track ahead of me and waited at an old totara log for me to take off the bark for it. My pet one brought along a fledged young to feed it on the grubs and ants provided by my working.

Song.

The full song is a high musical five-note "tweet-tweet-tweet-tweet-tweet" sounded on a descending scale. There is a slight pause after the second "tweet" and the last three notes are shortened. It can be heard at a considerable distance. A sudden "twit" as one walks along will sometimes announce its arrival, though its approach from a distance is seldom seen. The "twit" is also used if it is disturbed. The rarely heard whisper song is not as faint as that of the Silvereye and is even more delightful.

ANALYSIS OF MONTHLY CHARTS

(Brackets = total birds seen plus estimate of birds heard only).

Proportion seen to heard: 1 seen to 4 heard and not seen.

TIHOI

The total of birds seen for the two years May 1944 to April 1946 was 875 (4375).

Count days per month for 24 months averaged 21.6; days birds seen 13.6; days not seen 8.

Daily counts of birds seen ranged from 0 to 11.

Count days totalled 519 and the total birds seen 875, giving an average of 1.7 (8.5) per count day.

Notes on Analysis

For this species the average of 1.7 seen is quite good because I was working part of the time in the cut-over area next to the main bush, but there were variations, which, however, do not appear to be

seasonal. From May to December 1944 the average per count day per month was 3.4 (17); from January to October 1945 1.43 (7.15) and from November 1945 to April 1946, when I left Tihoi, almost none at all. I can offer no explanation.

MINGINUI

The total of birds seen from part 1946 to part 1961 was 3414 (17,070).

Count days per month for 170 months averaged 20.5; days seen 10.5; days not seen 10.

Daily counts of birds ranged from 0 to 11.

Total count days were 3487 and total birds seen 3414 giving an average of 0.98 (4.9) per count day.

Notes on Analysis

Table 1 shows the average numbers per count day for each calendar month for the full period, 1946 to 1961. It does not indicate a drop in summer as in the case of the Pied Tit, nor do the winter counts have the appearance of any move to lower country so that it must be one of the most sedentary birds of the region.

TABLE 1 — Monthly averages of birds seen per count day

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.9	0.8	1.3	1.2	1.0	0.9	1.0	0.7	0.8	1.3	1.5	1.0

The yearly figures are shown in Table 2. These do not follow the trend of the Whitehead or of the Pied Tit, except that the years 1952 and 1953 are again the poorest and the drop at the end of the whole period is greater.

TABLE 2 — Averages of birds seen per count day for the periods shown

May 1946 to Dec 1950	2.01 (1.63, 1.73, 2.44, 2.85, 1.38)
1951	0.74
1952-1953	0.30 (0.00, 0.06)
1954	0.10
1955-1956	0.38 (0.33, 0.44)
1957-1959	1.35 (1.17, 1.84, 1.06)
1960-1961	0.63 (0.51, 0.75)

The Robin is another bird which has adapted itself to the exotic pine forest. It has populated the Matea Block of the Kaingaroa State Forest where the pines adjoin the native bush. Since so much of the native bush is being destroyed it would be good policy to introduce the Robin and other insectivorous native birds to pine forests which they cannot reach of their own accord. It would be beneficial to both the birds and the pine forests.

WAIAM

The total of birds seen on hunting trips for parts of 47 months (from 1 to 24 days per month) was 1772 (37,212).

Count days per month averaged 5; days seen 4.4; days not seen 0.6.

Daily counts of birds ranged from 0 to 11.

Count days totalled 234 and the total birds seen 1772, giving an average of 7.6 (38) per count day.

Notes an Analysis

The Robin, as with the Whitehead and the Pied Tit, was readily seen owing to the bush being unspoiled and to my being on the move so much. However, the count of 7.6 per day while Tihoi had 1.7 and Minginui 0.98 indicates a much larger population for Waiau.

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SHORT NOTE

LITTLE WHIMBREL IN THE BAY OF PLENTY

When visiting Maketu Harbour on 6 January 1976, I spotted an unusual bird being chased by godwits which were coming onto a small island to roost, approximately 50 m off-shore. When the godwits settled down the bird quietly mixed among some Pied Stilts (*Himantopus himantopus*). The bird seemed very nervous since it was continually standing up and sitting down. At that distance with a 25 x telescope I could not see the bill, but the light was good and the colour, shape and size of the bird seemed similar to that of a Golden Plover (*Pluvialis dominica*) except the neck which appeared longer.

Having rowed out to the opposite side of the island I managed to crawl close to the bird and had excellent views of the important features. The beak was about 30-50 mm long, down-curved and pinkish at the base. The legs were bluish-grey and there was a buff coloured eye stripe. The crown was dark brown with a buff median stripe. Underparts were pale with brown streaks on the breast. After exhaustively studying the bird on the ground, I made it take flight to observe the rump which was brownish with a barred tail.

Later that day I saw the bird feeding on the mud, but it has not been seen since. I believe this to be the first record for the Bay of Plenty. Other notable waders seen here this season are: 6 Sharp-tailed Sandpiper (*Calidris acuminata*), 6 Long-billed Curlews (*Numenius madagascariensis*), 7 Knot (*C. canutus*), 2 Wrybilled Plovers (*Anarhynchus frontalis*) and 2 Turnstones (*Arenaria interpres*.)

TONY PALLISER, 12 Russel Crescent, Rotorua.

DISTRIBUTION OF BREEDING SITES OF THE WESTLAND BLACK PETREL (*Procellaria westlandica*)

By H. A. BEST and K. L. OWEN

ABSTRACT

During the period 25 April to 5 July 1974 observations were made of the numbers and direction of Westland Black Petrels overflying the coastal road at points between Perpendicular Point (3 km north of Punakaiki) and Barrytown (16 km south of Punakaiki), north Westland, to determine the area used for breeding. Intensive searches of known breeding areas and areas to which birds were seen flying were then made and the distribution and numbers of burrows mapped.

INTRODUCTION

Petrels, as a group, visit land only to breed and they commonly arrive at dusk and depart at dawn. Some species, including the Westland Black Petrel, tend to congregate in rafts some one to two kilometres offshore before flying inland. Most petrels nest underground in burrows and both parents share in the incubation of the egg and care of the young which is deserted by day after it starts to grow.

The Westland Black Petrel is unusual in that it is a winter breeder. The breeding ground, in forested hill country about four kilometres south of Punakaiki, north Westland (Fig. 1), was discovered in 1946 (Falla 1946).

Since that time little work has been done on the natural history of this species although Jackson (1958) gave an outline of the breeding cycle, mapped the burrow distribution and made an estimate of the population size.

In late March and early April Westland Black Petrels return to the colony and clean out their burrows in preparation for nesting. The single egg is laid between late May and the end of June and hatches over two months later (between early August and mid-September). The young do not fly until early December, though a few remain until the end of that month (Jackson 1958).

The objects of our survey were: to determine the number and extent of burrows in the present known breeding area and to discover the existence of other, yet unknown breeding areas in the immediate vicinity. Distribution maps of the number of burrows in use are necessary to define the approximate size of the breeding population and also show whether there have been changes in the population distribution.

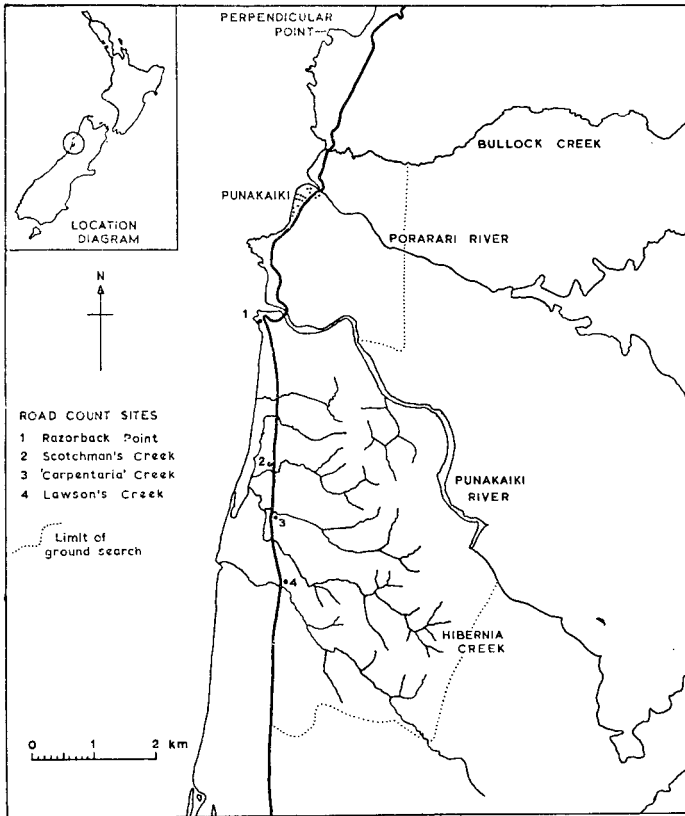


FIGURE 1 — Locality map of the Westland Black Petrel breeding area.

To determine the area where the species breeds, evening searches were made for rafting birds or birds wheeling about close inshore from Perpendicular Point to Razorback Point, and as far south as Barrytown for birds flying inland. These observations were followed by intensive ground searches. Because petrels require open areas on steep slopes to take off from, ground searches were concentrated along ridge crests and flanks and immediately above bluffs. The following features were indicative of nesting activity:

1. fresh droppings on the ground (large white fluid deposits);
2. an appreciable thinning out of the understorey and ground cover;
3. the presence of the typical strong musty petrel odour found in breeding areas;
4. vertical claw marks on trees, faces of banks and small bluffs up which birds had scrambled to take off from; and

5. pieces of broken egg shell that birds had kicked out of their burrows.

Only occupied burrows (those which had recently been cleared out and having the typical musty petrel smell) were counted during the survey.

AREAS SURVEYED FOR BREEDING SITES

The survey was made in three adjacent areas of forested hill country, namely:

1. *Bullock Creek* (area c.1.60 km²) — between Bullock Creek (1 km north of Punakaiki) and the Porarari River (0.5 km north of Punakaiki). The survey extended from State Highway 6 inland some 1.25 - 1.75 km to grid line 4870N on NZMS 1, Punakaiki, S37 (scale 1:63360).
2. *Porarari River* (area c. 4.21 km²) — bounded by the Porarari River in the north, the Punakaiki River in the south, State Highway 6 to the west and grid line 4870N to the east.
3. *Punakaiki River* (area c. 13.00 km²). The boundaries of this block were formed by the Punakaiki River to the north and east, the crest of the southern ridge of Lawson's Creek to the south (some 7 km south of Punakaiki), and State Highway 6 to the west.

The terrain in the Punakaiki River area consisted of deeply dissected hill country clad in luxuriant dense coastal forest. Long main ridges, dropping gently to the westward from an altitude of 60 m, alternated with steep-sided, deep valleys. The flanks of these ridges were dissected by series of closely spaced, steep discrete gullies which, especially along the Punakaiki River, may terminate in bluffs 20 to 100 m high. Streams drained many of the small valleys.

The vegetation consisted of very dense thickets of kie-kie (*Freycinetia banksii*), supplejack (*Rhipogonum scandens*), nikau palm (*Rhopalostylis sapida*) and tree ferns (*Cyathea* spp) in the valley floors and gullies. This association was replaced by a canopy of miro (*Podocarpus ferrugineus*), rimu (*Dacrydium cupressinum*) and southern rata (*Metrosideros umbellata*) with an understorey of kamahi (*Weinmannia racemosa*), toro (*Myrsine salicina*) and *Quintinia acutifolia* on ridges and spurs. In the highest parts of the Punakaiki River area the podocarp canopy graded into a cover of red beech (*Nothofagus fusca*) which had a characteristically sparse understorey. In areas of wind throw the ground was covered by a thick mass of rata creepers (*Metrosideros* spp), bracken, fern (*Pteridium aquilinum*), kie-kie and a few small tree ferns and kamahi shrubs.

From the Punakaiki River north to Bullock Creek the terrain consisted of limestone mesas separated by deep sheer sided gorges some 150 to 300 m deep. The surface of the mesas comprised bluffs, potholes and deep narrow-gutted stream beds. The vegetation in this area was similar to that in the Punakaiki River block.

FLIGHT PATTERNS

The majority of petrels flying inland each evening followed set flight paths and moved directly up valleys towards specific groups of burrows. However, some birds meandered about considerably before continuing inland or swinging back to sea. In contrast, birds leaving the colonies in the morning flew directly out to sea.

The majority of birds flew into the colonies along the south bank of the Punakaiki River, or up the valleys of Scotchman's Creek or "Carpentaria"* Creek. A few birds (2 to 10) flew along the valley of Lawson's Creek (Fig. 2). No petrels were seen flying overland outside the Punakaiki River-Lawson's Creek area. Bartle (1973) saw petrels flying towards the high bluffs in the Waikori peak area from the ford on the Punakaiki River but our observations, made about three kilometres further upstream, indicate that birds flying up the Punakaiki River swing in toward the large concentration of burrows on the ridge at the eastern side of the petrel reserve (Fig. 2). No birds were seen continuing on towards Waikori itself.

The flight of Westland Black Petrels in calm conditions consists of slow, heavy, regular wing beats. However, in windy conditions, the birds wheel, soar and scud in a smooth fluid motion typical of petrels. At dusk birds fly over land at a variety of altitudes. We judged that most passed over 60 to 75 m above the ground while some flew up to 120 m overhead. In the morning, however, birds flew out to sea at heights ranging from 15 to 70 m above ground level. Late birds especially come over very low and fast, making a distinct "whoosh" as they passed.

ROADSIDE COUNTS

Morning and evening counts at a variety of sites (Fig. 1, Table 1) were made to determine the number of petrels flying into each region of the breeding area. There was considerable variation in the number moving in and out of the colonies (Table 1) and this appeared to be, in part, related to the weather and sea conditions. For example, after a period of stormy weather, 520 birds were counted flying inland over Razorback Point, Scotchman's Creek and Carpentaria Creek on the evening of 2 July. Three nights later (after three days calm settled weather) only 27 birds were recorded flying inland over the same sites. The greatest number of birds, 578 flying out from Scotchman's Creek, was also recorded during stormy weather on 26 June.

Counts made in the evening and on the following morning indicated that there could be a considerable movement of petrels in and out of the area during the night. On the evening of 3 July, 146

* This creek is not named on NZMS 1, S 37 Punakaiki. We have named the creek after the Carpentaria Mining Company's installation located where State Highway 6 crosses the creek.

birds were seen flying into the valley of Carpentaria Creek, and 65 inland over Razorback Point. The following morning 236 petrels flew out from Carpentaria Creek and only five passed over Razorback Point.

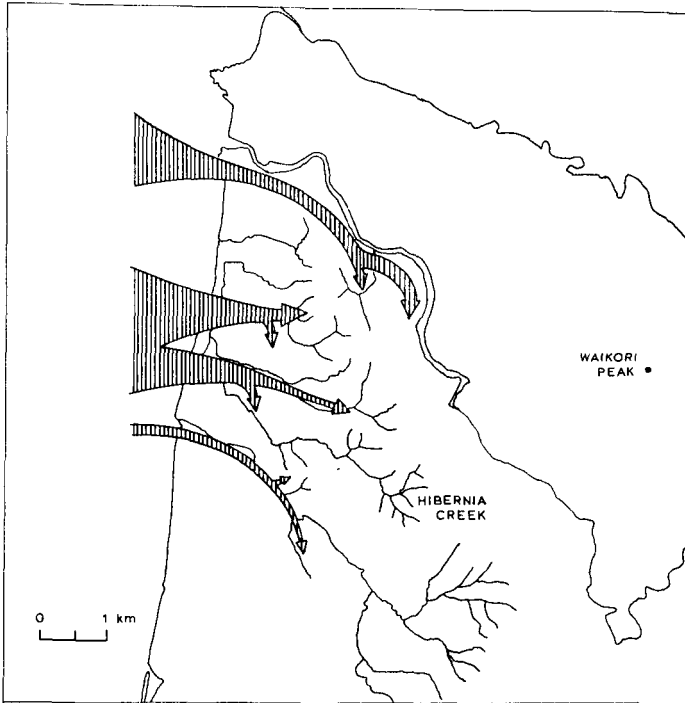


FIGURE 2 — Main flight paths of Westland Black Petrels. (No birds were observed flying on towards Waikori Peak.)

TABLE 1: Number of petrels seen flying over road-side counting sites

Site	Razorback Pt	Scotchman's Ck	"Carpentaria" Ck	Lawson's Ck.	Punakaiki River
Maximum	65	578	280	10	57
Mean	29.5	281.4	138	4.5	34.6
Minimum	0	6	21	1	11
No of observations	6	5	6	4	5

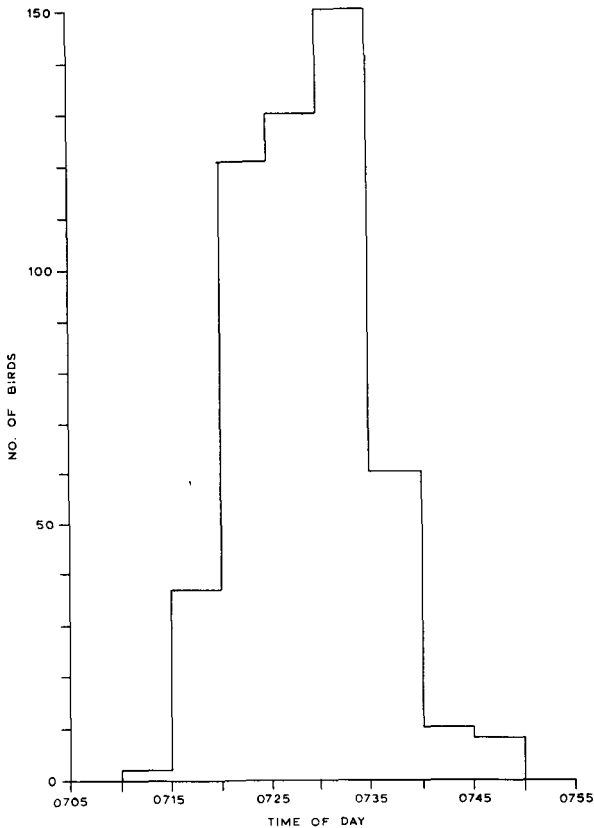


FIGURE 3 — Morning flight schedule of Westland Black Petrels over the road counting site and Scotchman's Creek, 26 June 1974.

Westland Black Petrels showed a marked punctuality in their flights to and from their colonies. The majority of birds counted passed over the observation sites within a 20 to 30 minute period (Fig. 3, Table 2). This flypast was especially pronounced at Scotchman's Creek on the morning of 26 June. The first bird was sighted at 0713 hr and thereafter birds flew over in ever increasing numbers. The peak period lay between 0730-0735 hrs when 150 birds flew out of the valley, and from then on the number decreased rapidly. This was the only morning when, from the roadside, we heard the morning chorus of screaming birds, although the nearest group of burrows facing us was one kilometre distant.

TABLE 2 Time range of first and last petrels seen flying over Razorback Point, Scotchman's and Carpentaria Creeks

	Morning	Evening
Earliest petrel	0713 hr	1731 hr
Latest petrel	0755 hr	1830 hr (too dark to see after this)
No. of observations	8	15

NOCTURNAL ACTIVITIES OF PETRELS IN THE COLONY

An overnight visit was made to the largest colony (265 burrows) on the night of 4-5 July. The weather was calm and clear. Birds began to fly over the colony at 1740 hrs. At first they flew above the general environs but a few which we could observe began to pass over a particular spot and, on successive circuits, came over at decreasing altitude and speed, sometimes almost stalling, before gathering speed again. On the final approach birds appeared to aim for an opening in the vegetation, and after stalling, fell heavily through the foliage, sometimes becoming tangled momentarily or turning over and over before striking the ground. After landing, birds either sat quietly for a while, or moved directly towards burrows. Most had landed by 2000 hrs, two hours after the first had arrived.

Soon after the first birds landed and had entered their burrows, subterranean calls were heard from pairs. These calls were of short duration (less than a minute) after which the birds remained silent. Surface-calling birds were first heard soon after 1810 hrs but their calls were intermittent and of low intensity. The volume and intensity of calling gradually increased, and rose to a crescendo with many birds all around shrieking in full chorus by 1830 hrs. Most surface birds were calling in pairs although some were alone or in trios. Calling ceased suddenly at 2100 hrs and was heard only intermittently thereafter except for the odd brief concerted outburst in the night. From 0530 hrs calling started very loudly in a sustained chorus until 0730 hrs, by which time birds were streaming out of the colony.

DISTRIBUTION AND DENSITY OF BURROWS

The distribution of occupied burrows has been plotted in Figure 4. The sites marked were placed as precisely as the Lands and Survey base maps (scale 1:15,840 or "1 inch: 20 chain") allowed. Many small gullies and spurs were not shown on these maps.

Burrows were found in groups of 1 to 265 from 30 to 215 m above sea level, 90 percent of the groups being on or near ridge crests and adjacent to a take-off area. Such areas consisted of a gap in the forest caused by wind throw, a slip or cliff face, or trees whose limbs reached out through the surrounding vegetation. The other 10 percent

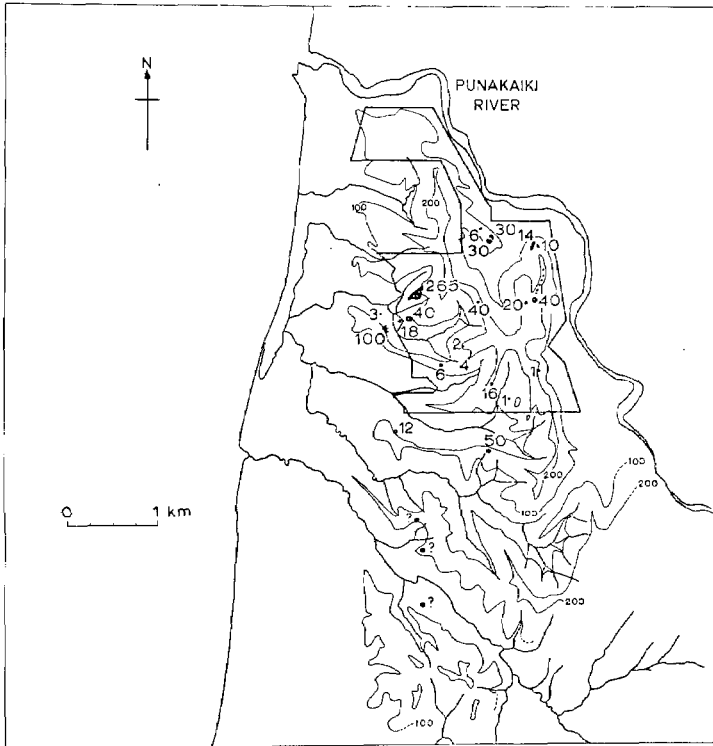


FIGURE 4 — Distribution of Westland Black Petrel burrows. The border of the present reserve for Westland Black Petrels is also shown. The six unnumbered groups of burrows overlooking the Punakaiki River consist of four groups of 10, one of 20, and one of 30 burrows. Question marks alongside sites in Lawsons Creek indicate where birds dropped into the trees, but no occupied burrows were found there. Contours are at 100m intervals.

of the groups of burrows were in small gullies and spurs on the flanks of main ridges. The breeding area occupied 3.6 km².

Many burrows were in areas devoid of ground vegetation, but some occurred in dense stands of kie-kie, shrubs and rata creepers which grew at the periphery of most concentrations of burrows. Burrows were excavated between the roots of trees, in the faces of banks and sides of spurs. The majority of burrow entrances faced downhill, presumably to stop rain water and debris from draining into the nesting chamber. Few burrows were found in poorly-drained sites, such as along the axis of a gully.

Because of the extremely dense vegetation flanking the ridges and the topography and large area of ground involved we have certainly not found every occupied burrow. However, it is unlikely that any

appreciable concentration has been missed between Lawson's Creek and the Punakaiki River, as any such would have been fairly obvious during our concentrated ground search. As petrels typically nest in colonies, the number of uncounted burrows occurring in twos and threes is probably very low. For example, those breeding sites containing one to ten burrows provided only 63 (7.8%) of the total; whereas sites of 11 to 20, 21 to 100, and 100 plus contained a total of 120, 360 and 265 burrows respectively. Therefore, we estimate from our count of 818 burrows that the actual number in existence does not exceed 1,000 and is likely to be less than 900.

DISCUSSION

The only other distribution map of Westland Black Petrel breeding areas is that by Jackson (1958). Unfortunately, he had neither the time nor the manpower to cover the country as thoroughly as we could, and at that time there were no topographical maps of the area. Hence, his map is not as detailed as ours. This statement is not intended to disparage Jackson's work but is to indicate the difficulty in pin-pointing an exact position in the area even with present day topographical maps.

The two distribution maps are the same in the following respects:

1. Both show a concentration of burrows on the tops of bluffs overlooking the Punakaiki River on the east side of the reserve. However, Jackson indicated that the burrows are spread over a longer stretch of ridge than we found, but this may have been a mapping error caused by the quality of maps available in 1958.

2. There is a large concentration of burrows towards the head of Scotchman's Creek.

However, there are some discrepancies:

1. We did not find any very large concentrations of burrows in the catchment of Carpentaria Creek. The sites we found contained from 12 to 50 burrows.

2. No burrows were found on the south side of Hibernia Creek; and

3. No burrows were found in the vicinity of the "Rowe" colony. Jackson's description of the "Rowe" colony is that it "is just inside the bush on the top of a terrace north of Hibernia Creek." The only terrace we are aware of in this area lies on the southern ridge flanking Scotchman's Creek. The "Rowe" colony may have been wrongly placed and should possibly lie immediately below his next most northerly concentration of burrows (265 burrows on our map). Falla (1946) did not specify the area which he visited, but he acknowledged the assistance of W. J. Rowe (then a senior pupil of the Barrytown School) in the field. Jackson's "Rowe" colony may have been the one that Falla visited.

Mr J. Arnair, a farmer who lives at Hibernia Creek, says there has been a decrease in the number of birds flying across the ridge between Hibernia and Carpentaria Creeks since 1950. This could be the result of changes in one or a few colonies rather than indicating an overall population decline. Bartle (1973) mentioned that there was a decline in the area used for breeding since 1948 but we have not found any reference to the distribution of breeding sites at that time.

Petrels are long lived birds that breed for many seasons, typically with the same mate and at the same site. Because breeding birds exhibit such strong site tenacity they would not readily move to new breeding areas. The only section of the population that would be likely to play an important role in colonising new areas would be non-breeders or first breeders. The basic similarities between Jackson's map and ours show there has been no large-scale change in the distribution of Westland Black Petrel breeding areas over the last 18 to 20 years.

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BREEDING SCHEDULES OF ANTARCTIC AND KERGUELEN TERNS AT MARION ISLAND

By A. BERRUTI and A. HARRIS

ABSTRACT

Observations on *Sterna vittata* and *S. virgata* breeding and foraging at Marion Island are reported. The breeding season of *S. vittata* corresponds with the period of least strong wind. The breeding periodicity of *S. virgata* is apparently less affected by seasonal wind variation, since the bird obtains much of its prey on land.

The Antarctic Tern (*Sterna vittata*) and the Kerguelen Tern (*Sterna virgata*) occur at Marion Island (46° 54'S, 37° 45'E), where the two populations have been estimated at 10-30 pairs (pers. obs) and 150 individuals respectively (van Zinderen Bakker, Jr. 1971). The Kerguelen Tern breeds at Kerguelen and Crozet islands and Marion Island. The Antarctic Tern breeds throughout the subantarctic region, but has not yet been confirmed as breeding at Marion Island. At Marion Island, tern eggs have been recorded in November (Rand 1954) and February (Crawford 1952).

Identification of the two tern species in the field at Marion Island proved initially difficult, in spite of detailed plumage descriptions given by Falla (1937). We were only able to identify solitary terns after we had compared both species at close range. Antarctic Terns were seen more frequently than Kerguelen Terns.

Two Antarctic Tern nests, each containing a single egg, were found at Marion Island in February 1975. The eggs measured 50.4 x 34.3 mm and 45.8 x 33.7 mm, and were situated on raised black lava platforms, within 10 m of the sea. One egg hatched on 15 February, and the second egg was found on 27 February. On 14 March, we observed a recently fledged juvenile being fed by adults at a third locality. No Kerguelen Tern eggs were found, but four recently fledged juveniles were seen at two different localities on 15 and 27 February. On both occasions the juveniles were part of small mixed flocks comprised of Kerguelen Terns and a few Antarctic Terns. At this time, all the Antarctic Terns were in breeding plumage, whereas all the Kerguelen Terns were in various stages of winter plumage.

According to Falla (1937), the two tern species have allopatric breeding schedules at Kerguelen where the Kerguelen Tern nests in October and November, and the Antarctic Tern nests in January and February. At the Isle de l'Est, in the Crozet islands, the last Kerguelen Tern eggs are laid in mid-December, 8-15 days before the first Antarctic Tern eggs are laid (Despin *et al.* 1972). Serventy (*in* Crawford 1952)

suggested that the February breeding records of the Kerguelen Tern at Marion Island possibly referred to the Antarctic Tern. Our data on Antarctic Tern nests, and on the temporal occurrence of various plumage phases (breeding, non-breeding and juvenile) support this suggestion. A tern nest and egg found on 9 February 1974 on an inland grey lava ridge at Marion Island (A. Burger pers. comm.) is attributed to the Antarctic Tern, on the basis of the date.

Antarctic Terns were often seen foraging over the kelp zone 20-200 m from the shore. On two separate occasions, a single Antarctic Tern was seen diving in brackish ponds, situated within the salt-spray zone at the coast. We could not, however, see whether the birds had obtained prey. The Antarctic Tern apparently feeds predominantly in the kelp zone at Heard Island (Downes *et al.* 1959) and at South Georgia (Murphy 1936), although intertidal polychaetes and limpets have been recorded in the diet of the birds at Heard Island (Ealey 1954). The Antarctic Tern has not yet been recorded as feeding on terrestrial invertebrates. At Marion Island, Kerguelen Terns were seen feeding on invertebrates in damp *Tillaea* meadows. At Kerguelen, the Kerguelen Tern has been recorded as feeding in the surf zone during the day, and on spiders and insects on marshy terraces at dusk (Falla 1937). Crustaceans, fish and insects were recorded in the diet of Kerguelen Terns at Isle de l'Est (Despin *et al.* 1972). Further study may show a similar partial overlap in the diets of the two terns at Marion Island.

Wind is an important environmental factor affecting the fishing ability of terns which dive for prey (Dunn 1975). Terns are unable to fish at optimum efficiency at high windspeeds, because of rough sea surface conditions, and starvation of chicks can result (Dunn 1975). Marion Island is subject to frequent strong winds, typical of subantarctic, oceanic weather. The three months at Marion Island with the least number of moderate gale days (during which the wind averages 54.8 km/hr for at least one hour) are February, March and April (Schulze 1971). The breeding season of the Antarctic Tern thus corresponds with the period of least strong wind. The breeding periodicity of the Kerguelen Tern is apparently less affected by seasonal wind variation, since it obtains much of its prey on land. It may similarly be possible to correlate differences in clutch size (1-3 eggs) in the Antarctic Tern at different localities (Murphy 1936) with the relative amount of wind and concomitant interference of feeding efficiency. In windy localities, parents may only be able to obtain enough food for one pullus.

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SHORT NOTE

LONG-TAILED FRUIT BATS AS PEREGRINE PREY

The hunting of insectivorous bats by Peregrines (*Falco peregrinus*) has been recorded in several parts of the world (Porter & White 1973, *Brigham Young Univ. Sci. Bull., biol. Ser.* 18: 30). Studies at a Peregrine eyrie at Joske's Thumb in southern Viti Levu, Fiji Islands, proved that the large Flying Fox fruit bat (*Pteropus tonabus*) which weighs over 700 g. was the staple food of the falcons there (Clunie 1972, *Notornis* 19: 302-322; 1976, *Notornis* 23: 8-28).

Bones collected from the Joske's Thumb eyrie reveal that the considerably smaller Long-tailed Fruit Bat (*Notopteris macdonaldi*) was also taken quite often by the Peregrines. The Long-tailed Fruit Bat, like the Flying Fox, is not strictly nocturnal, frequently venturing out of its roosting caves several hours before sunset to feed on yaqoyaqona (*Piper puberulum*) flowers growing along creek banks near Joske's Thumb.

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FOODS OF THE COMMON MYNA (*Acridotheres tristis*) IN CENTRAL INDIA AND IN HAWKE'S BAY, NEW ZEALAND

By ABDUL MOEED

ABSTRACT

Foods of the adult Mynas from near Bhopal in central India are described from 43 birds collected during the breeding season. A comparison is made with adult and nestling Myna foods in Hawke's Bay, New Zealand. The results show that Mynas fed on both animal and vegetable foods.

INTRODUCTION

Foods of the Myna (*Acridotheres tristis*) have been briefly mentioned by many workers including Kent (1927) from South Africa, Walker (1952) from Australia, Akhmedov (1957) and Sagitov *et al.* (1957) from the U.S.S.R. and Sengupta (1968) from India. The feeding habits have been studied in any detail only by Mason and Lefroy (1912) and Toor & Ramzan (1974) in India, and Wilson (1965) in Hawke's Bay, New Zealand.

This work reports a comparative study of the foods of Mynas from near Bhopal (23°20'N, 77°30'E) in central India, from an area used extensively for growing wheat. Mynas are abundant in this region, living around villages and nesting in buildings and in old trees. To examine the food eaten 43 adult Mynas (22 ♂♂, 21 ♀♀) were shot during the breeding season in May 1974. The results were compared with findings from New Zealand.

RESULTS AND DISCUSSION

The food consisted of insects, seeds and fruits. Percentage occurrence of insects and the abundance of seeds and fruits for both sexes of the Myna are given in Table 1. The insects were counted by eye, and very small specimens could have been missed. Seeds and fruits were arbitrarily recorded as 1 (traces), 2 (few) and 3 (many), and identified by reference to specimens collected in the area.

Of the gizzards examined (Table 2), 16 contained insects, seeds and/or fruits (37.2%), 15 had only insects (34.9%), 10 had seeds and/or fruits (23.3%), and 2, both females, were empty (4.6%, excluded from the food analysis).

Adult beetles (Carabidae and Coccinellidae, 30.9%), crickets (Gryllidae, 29.9%) and grasshoppers (Acrididae, 27.2%) were eaten more than weevils (Curculionidae, 10.4%) which in turn were eaten more than beetle larvae (Carabidae, 1.6%). The insect composition in the diet was similar in both the male and female Mynas.

TABLE 1 - Food of the Myna in central India

No. of Mynas	Actual numbers recorded					Mean score of arbitrary scale				
	Beetle Adults	Beetle Larvae	Weevil Adults	Crickets	Grass-hoppers	Wheat	Dates	Figs	Beans	Other stone fruits
	%	%	%	%	%					
22♂♂	15.6	0.4	4.3	15.0	13.5	2.1	2.1	2.0	1.3	1.6
19♀♀	15.3	1.2	6.1	14.9	13.7	1.2	2.0	2.0	1.0	2.5
Totals	30.9	1.6	10.4	29.9	27.2	1.7	2.0	2.0	1.1	2.0

TABLE 2 - Food items in individual gizzard of Mynas (- = Absent, * = Traces, ** = Few, *** = Many; 1-22♂♂, 23-43♀♀)

Myna No.	Food items									
	Beetle Adults	Beetle Larvae	Weevil Adults	Crickets	Grass-hoppers	Wheat	Dates	Figs	Beans	Other stone fruits
1	10	-	-	4	5	-	-	**	-	-
2	6	-	2	3	4	-	-	-	-	-
3	4	-	-	2	3	-	-	-	-	-
4	-	-	-	3	-	*	-	***	-	-
5	-	-	-	7	8	-	***	-	-	-
6	-	-	-	2	3	**	-	-	**	-
7	3	1	1	1	4	-	-	-	-	-
8	-	-	-	11	6	-	**	-	-	-
9	2	-	1	1	2	-	**	-	-	-
10	8	-	-	-	-	**	***	-	-	-
11	-	-	-	4	3	-	-	***	-	-
12	-	-	-	-	-	-	***	-	-	**
13	-	-	-	-	-	***	-	*	-	*
14	3	-	2	7	4	-	-	-	*	**
15	9	-	3	8	6	-	-	-	-	-
16	-	-	-	-	-	***	-	*	*	-
17	2	-	-	11	7	-	-	-	-	-
18	-	-	-	-	-	**	*	-	-	**
19	16	-	4	3	1	-	-	-	-	-
20	10	1	9	2	4	-	-	-	-	-
21	4	-	-	-	2	**	**	-	-	-
22	3	-	-	8	7	-	*	-	-	*
23	12	-	9	6	4	-	-	-	-	***
24	-	-	-	6	8	-	-	-	-	-
25	3	2	-	9	4	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-
27	-	-	1	4	7	*	-	-	-	-
28	12	1	1	3	2	-	-	-	-	-
29	6	-	-	10	9	-	-	-	-	**
30	-	-	-	-	-	**	-	-	*	**
31	-	-	-	-	-	-	-	***	*	-
32	-	-	-	-	-	*	**	-	*	-
33	-	-	-	-	-	-	***	-	*	**
34	-	-	-	-	-	*	*	-	-	***
35	-	-	-	4	7	-	***	-	-	-
36	6	1	1	6	8	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-
38	13	-	2	4	6	-	-	-	-	-
39	-	2	6	8	4	-	-	*	-	-
40	4	-	6	12	4	-	-	-	-	-
41	14	-	5	1	3	-	-	-	-	-
42	-	-	-	-	-	*	*	-	-	***
43	8	-	-	3	4	-	-	-	-	-

Twelve gizzards contained wheat (7 males, 5 females), 13 had dates (8 males, 5 females), 7 had figs (5 males, 2 females), 7 had beans (3 males, 4 females) and 11 had other stone fruits (5 males, 6 females). The mean score of occurrence of seeds and fruits on the 1-3 scale is shown for each food item in all gizzards in Table 1. The diet of male and female Mynas was similar although males ate more wheat and females more miscellaneous stone fruits.

This study confirms earlier reports (Mason & Lefroy 1912, Kent 1927, Walker 1952, Akhmedov 1957, Sagitov *et al.* 1957, Wilson 1965, Sengupta 1968, Toor & Ramzan 1974) that the Mynas' food consists of both animal and vegetable matter. Comparable data for the breeding season were reported by Wilson (1965) who studied the foods of 17 adults (shot January to March) and 4 nestlings. The adult Mynas in Hawke's Bay, New Zealand, ate a mixed diet, while the nestlings were fed exclusively on insects. Wilson's findings for nestling foods are supported by Sengupta (1968) who reported that nestlings up to 10 or 12 days old are fed exclusively on animal food, and vegetable food is added later to the diet. Subsequent observations on feeding behaviour by Wilson (*pers. comm.*) show that the young nestlings were fed on some vegetable matter, the proportion of which increased considerably in nestlings older than 10 days. Moeed (1975), studying the diets of nestling Starlings and Mynas in Hawke's Bay, also found that the Myna nestlings (3-18 days old) were fed on both animal and vegetable foods. A similar feeding pattern seems likely in central India.

The danger of small samples for food analysis of adults of this species was demonstrated when 15 gizzards showed only insects and 10 had only seeds and/or fruits. An assessment based on either of these would have been misleading.

Definite conclusions are difficult because the birds were collected over only a five day period. Nevertheless, it seems that the Mynas in that area may have some economic significance, at least during the breeding season because they fed on seeds and fruits that are a part of the human diet.

The economic importance of insects eaten by Mynas in central India is not known. If the insects are harmful, the damage to fruits and seeds by Mynas may be somewhat balanced. On the other hand, the grasshoppers eaten were not "locusts," and some beneficial Coccinellid beetles (ladybirds) were also eaten, so any economic assessment would be complex.

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SHORT NOTE

HARRIER RECOVERS DEAD DUCK FROM WATER

On 5 June 1976, while I was in a hide beside a large dam near Martinborough (Wairarapa), a harrier (*Circus approximans gouldi*) circled, then alighted on a dead duck floating 10 m from shore. Under the weight of the harrier, the duck tilted and slowly sank until the harrier's legs and lower breast were immersed. To balance, the harrier spread its wings on the surface. Some 3-4 minutes later, the harrier endeavoured to feed on the small portion of the duck's rump above water, but on each attempt lost balance as the corpse moved. After another minute or two (of apparent intense deliberation) the harrier tried twice, without success, to lift the duck clear of the water. Finally, grasping the duck's neck with one foot, the harrier slowly progressed toward the more distant shore about 20 m away, by vigorously flapping 4 or 5 times, then resting for up to a minute. At rest, the harrier floated with wings outstretched on the water. Approximately 15-20 minutes later, the thoroughly wet harrier reached shore and pulled the duck partially clear of the water. Despite the long time in the water, the harrier flew without any apparent difficulty when the ownership of the duck was disputed!

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SHORT NOTES

PHENOMENAL ANTARCTIC FULMAR WRECK

During September and October 1975 a total of 615 wrecked Antarctic Fulmars (*Fulmarus glacialisoides*) was recorded from west coast beaches of the North Island; 525 of these occurred from Auckland northwards.

Up to the end of the 1950s, a total of 12 storm-wrecked Antarctic Fulmars had been recorded on the New Zealand coast. Of these, the farthest north record was from Kaipara Harbour Heads. Beach patrol records give only 7 specimens for the years 1935-59 from 1041 km of beach. For the next decade this species remained a comparatively rare straggler to New Zealand. Then, in 1970, 16 were picked up. In 1973 the figure was a phenomenal 134 (see Table 1), but dropped again the following year to 19.

BEACH PATROL RECORDS OF FULMARS FOR ALL NEW ZEALAND AREAS

(Figures from reports of dead seabirds published in *Notornis*)

	No.	Km covered
1935-59	7	1041
1960	0	1027
1961	0	1379
1962	0	1176
1963	0	1371
1964	1	1057
1965	1	785
1966	0	661
1967	0	1047
1968	0	1304
1969	0	1711
1970	16	2013
1971	3	2473
1972	5	2752
1973	134	2456
1974	19	2847
1975	615*	-

* Provisional total at time of writing.

In both 1973 and 1975 the big wrecks occurred at about the same time of year and in association with high numbers of Kerguelen Petrels (*Pterodroma brevirostris*). The wrecks occurred in the winter months when sea temperatures are at their lowest. In August 1975 a deep depression passed across the South Tasman Sea on 28-29 August and became complex south of New Zealand on 30 August with strong

SW winds which persisted through to 12 September gradually moderating.

At about this time, two sightings of Fulmars at sea were reported by Mr Neil Cheshire of Auckland as follows:— 1 bird 7 Sept. close to ship. Position: 40°S, 173°11'E, 52 miles SSW from Cape Egmont. Wind WSW 35-40 knots; and, 2 birds 8 Sept. flying close. Position: 36°27'S, 172°43'E, 64 miles west of Kaipara Harbour entrance. Wind SW 20-25 knots.

During coastal voyages since 1971, Mr Cheshire has only once before seen this species at sea; that was on 17 January 1973 when he noted one bird 15 miles off Baylys Beach, Dargaville. On 11 Sept. about 100 Fulmars were seen alive standing on the edge of the surf along the beach south of Glink's Gully by Mr Barry Searle and Mr John Parker. Two days later, a beach patrol in the same area found only 2 live specimens out of a total of 159 dead. A flying Fulmar was noted off Muriwai Beach on 12 October 1975 by Mr Pat Crombie of Auckland. Another was seen flying off the Cavalli Islands on 27 October by a group of 13 OSNZ members. On 27 September, 86 specimens of Fulmar were picked up on Ninety Mile Beach, considerably farther north than any previous records. The wreck of September-October appears to have occurred only on the west coast since no Fulmars were found on any east coast area in spite of checks on a number of beaches.

Undoubtedly weather conditions were among the main reasons for the large wrecks of 1973 and 1975, but they do not satisfactorily explain the wrecks. It is, perhaps, significant that in October 1965 somewhat similar conditions prevailed when there was a wreck of over 400 Prions on the Wellington west coast beaches, but only one Fulmar. Similar wrecks involving other species have been noted from time to time. It is well known that in winter the Antarctic Fulmar travels north with the Humboldt current into low latitudes in the western Pacific, some even crossing the equator into the northern hemisphere. In October 1972 one of the authors (SMR) was in Peru and saw many dead Fulmars on the beaches there; at that time, a warm equatorial current had displaced the Humboldt and thousands of seabirds perished. Hence, it seems likely that wrecks of species with seasonally differing migratory movements occur when exceptionally severe weather or abnormal hydrological conditions are encountered.

Of 26 bodies examined, 13 could be accurately sexed; all these were females. All bodies had squid beak remains in the gizzard and several contained Prion species, one even had the complete head, backbone, leg and foot of a Fairy Prion (*Pachyptila turtur*); some ramshorn shells (*Spirula spirula*) were found in one and in others a few rubber bands and one bootlace. The Animal Health Laboratory at Whangarei reported 11 specimens suffering complete exhaustion of fat reserves and wasting of pectoral muscle.

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SIGHTING OF A YELLOW-NOSED MOLLYMAWK
OFF STEWART ISLAND

The recent record of a Yellow-nosed Mollymawk (*Diomedea chlororhynchus*) at the Chatham Islands (Robertson 1975, *Notornis* 22: 342-344) has finally prompted me to record a sighting of this species made near South Cape, Stewart Island. This bird was seen about two kilometres west of South Cape (47° 18'S, 167° 31'E), at about midday on 14 February 1974 by J. M. Clark, R. Schofield and myself. It was watched both in flight and on the water for several minutes and at times was less than 50 metres from us.

The head, neck and breast were entirely white, except for dark brown or black markings around the eye. The bill was entirely black, and the feet fleshy grey. The dorsal side of the wings, the mantle and the tail were black. The under wing was predominantly white, with very narrow black margins. These margins were too narrow for the bird to be a Black-browed Mollymawk (*Diomedea melanophris*). The bird was noticeably smaller than a Shy Mollymawk (*Diomedea cauta cauta*) which it settled beside at one stage.

The black bill is characteristic of immature Mollymawks and the combination of the almost white underwing, entirely black bill and white head indicates it was a Yellow-nosed Mollymawk (Serventy *et al.* 1971, *Handbook of Australian Sea-birds*, Sydney: Reed: 76).

This observation was made while aboard the fishing vessel *Kowhai* (Skipper Murray Schofield). Dr J. Warham helped confirm my identification of the bird, and he and Dr W. Threlfall criticized the manuscript.

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HYBRID PARAKEETS ON THE MANGERE ISLANDS, CHATHAM GROUP

Taylor (1975, *Notornis* 22: 110-121) has described the parakeet populations of the two Mangere Islands and the circumstances surrounding the recent development of a large population of hybrid forms there. On Mangere Island hybrids became as, or more, common than the parent types, while on Little Mangere Island the rare Forbes' Parakeet (*Cyanoramphus auriceps forbesi*) maintained about 10 pairs on the forested top, with a few hybrids and Red-crowned Parakeets (*C. novaezelandiae chathamensis*) in some cliff vegetation. I have regularly visited Little Mangere Island since 1972 and have observed increasing numbers of both hybrids and Red-crowned Parakeets, and an expansion of the area occupied by them. In late January 1976 a pair of hybrids was found with four large nestlings in an area formerly occupied by a pair of Forbes' Parakeets. This note describes these birds and discusses the present situation.

The nest was on bare soil a metre down in the base of a hollow, dead akeake tree. Both parents and the four chicks were captured alive in the nest. The chicks ranged in weight from 63 to 75 grams and were covered in partly sheathed contour and flight feathers. The larger chicks were just beginning the rapid shedding of feather sheaths. I managed to keep two chicks alive and they soon became pets, growing well with developing colours showing on the head. After five days they were drowned in a boating accident. All birds are deposited in the National Museum, Wellington.

Both adults were colour types described by Taylor (p. 119 middle illustration) as inter-specific hybrids. The male had a red front, orange crown fading to gold at the rear edge and an orange patch behind the eye. The legs and feet were dark. The female differed in having more gold in the orange crown and eye patch, and her feet and legs were light brown and grey respectively. The thigh patches of both adults were reddish-orange with some of the feathers showing golden-yellow tips. Crown and eye patch colour in the chicks was also orange with yellow.

The capture of these birds confirms Taylor's suggestion that, in the strongly modified environment of the Mangere Islands, the hybrids breed among themselves. This pair occupied the area around the camp site on the main ridge on top of Little Mangere. The forest and scrub remnants there are in an advanced state of retrogression, forming small open patches between large areas of bare soil or *Senecio-Carex* meadow. A pair of Forbes' Parakeets reoccupied the area on the morning following the capture of the hybrid family.

Since my first visit in March 1972, I have observed increasing numbers of Red-crowned and hybrid parakeets on the north cliff and ridge of Little Mangere Island; and Red-crowned birds have also been recorded in the forest of the top plateau on three occasions — in

spring, summer and autumn. Recently, a group of up to six Red-crowned Parakeets were seen on the ridge near camp. Hybrids have been removed from cliff areas but others have taken their place, and a hybrid was seen courtship-feeding a Red-crowned bird. Forbes' Parakeets still occur in the cliff areas. The hybrid pair was the first actually seen to have clearly displaced Forbes' Parakeets.

It seems that the hybrids can displace Forbes in semi-open habitat by direct interaction. Hybrids may have ecological advantages in modified habitats; but if they are indeed behaviourally dominant, they present a greater threat to the remnant Forbes' population than was supposed.

The parakeet populations of Mangere Island have rapidly built up in the last decade according to Taylor and this process probably began to affect Little Mangere Island in the early 1970s. Except for about a hectare, all forest on this island has become divided into small patches and open areas with scattered dying and dead trees. The forest is steadily degrading and becoming more open as a result of the effect of natural factors such as excessive burrowing by Sooty Shearwaters (*Puffinus griseus*), lack of regeneration, and strong winds. The unmodified stronghold for Forbes' Parakeet as described by Taylor and the even rarer Black Robin (*Petroica traversi*) (Flack, in prep) hardly exists any longer. The hybrids can successfully breed in the degenerating forest.

Smith (1975, *Notornis* 22: 351-352) interprets Taylor's counts as showing a reduction in the hybrids on Mangere Island since 1970. He relates this to a three-year period of regeneration of natural vegetation and to differences in behaviour and, especially, size that favour intra-specific matings, thus eliminating hybrids. In fact, during that time, native forest showed little regeneration, but more than a hundred hectares of exotic grasslands that had been closely cropped by sheep until 1968 started to flower and seed annually. This greatly favoured the Red-crowned Parakeets which are better adapted than Forbes' to open environments, increasing their numbers and thus their proportion in the total population. At the same time, hybrids increased in total numbers rather than decreased, and more have appeared on Little Mangere since 1973 than in previous years. Hybrids were still abundant on both islands in 1976.

While it cannot be doubted that Smith's (1975) suggestion that physical characters and calls are important as part of the isolating mechanism between Forbes' and Red-crowned Parakeets, his suggestion that these are very similar species is not correct or useful. Taylor's field observations show that the two species are very different ecologically, and this is reflected in social organisation and use of space. The special conditions of the Mangere Islands allow large scale mixing in the breeding season (my observations indicate that both species have a long laying period in spring and summer) of species usually rather effectively segregated by unbroken forest and more open

environments. Size is very similar (Taylor 1976, *Notornis* 23: 198-200); behaviour clearly fails to prevent large scale hybridization, and hybrids are clearly successful in the present environments — contrary to Smith's arguments.

Although reforestation of Mangere Island is being hastened by large scale planting, it will be many decades before forest becomes predominant. Forbes' Parakeets will continue to be at a disadvantage on Mangere Island for a long time; while on Little Mangere Island, we can expect Red-crowned and hybrid forms to further increase as the remaining forest opens up and birds disperse from Mangere.

Parakeets do notably well in captivity, and aviary-bred Red-crowned Parakeets have recently been re-established in the wild elsewhere in New Zealand by the Wildlife Service. It would be valuable to breed Forbes' Parakeets from Mangere stock for the future establishment of a wild population.

The question of management of wild parakeet populations on the Mangere Islands requires a decision on the relative value of the hybrids compared with their threat to the seriously endangered population of Forbes' Parakeets. The present situation could be allowed to take its own course for its scientific interest. On the other hand, in the interests of conservation of a very rare species, the hybrid and Red-crowned Parakeets could be regularly removed from the two islands until forest cover once again favoured the Forbes' Parakeet.

I would like to thank Wildlife Officers D. Clarke and L. Scown for assistance on Little Mangere Island in January 1976, and Wildlife Officer W. Brown for his efforts on numerous expeditions. R. H. Taylor and G. R. Williams provided helpful comments on the manuscript.

J. A. DOUGLAS FLACK, *Wildlife Service, Department of Internal Affairs, P.B., Wellington*



AERIAL DISPLAYS BY LARGE PETRELS

Although many small to medium-sized procellariiforms perform aerial displays near their breeding places, usually at night, little similar activity has been reported of the larger, diurnally-active petrels. Best known are the loose dual flights of the two Sooty Albatrosses (*Phoebastria* spp.). The performances of Giant Petrels (*Macronectes* spp.) are quite different. The birds rise a few metres on stiff, slightly drooped wings and then descend in a short curve. Meanwhile their necks are stretched, heads raised and waved from side to side to the accompaniment of braying cries. The nape feathers are erected and tails fanned. The whole performance appears to be the aerial equivalent of the upright threat display (Warham, 1962, *Auk*: 79: 139-160).

When I first described this behaviour the existence of two sympatrically breeding species of Giant Petrel (*M. giganteus* and *M. halli*) had not been established. It is now clear that both species use the aerial display. This was often seen in February and March 1969 at Antipodes Island where only *M. halli* breeds, while R. Schlatter (pers. comm.) described similar behaviour in *M. giganteus* flying over nesting grounds in Antarctica. That such activity may be more widespread among fulmars is suggested by brief sightings of similar displays among Northern Fulmars (*Fulmarus glacialis*) recently (Warham, 1975, *Scottish Birds* 8: 319-321). Voisin (1968, *Oiseau Special No.*: 95-122) reported aerial displays by both *Macronectes* spp. and also saw them perform closed-circuit pursuit flights involving two or three birds.

Aerial displays of Northern Giant Petrels at Antipodes Island, where the bird is not particularly abundant, were common and persistent in 1969. Breeding had ended and the chicks recently fledged, but the displays took place above or near the nesting areas. Thus on 10 March four to six petrels circling about a small group of *M. halli* nests made successive individual gliding approaches in the face of a strong breeze and then stiffened and drooped their wings, lowered their feet and rocked their heads from side to side with loud brayings, as they passed over the nests. Usually only one bird performed at a time but some were still displaying two hours later. The function of the activity was not clear. I was too far away for the display to have been aimed at me but it could have been triggered by the close proximity of another flying petrel or perhaps directed at one on the ground hidden in the tussock, but no physical contacts were seen.

Similar aerial performances are used by the two giant albatrosses, the Royal (*Diomedea epomophora*) and the Wanderer (*D. exulans*). These were observed during field work at Campbell Island in January 1969 and at Antipodes Island in February and March of that year. For example, on 13 January a flying Royal Albatross displayed with opened bill and drooped wings when another albatross flew close by, and a braying call seemed to be uttered. As this display was only seen three times during 18 days in the field it is evidently not often used, at least at that season of the year. Similar actions of flying Wanderers at Antipodes Island were also brief, lasting no more than 4 seconds and hence very easily overlooked. The Wanderer displays took place when small groups of albatrosses were wheeling above "gams" of courting birds on the ground. The display began when the bird set its wings in a drooped attitude, arched its neck awkwardly and with uptilted bill appeared to emit a rattling cry. Again no physical contact was made with another bird and it was impossible to determine at what the display was directed.

These aerial displays may be merely extensions into flight of parts of the ground-display repertoire in which several males typically display before a female. The purpose of this note is to draw attention to these aerial displays in the hope that further detailed observations

may be made on the giant albatrosses, on fulmars like the Cape Pigeon (*Daption*) and Snow Petrel (*Pagodroma*), and also on the smaller albatrosses of the genus *Diomedea*.

JOHN WARHAM, *Zoology Dept., University of Canterbury, P.B. Christchurch.*

1. University of Canterbury Antipodes Island Expedition 1969, paper No. 10.



BLACK-TAILED GODWIT IN THE BAY OF PLENTY

For the past six summers I have kept watch on a small group of sand islands situated inside the northern extremity of the Tauranga Harbour about half a mile from Bowentown Heads (see NZMS 1, Sheet N53, Paeroa, Square 34:58).

On 19 December 1974 I noticed a single godwit in company with a flock of 76 Pied Stilts (*Himantopus leucocephalus*). As I approached the bird flew, displaying the characteristic white rump and black tail of a Black-tailed Godwit, but I was unable to see the underwing pattern. During three subsequent visits, 28 December 1974 and 2 and 9 January 1975, I was unable to find the bird again. Also fruitless were visits to various likely coastal points (Tanners Point, Ongare Point and Kauri Point) where Pied Stilts are known to gather.

It was not until 15 January that I resighted what I believe was the same bird. The weather at 1105 hours was fine and clear, with excellent visibility. About 50 metres away, it was seen through a Bisley telescope at 40X magnification. A flock of 45 Turnstones (*Arenaria interpres*) was feeding between two sand islands on the flats exposed by the falling tide and with this flock was a single godwit which appeared paler and less mottled than a Bar-tailed Godwit. The white upper-tail coverts were particularly obvious. Later a small group of Bar-tailed Godwits alighted near this bird and I was able to make some useful comparisons. It was about the same size as the male Bar-tails, but its upper parts were greyer and less speckled. Having examined the bird carefully for about ten minutes, I decided to flush it; the gleaming white underwing characteristic of an Asiatic Black-tailed Godwit (*Limosa limosa melanuroides*) showed up very clearly (Fig. 1). It landed about 50 metres away and after an hour and a half eventually flew off alone, heading north-east across the bay towards the now exposed mud-flats.

The godwit could not be found on further visits to the islands. Published records indicate that this is the first sighting of an Asiatic Black-tailed Godwit in the Bay of Plenty.

GEOFFREY N. L. ARNOLD, 4/23 Gardner Road, Epsom, Auckland 3

ASIATIC BLACK TAILED GODWIT

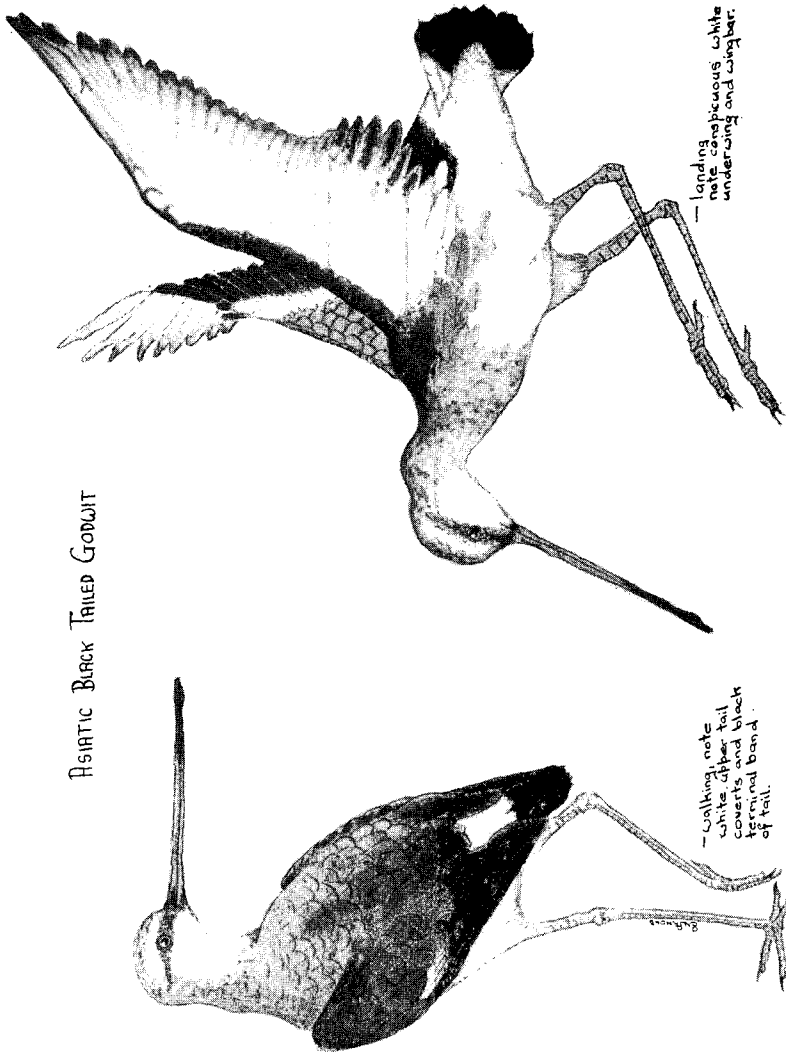


FIGURE 1 — Asiatic Black-tailed Godwit, *Limosa limosa melanuroides*, Tauranga Harbour, January 1975.

REPORT ON CUVIER ISLAND, JANUARY 1976

This report is intended as a follow-up to the Brief Survey by Blackburn, 1967, *Notornis* 14: 3-8). It is hoped that these two articles will form a basis of comparison for any future visitors to the island.

The following observations were made between 21 and 28 January 1976 by a group of six OSNZ members (Simon Chamberlain, Neil Cheshire, Bruce Keeley, Mark Neilson, Sylvia Reed and Jean Skinner) who explored the island as much as possible. Accommodation was available in the old radar hut on the summit, and from this members visited most parts of the island.

The weather was predominantly fine with variable winds, fresh southerlies reaching gale force on two nights, little cloud, and some rain on one night. The previous week there had been fairly heavy rain.

Vegetation:

No attempt was made to list all plant species in the fenced off forest area. The main regenerating species remain those recorded by Blackburn in 1967, namely kohekohe (*Dysoxylum spectabile*), kawakawa (*Macropiper excelsum*), hangehange (*Geniostoma ligustrifolium*), rangiora (*Brachyglottis repanda*), kanono (*Coprosma australis*), mahoe (*Meliccytus ramiflorus*), five-finger (*Neopanax arboreum*). The following are common: nikau (*Rhopalostylis sapida*), karaka (*Corynocarpus laevigatus*), mapou (*Myrsine australis*), kohuhu (*Pittosporum tenuifolium*), whau (*Entelea arborescens*), pigeonwood (*Hedycarya arborea*), parapara (*Heimerliodendron brunonianum*) in damp areas, wharangi (*Melicope ternata*), puriri (*Vitex lucens*) and broom (*Carmichaelia* sp.). Taurepo (*Rhabdothamnus solandri*) flourishes along the banks of the only permanent stream. Less common are *Hebe* spp., tea tree (*Leptospermum scoparium*), rewarewa (*Knightia excelsa*), karo (*Pittosporum crassifolium*) and several *Coprosma* spp. The climbers *Parsonsia heterophylla* and *Clematis paniculata* are abundant. It was noticeable that the large puriris were bare of epiphytes while many big pohutukawas were generously covered with climbing ferns and clumps of *Collospermum*. In the open coastal areas taupata (*Coprosma repens*), pohuehue (*Muhlenbeckia complexa*) and bracken (*Pteridium aquilinum* var. *esculentum*) are common, the last quickly overgrowing tracks and obliterating them. Flax (*Phormium tenax*) is growing in odd clumps within the bush as well as abundantly in coastal areas.

Birds:

A total of 29 species was seen on the island; this does not include seabirds seen offshore only. Bellbirds were the most abundant, with a high proportion of juveniles. Saddlebacks were seen throughout the bush area, likewise with many juveniles. It was noticeable that wherever Saddlebacks were feeding, so also were Fantails which followed them through the trees. Most noteworthy was the record of a dark phase Kermadec Petrel (details in list) on 27 January 1976, which was captured and released.

NORTHERN BLUE PENGUIN (*Eudyptula minor*). Five nests of recent occupation were found.

GREY-FACED PETREL (*Pterodroma macroptera*). A number of empty burrows found and one juvenile bird sitting above ground looking very sick and emaciated; it died the next day and the body was taken for the Auckland Museum.

KERMADEC PETREL (*Pterodroma neglecta*). On 27 January 1976 one bird was observed from 1800 to 1830 hrs, soaring (up to 45 m) and gliding around the lighthouse settlement, occasionally going out to sea and returning, almost dropping to land several times. Twice it called while flying, a harsh 'keow.' Occasionally it was chased by a Red-billed Gull and once it chased one. Characteristic marks noted in flight were the white underwing flashes and light primary shafts giving a striped area on the upper wing. The bird flew so close that these details were extremely clear; mottling round the base of the bill could also be seen. Finally the bird landed, disappearing into some long grass and sedge. An immediate search in the area soon revealed the bird sitting in a scrape, probably that of a Red-billed Gull, between clumps of the sedge *Scirpus nodosus*. Examined in hand (Fig. 1) the bird appeared similar in size to a Grey-faced Petrel but with the wings somewhat broader and not curved back; bill short and black, the light coloured mottling around the base more extensive above than below; inside of mouth pinkish mauve; back, upper wing coverts and tail uniform dark greyish brown; the white streaked effect on upper wing formed by white shafts of primaries, the shaft of the outermost being very broad. The white underwing flash is formed by the white inner webs of the base of the primaries. The tail was square with rounded corners; tarsi very pale fleshy-grey with light brown markings in front; feet black, paling to light grey at base, claws black. Measurements

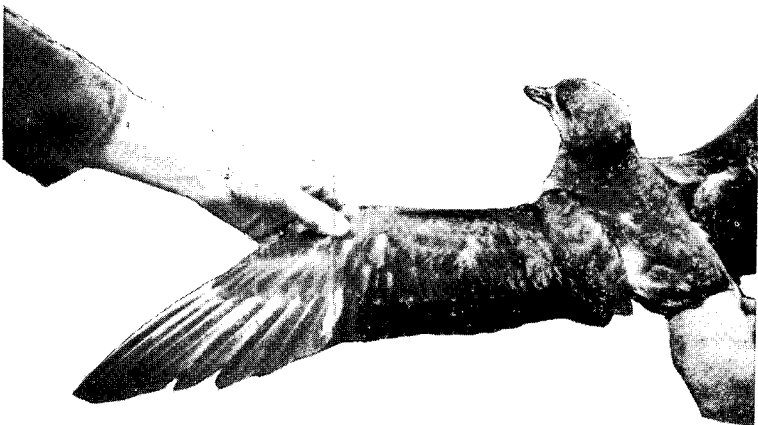


FIGURE 1 — Kermadec Petrel (*Pterodroma neglecta*), Cuvier Island, 27 January 1976. Photo: Neil Cheshire

(in mm): culmen 31, wing 305, tarsus 39, total length 371. Samples of lice were taken from the neck and nape area and sent to Professor R. Pilgrim at the University of Canterbury who identified them as *Halipeurus kermadecensis*. From cloacal inspection the bird was judged to be a female. According to the Principal Keeper, Mr Martin, this bird has been a regular visitor during Red-billed Gull nesting period for the last three seasons. This is the first New Zealand record of a live individual.

SCOTY SHEARWATER (*Puffinus griseus*). One bird found in a burrow with 3-4 day old chick. Three birds, probably of this species, seen flying at dusk. These birds were entirely silent as they came in.

PIED SHAG (*Phalacrocorax varius*). 12 birds counted at points round the coast. One breeding colony with 6 nests.

HARRIER (*Circus approximans*). One seen regularly, three on one occasion.

TATTLER (*Tringa* sp.). Two birds seen on beach near lighthouse settlement on 25 January. Not possible to define which of the two species as birds very timid and visited the island very briefly.

RED-BILLED GULL (*Larus scopulinus*). A breeding colony of about 500 pairs on Scott Monument and the nearby cliffs. In January nearly all juveniles were flying; many birds had probably already left the breeding ground.

CASPIAN TERN (*Hydroprogne caspia*). One close inshore.

WHITE-FRONTED TERN (*Sterna striata*). A small breeding colony of about 50 pairs on cliffs adjacent to the lighthouse.

N.Z. PIGEON (*Hemiphaga novaeseelandiae*). Present in bush area, about 8 sightings through the week.

RED-CROWNED PARAKEET (*Cyanoramphus novaezelandiae*). Four birds seen. Calls heard twice. Two birds near one of the houses of the settlement. A difficult bird to find in the bush and not at all plentiful.

SHINING CUCKOO (*Chalcites lucidus*). One seen in pohutukawa at Radar Point.

KINGFISHER (*Halcyon sancta vagans*). Not uncommon. Four nests with young found, three of them in pohutukawa in the bush area, the fourth in cliff face.

SKYLARK (*Alauda arvensis*). Two on farmland near settlement. A nest reported by lighthouse keeper.

WELCOME SWALLOW (*Hirundo neoxema*). One seen in settlement area.

DUNNOCK (*Prunella modularis*). One heard singing near the lighthouse.

GREY WARBLER (*Gerygone igata*). Common in bush area but not quite so abundant as Fantail and Bellbird.

FANTAIL (*Rhipidura fuliginosa*). Very common and nearly always to be found following feeding Saddlebacks.

SONG THRUSH (*Turdus philomelos*). Two observed, one in the bush, one near lighthouse settlement.

BLACKBIRD (*Turdus merula*). Very few in any part of the island.

SILVEREYE (*Zosterops lateralis*). Common, but not so much as Fantail.

BELLBIRD (*Anthornis melanura*). Abundant, especially flying juveniles being fed by parents. Calling and singing throughout the bush area; a few round the houses of the settlement.

YELLOW HAMMER (*Emberiza citrinella*). One seen singing in clearing on edge of bush.

CHAFFINCH (*Fringilla coelebs*). Not uncommon. Up to 4 seen together at one time on Lookout Spur.

REDPOLL (*Carduelis flammea*). One seen in clearing on main ridge.

HOUSE SPARROW (*Passer domesticus*). A flock of 20-30 round the settlement.

STARLING (*Sturnus vulgaris*). A flock of 30+ moving round the settlement and adjacent farmland.

SADDLEBACK (*Philesturnus carunculatus*). Abundant throughout the bush singly and in family parties. Many birds feeding low in bushes and on the ground. They were seen to feed on mahoe berries and flowers, tips of kawakawa catkins, coprosma and fivefinger berries, spiders, caterpillars and other insects. As they searched for food, often probing in the bark, pieces of twig and bark fell to the ground. The noise thus made can be imitated and will often attract the birds.

Tuatara:

Three were seen; two live near the houses of the settlement, the third near the only permanent stream. Length of third was 350 mm.

SYLVIA M. REED, 4 Mamaku Street, Auckland 5



CRESTED GREBE IN THE NORTH ISLAND

While counting shags and swans at Lake Rotorua on 21 December 1975, my attention was immediately drawn to a Crested Grebe (*Podiceps cristatus*). The white neck, crest and bill, and the bird's position in the water made the identification quite positive. I spent the next half-hour watching it dive for small fish and just "loaf around" with shags behind some rocks off-shore. Immediately afterwards I contacted Dr and Mrs M. Wilcox who confirmed the sighting that afternoon. The bird was then seen every day until 30 December when it disappeared. Both Dr Wilcox and I have seen this species before in England.

TONY PALLISER, 12 Russel Crescent, Rotorua

RED-VENTED BULBUL USES VANIKORO BROADBILL NEST

On 7 January 1976, in Suva, Fiji Islands, I saw a Red-vented Bulbul (*Pycnonotus cafer*) perched incubating on a nest 4 m up in the canopy of a small mango tree, the nest having been built by a pair of Vanikoro Broadbills (*Myiagra vanikorensis*) in an unsuccessful nesting attempt the previous November. The nest did not appear to have been added to or in any way modified by the bulbuls. It contained three Red-vented Bulbul eggs, averaging 20 mm x 16 mm. An average Red-vented Bulbul nest measures 120 mm outside diameter by 100 mm outside depth, with inside cup diameter 75 mm, inside cup depth 60 mm. The clutch size was normal for this species, despite the fact that a Vanikoro Broadbill nest by contrast only measures some 67 mm outside diameter by 48 mm outside depth, inside measurements being 48 mm cup diameter by 32 mm cup depth, and contains only one or two eggs measuring 18 mm x 14 mm.

FERGUS CLUNIE, *Fiji Museum, P.O. Box 2023, Suva, Fiji*

NOTICES

BIRD MAGAZINES FOR SALE

Mr Harvey Dickison, 43 Tucker Rd, Mocrabbin, Victoria, Australia 3189, has surplus back issues for sale. Prospective buyers should contact him directly. His list is: *Emu*, *Victorian Naturalist*, *Bird Observers' Club Notes* (including *Nature Lovers' Notes* and *World Bird Day Lists*), *Wild Life*, *Walkabout Magazine*, *Zoo Magazine*, *Parade Magazine*, and the *Victorian School Paper*.

SOME RECENT PUBLICATION OF INTEREST

- STONEHOUSE, B. (ed.) 1975. *The Biology of Penguins*. London: Macmillan Press, UK \$18.50.
- LYSAGHT, A. M. 1975. *The Book of Birds*. London: Phaidon Press, UK \$20.
- WATSON, G. E. 1975. *Birds of the Antarctic and Sub-Antarctic*. Washington, D.C.: American Geophysical Union, US \$15.
- EAGLE, AUDREY. 1975. *Trees and Shrubs of New Zealand in Colour*. Auckland: Collins, NZ \$50.
- WOLTERS, H. E. 1975. *Die Vogelarten der Erde. Eine systematische Liste*. . . . Hamburg: Paul Parey, DM 38.
- YALDWYN, J. C. (ed.) 1976. *Preliminary Results of the Auckland Islands Expedition 1972-1973*, 448 pp. Wellington: Lands and Survey Department.

REFERENCE SOURCES FOR ECOLOGICAL ORNITHOLOGISTS

The New Zealand Oceanographic Institute, DSIR, Wellington, is currently producing in its "Miscellaneous Series" of publications a number of bibliographies of literature within its interests. Issues so far published are listed below, and copies may be obtained from the Director, N.Z. Oceanographic Institute, DSIR, P.O. Box 12-436, Wellington North. Other topics to be dealt with in forthcoming issues include Kaipara Harbour, Castlepoint region, offshore islands, Te Anau and Manapouri lakes, and the Auckland Islands.

PEDERSEN, L. 1974. Bibliography of scientific studies of Wellington Harbour. MP 56: 45 pp.; PISHIEF, P. J. 1974. Mangroves in New Zealand: a preliminary bibliography. MP 63: 10 pp.; STANTON, B. R. 1975. Bibliography of the physical oceanography of the Tasman and Coral Seas to 1974. MP 66: 36 pp.; BARDSLEY, E. 1975. Preliminary bibliography of the geology and geophysics of the Cook Islands and Niue. MP 68: 13 pp.; HURLEY, D. E. 1975. Marine oil spills: a selected bibliography. MP 69: 68 pp.; YARRALL, E. I. 1975. Bibliography of the natural history of Pauatahanui Inlet (Porirua Harbour). MP 70: 8 pp.; BARDSLEY, E. 1975. The natural history of the Marlborough Sounds . . . a bibliography. MP 72: 88 pp.; ANDERSON, P. W. & GRANGE, K. R. 1976. Bibliography of scientific studies of Manakau Harbour, Auckland. MP 74: 16 pp.; ESTCOURT, I. N. 1976. Bibliography of . . . N.Z. mainland estuaries, inlets, lagoons, harbours and fiords. MP 75: 40 pp.; GRANGE, K. R. & PISHIEF, P. J. 1976. Effects of heated effluent discharge, with special reference marine biological interference: a selected bibliography. . . MP 76: 28 pp. MP 77 is a full list of the Institute's "Publications to April 1976," many of which are of direct relevance to those OSNZ members concerned with the physical oceanographic basis of seabird distribution. They include, also, charts and data on New Zealand lakes, particularly, a "Checklist of New Zealand Lakes," Memoir 74, giving a detailed, illustrated tabulation of location, area, dimensions, etc., of all New Zealand lakes with an index to their names and location. How many Blue, Diamond, Rotorua, or Swan Lakes do you know?

E. W. D.



PARASITIC HABITS OF HOUSE SPARROW

Dr D. A. C. McNeil and his colleague, Mr Frank Clark, are doing a survey of the parasitic habits of the House Sparrow on other species of birds. If any OSNZ member knows of any information in New Zealand on this phenomenon, would he please oblige Dr McNeil by writing to him at 38 Queens Road, Leicester, England?

FORTHCOMING

The December issue of *Notornis* will contain Part D of Mr St. Paul's "Bushman's Notes" — Shining Cuckoo and Long-tailed Cuckoo. Part E, scheduled for the March 1977 issue, will deal with the Pigeon, Kaka, Yellow-crowned Parakeet and Kingfisher. A series of shorter accounts will conclude the series as Part F.



BIRD SONG RECORDS

Two further records have appeared in the series "Sounds of New Zealand Birds" produced by Mr Les McPherson of Christchurch. These are: *Vol. 6* (PR 767), 1975- side one: Adelie Penguin, Snares Crested Penguin, Yellow-nosed Mollymawk, Buller's Mollymawk, Snares Cape Pigeon; side two: Mottled Petrel, Southern Diving Petrel, Southern Skua, Southern Black-backed Gull, Antarctic Tern. *Vol. 7* (PR 808), 1976- side one: Rook, Skylark, Redpoll, Welcome Swallow, White-winged Triller; side two: Yellowhead, North Island Saddleback, South Island Fernbird, Yellow-breasted Tit, South Island Robin.

Several of these species were recorded by Mr Hugh Best, now of the Wildlife Service, on the Snares and, accordingly, are of special interest. Mr McPherson continues to do a good service to ornithologists by making a diversity of recordings readily available. The records may be purchased from him at P.O. Box 21-083, Edgeware, Christchurch, for \$1.80 each plus postage.



RECENTLY PUBLISHED

KINSKY, F. C. & FALLA, R. A. 1976. A subspecific revision of the Australasian Blue Penguin (*Eudyptula minor*) in the New Zealand area. *National Museum of New Zealand Records* 1 (7): 105-126; 19 May 1976.

Abstract:

Five subspecies are recognized in New Zealand and one in Australia. *E. minor minor* breeds in the southern and western South Island, *E. m. chathamensis* subsp.n. is restricted to the Chatham Islands, *E. m. albosignata* breeds on Banks Peninsula and Motunau Island, *E. m. variabilis* subsp.n. breeds in the southern North Island and northern South Island including Motunau Island, *E. m. iredalei* is restricted to the northern North Island, while Australian birds are all regarded as *E. m. novae-hollandiae*. Arcs of overlap between the known breeding ranges of subspecies are shown to occur and long distance straggling (up to 750 km) of banded immatures is recorded.

LETTERS

The Editor,
Sir,

BIRD BEHAVIOUR AND EARTHQUAKES

Animal behaviour has reportedly been used in China to help fix the likely site of an impending earthquake which had been predicted by other means. In New Zealand, at least one major earthquake has been followed by several stories of animals behaving oddly for some time before the event, but seismologists have not yet felt themselves able to make use of animal behaviour as an aid to earthquake prediction.

Bird watchers may possess information that could eventually be used in association with other indications for making predictions about earthquakes. Anyone who has seen behaviour which suggests that birds (or other animals) have had foreknowledge of an earthquake, can help by contacting me at the Seismological Observatory, so that their observations can be recorded. The length of time between the premonitory bird behaviour and the shock being felt by the onlooker is of particular interest.

The ultimate usefulness of a pre-earthquake behaviour pattern will depend partly on whether it is also seen in other situations. Notes that record all unusual behaviour over extended periods could help to decide which patterns show promise.

If animal behaviour is ever to be used as an aid to earthquake prediction in New Zealand, it is not too soon to begin collecting the facts on which such predictions will have to be based.

M. A. LOWRY

*Seismological Observatory,
Geophysics Division, DSIR,
P.O. Box 1320,
Wellington
22 June 1976*

The Editor,
Sir,

SHORT-TAILED SHEARWATER: A NEW SUBFOSSIL RECORD FROM THE CHATHAM ISLANDS

I can now report another addition to the birds which have reached the Chatham Islands. Among the bones collected at Long Beach and Te One Beach in December 1972 are the remains of at least four individuals of *Puffinus tenuirostris* (Temminck), the Short-tailed Shearwater or Tasmanian Muttonbird.

These sub-fossil bones are indistinguishable from those of recent storm-wrecks of *P. tenuirostris* which I have collected on Canterbury and New South Wales beaches, and show that at least a few stragglers have made their way to the Chathams. It is possible that more will be found as I work through the hundreds of Petrel bones awaiting identification.

R. J. SCARLETT

*Canterbury Museum,
Christchurch, 1
2 April 1976*

ABOUT OUR AUTHORS

A. BERRUTI was born in South Africa in 1952. He graduated from University of Natal with B.Sc. Hons. in Biological Sciences in 1973. Interest in birds was greatly stimulated by bird-banding activities. He worked on Marion Island from September 1974 to June 1975 as a research assistant for the Percy FitzPatrick Institute. At present, he is writing an M.Sc. thesis on the *Phoebetria* albatrosses, and, as such, is particularly interested in albatrosses and seabird ecology although his ornithological interests are wide.

T. HARRIS has, as his main ornithological interest, the study of raptors. He has worked for the Department of Geological Survey at Transvaal Museum and at Marion Island as a research assistant for the Mammal Research Institute from November 1974 to April 1975. He is at present studying for a B.Sc. degree at the University of Rhodesia, Salisbury.

HUGH BEST was born in Christchurch in 1949, and resided there until being appointed to the Wildlife Service in Wellington in August 1973 as a scientist attached to the Forest Fauna Survey Unit. This unit was set up to determine the bird populations in large areas of forest destined for exploitation (e.g. West Coast and Southland beech project areas).

While at the University of Canterbury he studied the biology of The Snares Fernbird for an M.Sc. thesis, which entailed visits to The Snares during the summers of 1970-71 and 1971-72. A further visit to these islands, including the Western Chain, was also made during November 1974 to March 1975. He also lived on the Auckland Islands from December 1972 to March 1973 while studying the social behaviour of Hooker's sealion.

He says that his main interests are the ecology of islands around Stewart Island and South of New Zealand, photography and diving combined with a strong attraction for living in undisturbed remote places.

KEITH OWEN was born in 1949 at Murchison, Nelson, but spent his school years at Porirua, Wellington. After leaving school he completed a four and a half year apprenticeship in photo-lithography. He then joined the Department of Agriculture and Fisheries to work on a fish catch-sampling programme which entailed many hours at sea in fishing and research vessels. In September 1973 he was employed by the Wildlife Service to work in the Forest Fauna Survey Unit and since then has been involved in forest bird surveys on Little Barrier Island and Kapiti Island, in the Kaimai-Manaku-West Taupo region and in the West Coast beech project area. His interest in natural history was originally fostered by his father, an ex-Government deer culler, and this has been considerably boosted by his experience at sea and on survey work. At present he is stationed at Nelson.

DAVID ROBERTSON is a neurosurgeon practising in Auckland. His first interest in birds came in his medical student days. He learned anatomy from Professor F. Wood Jones, a famous comparative anatomist who had a wide knowledge of birds and wildlife. Interest in birds was increased during summer holiday scientific surveys of South Australian off-shore islands with the Melbourne University McCoy Society. During the past ten years, holidays and spare time have been spent establishing native trees and some native birds in scrubland at Rawhiti, Bay of Islands. The liberation of the North Island Weka at Rawhiti is one successful practical experiment and this colony is now providing material for further studies of their habits.

PAUL SAGAR did his first serious bird-watching in South Canterbury while at secondary school. However, his field trips were much reduced when he attended the University of Canterbury. Earlier this year he graduated M.Sc. in marine biology and has since had much more time to spend on ornithology. In 1971 he was fortunate to join the University of Canterbury Antarctic research unit and has since spent five summers at Cape Bird, studying the morphology and growth of a species of amphipod and also completing annual counts of Adelie penguin rookeries. At present he is involved in a marine benthic survey of part of Hawke Bay under the supervision of Professor G. A. Knox. Although all aspects of bird biology are of interest to him, he says that population dynamics, breeding biology and feeding of birds are his main interests.

