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THE WHITE-FACED HERON IN NEW ZEALAND

By A. L. K. CARROLL

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The White-faced Heron (*Ardea novaehollandiae* Latham 1790) is one of at least seven species of Australian birds which have colonized New Zealand during the past century. Long known here as an occasional visitor or solitary resident, it has within the last thirty years become firmly established as a breeding species and is now the most common heron in the country, being found widespread in both coastal and inland habitats.

HISTORICAL

Early references to White-faced Herons are few. I have found only 23 definite records dated earlier than December 1940. These referred to 16 specific places.

Although previous works on the avifauna of New Zealand had described at least three other species of heron, the first listing of White-faced Herons was by Buller in 1868: "*Ardea novae-hollandiae*, Latham, of which I have obtained several specimens in the North Island, is a fresh addition to this section of our ornithology." Oliver (1955) noted its reported presence in Nelson in 1868.

In 1871 Hutton commented on its occurrence in "both Islands, Australia and Tasmania." Buller wrote in 1873, "The White-fronted Heron is very sparingly dispersed over the New Zealand coasts, being extremely rare in the far north"; also, "A pair of these birds which I obtained in the Porirua Harbour, near Wellington, in the month of April, had their stomachs filled with shrimps." It was listed by Sharpe (1875). Travers (1882) defined its range as, "Both Islands and habitats outside of them, and the Chatham and Auckland Islands." Reischek (1884) described it as "very rare in the Sounds, common from Jackson's Bay to Bruce Bay."

In 1888 Hamilton wrote, "I have not seen a specimen for many years; but the one now before you was killed at Waipawa in May last." Also in 1888 Buller noted, "In the Hairini Bay, at Tauranga, I saw a pair of these birds on the flats just above the bridge," and he quoted Edward Wakefield's communication, "a friend of mine at Collingwood told me that he had observed these birds in the southern estuaries of Blind Bay [Tasman Bay] for years." Handly (1895) reported its presence in Marlborough; although he gave no locality reference. he associated it in his text with other heron species sighted at Wairau Lagoons at that time.

In 1905 Buller wrote, "I have a specimen in my collection which was driven ashore on Centre Island, in Foveaux Strait, after a very heavy gale at sea. On the mud flats at Tauranga I saw one in the winter of 1892. . . I had observed one in exactly the same locality when crossing the bridge seven years before — quite likely the same individual bird. The species is very sedentary and has been known to frequent the same spot for years together."

In addition to these reports, two records of Reef Heron (Egretta sacra) given by Buller — a pair at Lake Taupo in October 1875 and a single bird in flight at Lake Rotoiti in October 1884 — were probably of White-faced Herons. Reef Herons are rare so far inland; but see McKenzie. Notornis IX, 20.

I found no further early references and, from 1905 until 1937, no mention of the species, apart from a passing note in very general terms made by Matthews and Iredale in 1913. In 1937 four solitary birds were reported at Lake Taupo (Potts) and "a few years after 1935" a pair at Richmond, Nelson (Rogers). Subsequent records became increasingly numerous and will be considered in a later section of this paper.

GROWTH OF POPULATION

The colonization pattern followed by White-faced Herons, i.e. a long initial period of occasional visits followed by a rapid increase in numbers and widespread exploitation of suitable habitat, is not uncommon in invasions overseas. Similar patterns were described by Thomson (1964) with special reference to the Cattle Egret (Ardeola *ibis*) in South America and the Spur-winged Plover (Lobibys novaehollandiae) in New Zealand.

Early occurrences of White-faced Herons were widely scattered, perhaps the result not only of chance land-falls by involuntary visitors but of seasonal dispersal from a resident breeding colony. Nesting was not proven although Wakefield wrote to Buller in 1888, "it breeds here sometimes" and Falla (1942), after careful investigations at Okarito, reported, "It seems likely that it has been a common breeding species there during the whole period of European settlement, and before." This theory was supported by Reischek's note, "common from Bruce Bay to Jackson Bay" (1884), whereas early sightings in other localities were usually of single birds, occasionally a pair.

It is not certain whether the population of later years sprang originally from one initial colony or from a few independently established colonies, although evidence generally favours the latter assumption. Early reports indicate that first points of landfall and settlement of White-faced Herons in New Zealand were in South Westland and possibly Tasman Bay.

In order to elucidate events in this country a study was made of climatic conditions in eastern and southern Australia during the relevant period, in an attempt to correlate years of drought and strong westerly winds there with dates of suddenly-increased numbers of White-faced Herons here. Hitchcock and Carrick (1958) wrote, "Nomadism is strongly developed in Australian birds, is frequently accompanied by opportunist breeding and may culminate in large scale movements, even emigration. It is exemplified by several species of waterfowl, especially ducks and ibis." The heron family, comprising "birds of powerful flight and wide-ranging propensities," (Myers and Atkinson 1924) would certainly fall into this category.

Reported occurrences showed a sudden rise during the years 1938, 1951-52, 1955, 1960 and 1965-66. Except for 1960 these dates agreed fairly closely with drought periods in eastern Australia. However, more severe droughts occurred in other years when no comparable rise in population was noted. This discrepancy may be explained by inadequacy of records caused by variable diligence and numbers of observers but could equally well be because Australian conditions have, in fact, had only a limited influence on the growth of the White-faced Heron population in New Zealand. The dearth of banded birds prevents accurate assessment of the situation, but the fact that this species remained persistently sparse here until breeding was established strongly indicates a local origin of the population explosion.

Breeding was first confirmed at lower Shag Valley, Otago, in 1941 (Ellis 1944) and subsequently reported at the Wainui River mouth, Nelson, in 1946, Blueskin Bay, Otago, in 1950 and Porirua Harbour, Wellington, in 1952 — the first North Island nesting record. During this period a rise in population became apparent in many parts of the country, accelerated during the 1950s and exploded in the 1960s. By 1968 many observers reported the peak apparently passed and numbers stable or rising only slowly.

The following table shows numbers of reported occurrences over the past 30 years. Six of the twenty sightings before 1939 were recorded during 1937 and 1938.

 Years inclusive	Number of Reports	
 1939-43	8	
1944-48	23	
1949-53	116	
1954-58	210	
1959-63	227	
1964-68	481	

TABLE 1

The proportion of solitary sightings was higher in earlier years. Flock sizes increased rapidly over the period.

From a study of available data it appears that, excluding seasonal phenomena of flocking and dispersal, the maximum permanent colony size in any locality was usually not great and was soon attained. In large tracts of favourable habitat colonies have coalesced and heavy occupation resulted.

The pattern of establishment of a colony occurs typically as follows:— after preliminary visits by a solitary bird, extending over one or more years, a pair appears. Nesting usually ensues and a family group forms. The total resident population may remain at one pair for many years but the group may increase until apparently its maximum size is attained, often three to five pairs. In the absence of a banding scheme it is impossible to determine whether subsequent colony members are birds from elsewhere or juveniles which, on reaching breeding age, remain loyal to their natal home.

Estimates of the approximate total population of a district is possible when winter flocks are counted, as between seasons birds frequently congregate in suitable areas such as mud-flats or wet pastures. Maximum flock size is usually 15-30 birds although not uncommonly as high as 60. In especially favourable localities numbers are sometimes very large, as shown in Table 2.

TABLE 2

Locality	Year	Birds estimated present
Kaipara Harbour	1965	723
Manukau Harbour	1966	200
Mangere	1965-66	200 - 300
Whangamarino River	1967	300 +
Piako Swamp	1967	300 +
Havelock	1966	c. 100
Farewell Spit	1962	c. 435
Westhaven Inlet	1962	87
Invercargill Estuary	1965	70

From 1960 to 1968 inclusive, a total of 245 colonies and/or flocks of ten or more birds was recorded. One hundred and forty groups were located in the North Island and of these 50 had already been recorded before 1960. All except three of the older groups occurred in coastal localities but colonies were found in many inland places after 1960, especially around Lake Taupo and the Waikato hydro-lakes. Three others were recorded before, but not after, 1960. Of the the 105 South Island groups, at least 61 were established before 1960. As in the north, these were predominantly in coastal habitat. More than half the colonies recorded after 1960 were inland and associated with lakes or rivers. Seven other colonies were reported before, but not after, 1960.

Years inclusive	North Island	South Island	
- 1943		2	
1944 - 1948	_ ·	1	
1949 - 1953	2	5	
1954 - 1958	8	10	
1959 - 1963	10	4	
1964 - 1968	25	16	

TABLE 3 — Reported First-Nesting

FABLE 4 — Reported First-S	Sig	hting	
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Year	Locality	Year	Locality	
1937	Richmond	1961	Lake Rotorua	
1938	Lake Wairarapa	1962	Balclutha	
1938	Waitaki River at Tawai	1964	Redhill	
1938	Bushey Park	1964	Taihape area	
1944	Takaka	1964	Rangitaiki	
1951	Kaiapoi	1965	Broadwood	
1952	Lake Hatuma	1965	Unitoke	
1953	Lake Tarawera	1965	Te Karae	
1955	Woodville	1965	Runaruna	-
1957	Halcombe	1966	Okaihau	
1957	Ohiwa Harbour	1968	Ruatahuna	
1961	Titoki		•	

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It must be remembered that these figures refer to known colonies only. The true number could be considerably higher. However, settlement clearly progressed from coastal to inland districts and in general from south to north. The sequence of reported first nesting occurrences supports this assumption. See Tables 3 and 4.

Unlike other members of its family in New Zealand, the White-faced Heron is a versatile species. Although most frequently found from sea level to 1,000 feet it is common in much of the volcanic plateau and not unknown in other elevated areas, e.g., South Island high country. Its prime requirements are suitable nesting sites and proximity to water. Nesting is almost invariably in large trees, especially in plantations of Macrocarpa or Eucalyptus. Water may be permanent or seasonal e.g. flooded pastures in winter.

Land development has greatly extended its range. Conversion of forests, scrubland and swamps into pasture, construction of ponds and clearing of stream verges has provided improved feeding and loafing facilities. Sibson (1966) noted, "Its rapid spread has been aided by the construction of farm dams which are quickly colonized by the introduced Australian green frog (*Hyla aurea*)," a favoured food of the herons. Hydro-electric schemes also have provided extensive new habitat. Hamlett (*in litt.*) noted that by 1966 all Waikato hydro-lakes were supporting as many as ten resident birds, whereas five years before only occasional visitors were seen.

The species has become sufficiently numerous in some areas to be considered a nuisance, its fishing activities reputedly conflicting with those of local fishermen. Indeed, as early as 1952, the South Canterbury Acclimatisation Society requested its removal from the protected list because of its alleged predation of trout. This request has so far not been granted but as birds continue to increase there will inevitably be further similar applications; thus, in order to provide a firm foundation on which to base future decisions, the present study was undertaken.

MATERIAL

Most of the records were supplied by Field Officers of the Wildlife Service and acclimatisation societies, members of the Ornithological Society of New Zealand and of the Royal Forest and Bird Protection Society. Information was gathered also from departmental records, books, journals, reports, personal comments and letters.

Fortunately, because of the characteristic appearance and large size of the bird, sighting records are likely to be more comprehensive than those of less conspicuous species. Early occurrences, first sightings, first nestings, establishment of colonies and reported population trends have been noted and relevant material arranged chronologically and geographically. These data, although undoubtedly incomplete as a consequence of uneven distribution and reliability of observers, should be sufficient to give a reasonably accurate picture of population trends and present status.

It is hoped that this paper will stimulate readers to (a) provide information which will augment our present knowledge and (b) submit reports in the future.









DISTRICT SUMMARIES

District boundaries coincide with those of acclimatisation societies, where geographically appropriate, but have, where necessary, been modified to suit the requirements of this study.

North Auckland

This district extends from North Cape to Helensville and Whangaparaoa Peninsula. The earliest record is of a single bird frequenting Onerahi, Whangarei, from 1949 to 1954 (E.K.S.). Another was sighted at Taipa River in April 1953 (R.B.S.) and a few had settled at Parangarenga Harbour by 1952. In 1955 the first proven breeding in northern New Zealand occurred at Kaipara Flats and two unconfirmed nesting reports were received from localities near Kaipara. In July 1956 nesting occurred at Hoteo Valley, Kaipara (J.P., H.R.McK.) and at Lower Kourawhero (P.F.H.). By 1958 birds were breeding freely around Kaipara Harbour and nesting also at Kaiwaka (K.C.B.C.), Warkworth (J.G.M.) and Silverdale (F.B.).

By 1955 widespread settlement was becoming apparent although then and for the next five years birds were numerous only in the Kaipara-Warkworth area. A population explosion began about 1961 and resulted in the species spreading rapidly northwards, colonizing most of the suitable habitat as it proceeded. During 1968 the rate of expansion appeared to decrease generally, although the range continued to extend in a few areas, e.g. Edgar reported from Kaikohe and Okaihau, "reports of birds where not previously seen," and at Awanui, Rangaunu Bay, large flocks have appeared very recently. (68 maximum, "Auckland Age," April 1969).

White-faced Herons are now found throughout North Auckland, with colonies established at all harbours and estuaries as well as many inland localities. Although birds are especially numerous in the vicinity of Whangarei and Kaipara Harbours, flocks of 15-20 have in the last three years been counted at Parengarenga Harbour, Awanui Harbour, Kaimaumau, Kerikeri Inlet, Maunganui River and Warkworth.

Auckland

This district extends from Helensville and Whangaparaoa Peninsula southward to Waiuku and eastward to Waihi, and thus includes the Coromandel Peninsula.

The first White-faced Heron sighted here was a solitary bird at Kaiaua, Firth of Thames, in 1948 (H.R.McK.). The following year, solitary birds were reported from Puketutu, Clevedon and Miranda (R.B.S., H.R.McK.). During the next decade, single birds or small parties were reported from an increasing number of localities. Nesting, first recorded at Manukau Heads in 1957, may well have occurred before this date.

By 1960 the species was well established. Nesting was reported at Glenfield, near Birkenhead, and Sibson (1960) noted birds present at all seasons in most creeks of the Auckland Isthmus. They had become typical inhabitants of the coast, creeks and ponds around Manukau Harbour and colonies flourished along the west and south coasts of the Firth of Thames, also at Clevedon (H.R.McK.). A population explosion began in 1961, reached its peak by 1966 and apparently subsided during the following two years. The Auckland Acclimatisation Society reported in 1967 the sighting of birds in small numbers in remote areas not before settled and by 1968 noted the population to be "more or less static."

Numbers were highest around and immediately south of Manukau Harbour, with heavy concentrations in the Mangere area e.g. 200 - 300 counted in 1966 (E.K.S.). Clevedon Estuary, the coast from Kaiaua to Thames and eastern Coromandel harbours were all heavily colonized by 1967; e.g. Clevedon 1966, 60 seen (E.B.); Miranda July 1967, up to 50 on farm paddocks (A.T.); Whangamata August 1967, 20+ seen (D.P.). The only exclusively inland group recorded was 40 birds at Island Block 12 miles from the coast. Presumably they were living near the Whangamarino Swamp.

At present it appears that White-faced Heron colonization of the Auckland district, although decelerating, will continue while large tracts of apparently suitable habitat await exploitation.

South Auckland - Waikato

This district extends from south of Waiuku eastward to the main mountain ranges, south to Lake Arapuni, thence westward through Te Kuiti to Tirua Point.

The first record of White-faced Herons here was not until May 1952, when a pair appeared at Kauroa, south of Raglan Harbour. During the next two years birds were occasionally seen on all the large harbours, usually singly or in pairs, although six occurred together at Waipuna, Kawhia Harbour, in 1954 (H.R.McK.). The first record of their nesting was in 1955 at Ahikuri, Raglan Harbour (E.K.S.), and the next at Waikato Heads in 1959.

R. T. Adams (*in litt.*) reported the species to be comparatively rare in 1957; by 1960 groups of two, three or four birds were common and by 1963 several flocks of up to 20 were seen. He noted a steady increase throughout the district in inland waterways, harbours and estuaries. Atkinson in 1968 (*in litt.*) confirmed this and added, "increasing . . . now to be found inland almost anywhere. All hydrolakes have colonies."

Large aggregations of birds were recently recorded at Lake Whangape "flocks of 20 - 30" (J.D.), Lake Waikare 70 (E.B.), Whangamarino Swamp 90+ (R.T.A.), Piako Swamp 300+ (H.A.), Cambridge Racecourse 15-20 (H.A.) and Long Swamp Bridge 70 (H.R.McK.). Otherwise the population was scattered. Atkinson noted in 1967, "any farm with a shallow pond with a pine tree near its edge will nearly always have a pair of White-faced Herons." The most isolated sighting was in November 1958 of a single bird in heavy bush at the Waipa River, south of Te Kuiti.

The colonization of this district appears to be still proceeding steadily and as yet shows no sign of reaching its maximum range.

Waimarino

Bounded on the west by the Wanganui River and on the east by high country from Waiouru to Tongariro, this district extends from Taumarunui south to Koriniti. Its altitude is predominantly above 1000 ft. and rises to 3000 ft. in many places.

There is little information about White-faced Herons here except that in 1967 approximately 50 to 100 were reported from Karioi Lake, Raurimu, Oio and Raetihi North (J.C.C.), thus indicating a widespread distribution. It is not clear from the records whether the figures refer to each locality or represent the total for the area.

Taranaki

This district extends from Tirua Point south to Waitotara.

The first sighting here was of a solitary bird at Pihama in 1948 (B.D.H.), the second, also of a solitary bird, at New Plymouth in May 1956 (K.C., B.C.). A year later three appeared in this area (P.W.L.), also five at Otakeho (B.D.H.). Nesting was recorded only twice — in 1966 and 1967 at Wharehuia (J.C.J.).

Although settlement apparently was slow, birds are now scattered throughout most of the district, either singly or in small groups. Two flocks of twelve were reported, one at the Waiongana River mouth in January 1967 (D.M.) and the other at Barrett Lagoon, New Plymouth, in July 1968 (C.P.).

Acclimatisation society officers reported in 1967 and 1968 a continuing growth of the White-faced Heron population in their districts.

Wanganui

Lying between the Waitotara and Wangaehu Rivers, this district entirely encompasses the lower Wanganui River system. The first sighting here was of a single bird at Wanganui in

The first sighting here was of a single bird at Wanganui in 1945 (C.G.F.). Subsequent reports indicated the continuing presence of a few birds at Wanganui and after 1960 one or two were usually present at the river, South Beach, Victoria Lake and Lakes Kaitoke and Wiritoa (W.J.P.).

In 1962 two appeared at Nukumaru (A.T.E.) and in May 1964 "as many as 50 at one time" at the Wangaehu River (R.V.). The only truly inland occurrence recorded was of a pair 21 miles from the coast, at Mangamahu in 1966 (K.H.).

The Wanganui Acclimatisation Society reported in 1967, "fairly plentiful and a fairly substantial increase over the past years." A marked influx of birds occurred during 1956 and 1957 (Pengelley pers. comm.), the population subsequently increasing until approximately 1966, when it appeared to become stable. White-faced Herons are now well-established and commonplace residents throughout most of the Wanganui district.

Manawatu-Wellington

This extends from Wangaehu to Taihape, south to Paekakariki and is bounded on the east by the main mountain ranges.

White-faced Herons arrived here before 1946 as Fleming reported them then to be already regular visitors at Waikanae. In 1947 a solitary bird was sighted at Palmerston North (T.A.). During the next ten years solitary or small groups appeared along the coast from Waikanae to the Manawatu Estuary and as far inland as Ashhurst.

Breeding was reported in 1954 at Waikanae (C.A.F.) and Oturoa Road, Foxton, (M.J.I.), in 1959 at Rongotea (E.D.) and in 1960 four miles up the Manawatu River (O.S.N.Z. report). Settlement has since continued steadily throughout the district. As late as 1964 birds were first seen at Taihape and by 1967 had become common in that area.

Numbers appeared generally to be small except at Foxton, where Dear counted 40+ birds in spring 1965 and reported the presence of a large breeding colony at Round Bush in 1966. Resident groups were also reported at all estuaries and at Rongotea, Ashhurst, Pohangina Valley and Lake Horowhenua.

In 1967 the Wellington Acclimatisation Society noted an increasing population especially during the past few years.

Bay of Plenty

This district comprises the wide belt of coastal lowland which extends from Waihi to Cape Runaway.

Although Buller observed single White-faced Herons in the vicinity of Hairini Bay, Tauranga, in 1885, 1888 and 1892, the species apparently failed to establish itself here until about 1957. It remained very rare elsewhere in the district and was reported as a newcomer at Ohiwa Harbour and Waiotahi mudflats as late as May 1957 (A.H.).

By 1960 numbers were increasing around Tauranga Harbour; Fitzgerald and Hodgkins noted, "now regularly seen, 30 reported," and in 1961 the first proven nesting occurred at Waikarino Inlet, followed by further nesting at Welcome Bay in 1963-64 (M.H.). By 1967 the Tauranga Acclimatisation Society reported them as being "well distributed through the district and found at all open river and tidal flat areas." Flocks of 20 or more had been seen at Welcome Bay (1964, M.H.), Otumoetai (1966, Mrs. McL.), Wairoa River (1964, M.H.) and Bowentown (1965, P.J.N.).

Further east, colonization proceeded rapidly. By 1967 large numbers of birds occurred on all major harbours, estuaries and wetlands and smaller parties appeared in many inland areas. Between 1965 and 1967 flocks of ten or more were seen at Matata, Whakatane, Ohiwa Harbour, Taneatua, Waimana, Waiotahi Pa and Opotiki. G. Anderson reported in 1968, "the number of birds in Matata-Whakatane and Opotiki has increased 30-40 per cent during the past year and they are now more widely spread."

Rotorua-Taupo

That part of the Rotorua Conservancy west of the main ranges, it includes most of the volcanic plateau and upper Waikato River system.

Buller made two references to "Reef Herons" one seen at Lake Taupo in October 1875 and another "on the wing" at Lake Rotoiti in October 1884. These have been mentioned earlier in this paper. The first positive report was from Taupo, "four solitary birds have been seen during the past eleven years" (Potts 1948).

Until 1960 the species remained rare, indeed I have discovered only one report, a first-sighting at Lake Tarawera in June 1953 (F.H.H.). By 1961 birds were occasionally to be seen at Lakes Tarawera, Okareka, Rotomahana, Rerewhakaaitu, Rotoehu, Taupo, Waikato hydro-lakes and Ohau Channel. In May 1961 the first White-faced Heron at Lake Rotorua was sighted (H.R.McK. *et al.*).

During subsequent years numbers increased in the Rotorua area although Veitch (1967) (*in litt.*) reported birds still not particularly common. Generally seen in swamps, near lakes and stable, spring-fed streams." Still in 1967, Hamlett (*in litt.*) noted that they were to be "found around shores of most lakes but decreasing in the last year." Flocks of more than ten birds have rarely been recorded in this sector, except, notably, at Rotomahana, where 41 were counted in October 1968 (L.J.R.).

In the Taupo district, also, the species increased after 1961. Main (1966) reported from the northern sector, "a number are roosting around rocky outcrops at the north and west end of Lake Taupo. As many as seven are seen in one day. Single birds are reported from most ponded areas, where there is permanent water. There is no information about nesting sites and birds appear to leave the area in winter." He remarked that no significant rise in population was apparent after 1967, when he estimated the district total to be 50-70 birds.

From southern Lake Taupo, Biddle (*in litt.*) reported in 1966 that birds were becoming more numerous and by 1968 were present over the whole lake shoreline, particularly at stream outlets. Thomson (1968) (*in litt.*) reported their presence along margins of streams and rivers as far south as Lake Rotoaira.

In November 1964 the first White-faced Heron at Rangitaiki was seen on a small pond near the Napier-Taupo highway. Subsequently one was regularly seen in this area (D.M. 1966).

By 1966 every Waikato hydro-lake was reported to be supporting at least ten birds.

South-east of Rotorua, in the upper Rangitaiki, Horomanga and Whirinaki valleys, herons have been reported since 1966, not uncommon near Galatea and Te Whaiti (L.J.R.) and nesting at Murupara (H.H.). Further east, in the forest settlement of Maungapohatu, a solitary bird was seen in 1967 and again in 1968 (L.J.R.).

It appears that White-faced Herons are still actively colonizing the Rotorua-Taupo district and may be expected to continue doing so while extensive areas of unoccupied habitat remain.

Gisborne - East Coast

This district extends south from East Cape to Mohaka.

The first sighting here was of two birds at Waipaoa in April 1953 (J.M.C.). In 1957 two were seen at Awapuni Lagoon (J.B.). Nesting was first observed at Wairoa but undated, the report reading, "One pair nesting for the past few years" (T.P.F. 1958).

Subsequently, birds spread to many other localities. In 1966 they were present from Tiniroto to Ruatoria and inland at Rere, Matawai, Motu and Tahunga (T.P.F.), with a single occurrence recorded at Lake Waikaremoana (E.B.). They were especially numerous on coastal flats near Gisborne. By 1968 the period of rapid growth in this area had apparently ended.

In 1966 they were present, sometimes numerous, at Mahia Peninsula, Opoutama, Hereheretau and Awamate and abundant at Wairoa and nearby coastal lagoons. Bucknell (1966) (*in litt.*) recorded " a marked increase in the past two years " in country extending from Wairoa to Waikaremoana.

In 1968 the species was reported to be still increasing in the Wairoa area, with many birds to be seen on coastal lagoons and quiet inland waterways ,T.P.F.).

It appears that the population of this district is widespread and still expanding.

Hawkes Bay

This extends from Mohaka south to Cape Turnagain and west to the Manawatu Gorge.

Hamilton, when recording the first dated sighting of a Whitefaced Heron in the district (Waipawa, 1888), observed, "I have not seen a specimen for many years until this one," thus indicating the probability of previous occurrences in the area.

The species was still very rare in Hawkes Bay in 1948 and remained uncommon until 1955 (N.McK.). In July 1952 a solitary specimen was seen at Ahuriri Lagoon (D.B.) and at Lake Hatuma in 1952 birds were reported as present and breeding (K.C., B.C.).

From 1956 to 1967 McKenzie conducted an annual count at Ahuriri Lagoon, Napier. This showed numbers to be increasing particularly rapidly between 1962 and 1965, attaining a maximum of 60 in 1965 and apparently diminishing during the next two years. Perfect (1968) reported an increase but, as he submitted no figures, a valid comparison is impossible.

By 1964 the species was established in much of Hawkes Bay. Reports originated predominantly in inland localities, the most remote of which was Noman's Hut in the mountains south of Kuripanga, where a solitary bird was seen in 1962 (N.B.). Birds were common not only at Napier but in country surrounding Dannevirke and Wanstead.

Although McKenzie reported in 1967 that the species "seems now to have occupied most available habitat," apparently colonization was still proceeding, as in 1968 Swinburne wrote to the Hawkes Bay Acclimatisation Society, "It is generally agreed they are more widespread than before and appear to be in greater numbers."

Wairarapa - Wellington

This district extends from the Manawatu Gorge and Cape Turnagain to Cape Palliser and includes Wellington City and its environs.

As early as 1873 Buller noted White-faced Herons present but scarce at Porirua Harbour. No further observations were made until 1938 and 1940 at Lake Wairarapa (R.S.). In 1951 nesting occurred at Porirua Harbour (R.B.S.) and a solitary visitor was seen at Kumenga, Lake Wairarapa (W.N.).

By the following year they had spread from Lake Wairarapa eastward to the coast and were to be seen throughout that area, sometimes "as many as twenty on one paddock" (Stidolph 1952). Five were seen at Porirua Harbour (R.H.D.S.) and breeding occurred at Pauatahanui in November (R.A.F.). Reports from many localities indicated subsequent rapid colonization. Dates and numbers are as

follows:— 1954 Lake Onoke (1, B.D.H.), 1955 Woodville (1, R.B.S.), 1955 Hutt River (W.R.B.O.), 1956 Paremata (29, E.J.), 1957 Raumahanga Bridge at Featherston (breeding, H.S.), 1957 Masterton (nesting in several localities, R.H.D.S.), 1960 Gladstone (nesting, J.C.), 1967 Pahiatua area (breeding for several years, I.S.R.), 1967 Mt. Bruce Reserve (nesting, W.J.P.), 1968 Lake Kohangatira (2, J.K.), 1968 Wainuiomata (present, J.K.), 1968 Western Lake Wairarapa (33 in one flock, W.J.P.), 1969 Pigeon Bush (nesting, R.D.). The longestablished populations at Lake Wairarapa, Paremata and Porirua Harbours continued to increase and birds are now abundant in these areas.

It appears that White-faced Herons are still actively colonizing the Wairarapa-Wellington district.

Nelson

This extends from south of the Heaphy River mouth eastward to Havelock and from Tasman Bay to Lewis Pass.

The first definite observation made here was by Wakefield in 1888, when he noted that the species had already been present in the southern estuaries of Tasman Bay for many years. A report from Rogers of Richmond mentioned its continuing scarcity until after 1935. He described the establishment of a colony in his locality, a single bird first arriving about 1937-40, "joined a few days later by a companion. From that time the birds continued to increase until now [1957] they are quite common."

Between 1945 and 1949 most coastal areas in Golden and Tasman Bays were colonized. Nesting was observed in 1946 at the Wainui Piver mouth (F.H.), but not again until 1952 when it was reported at the Aorere River mouth (B.V.). At Farewell Spit birds were reported present in 1948 (R.S.). By 1955 they had become numerous at nearby Whanganui Inlet and in the surrounding country from Puponga to Pakawau and Paturau (B.D.H.). Farewell Spit is a flocking area for many species of birds; Hartley-Smith (*in litt.*) noted that, although few nested there, the flocking population of Whitefaced Herons in May 1962 was approximately 435.

About 1951 there began a rapid acceleration of population growth, which continued until 1966 or 1967. During this period birds spread throughout the district. Zumbach (1966) (in litt.) reported, "40-50 birds are common especially round the sea coast or near nesting areas. Apart from these big flocks, they are either in pairs or on their own and nearly always near water." Occasionally they have appeared far inland; in January 1959 three were seen between Wash Bridge and Tophouse (R.B.S.) and the following May one was seen flying in the vicinity of Doubtful River, south of Lewis Pass (H.R.McK.). In 1966 they were present at the Matakitaki River near Murchison and in 1967 at Lewis Pass, Maruia River, Wairau River and Tarndal Station (D.V.Z.), all in the southern high country.

Although White-faced Herons are now abundant in coastal areas and have spread inland in many places, there is no clear indication as to whether the population has yet reached its maximum size in the Nelson district.

Carroll THE WHITE-FACED HERON IN NEW ZEALAND

West Coast - Westland

This district extends from Karamea to Martin's Bay and lies west of the main mountain ranges.

Early accounts indicated that White-faced Herons were, even in pre-European times, frequent visitors and perhaps established residents in some coastal areas. In 1888 they were common from Bruce Bay to Jackson Bay (Reischek) and Falla (1942) was satisfied that they were already breeding at or near Okarito before European settlement occurred. In January 1940 Sibson found at least three at Okarito.

From 1940 to 1949 solitary or small flocks of birds frequented many coastal localities from Karamea to Lake Mapourika and were seen also at the Arnold River below Lake Brunner in October 1941 (one doubtful, C.A.F.), along the Buller River in 1949 (usually several pairs, V.M.R.) and near Harihari in October 1949 (1, R.H.D.S.). It appears from comments made in later records that birds were present in other localities also at this time.

Nesting was first observed at Westport Sanctuary in July 1952 (Richardson), subsequently at Big Bay in 1955 (Oliver) and Kaiata, Greymouth, in October 1955 (L.O.). By 1959 colonies were established or flocks of ten or more were seen at the following places:— Karamea River, Westport, Orowaiti and Buller Rivers, Rotomanu, Western Paparoa Range from Bullock Creek to Seventeen-Mile Bluff, Greymouth, Lake Poerua, Kowhitirangi, Okarito Lagoon and Big Bay.

A steady acceleration in population growth was apparent after 1960 and by 1966 colonization had progressed in all sectors of the district. Flocks occurred mainly in coastal localities and river beds north of Bruce Bay; elsewhere, particularly in farmlands, the population was thinly scattered. A local diminution was noted at Okarito Lagoon, where White-faced Herons had been reported regularly from before 1940 until 1958 but were then not seen in 1959, 1961, 1965 or 1966. Although Wright *(in litt.)* observed a single bird in January 1968, subsequent visitors to the area found none. Whether this should be regarded as an example of the fallibility of observations even in a comparatively well-documented area or whether a colony has in fact dispersed is not clear. Alternatively, all sightings may possibly have been itinerant birds rather than successive members of a long-established colony.

Reports from departmental and acclimatisation society field officers in 1967 all agreed that population growth had decreased. Large numbers of birds occurred in several localities, e.g. Karamea River (34, R.W.S.). Kopara (30, R.W.S.). Inchbonnie (40, R.W.S.), Barrytown (15, R.W.S.). In south Westland the species, although increasing, remained sparsely distributed despite the presence of abundant suitable habitat. Nesting probably occurred at Maori Lakes, Okuru, (H.W.A.) but has not otherwise been recently reported in this area.

G. P. Adams *(in litt.)* estimated the 1967 total for the Westland Acclimatisation District to be approximately 500 birds. Sanson assessed the southern West Coast Acclimatisation District total to be at least 288 but gave no estimate for the northern part of his territory.

Reports made in 1968 indicated no further change in Whitefaced Heron population trends throughout the district.

Marlborough

This includes the Marlborough Sounds area and extends as far south as Kaikoura.

Handly noted the presence of White-faced Herons here in 1895 but unfortunately specified no locality. It would be reasonable to assume their occasional occurrence in the district during the following 57 years although I have found no records for that period.

From 1952 to 1956 single or small parties of birds were observed at Havelock, Blenheim, Woodbourne, Lake Grassmere and Kaikoura. Nesting was first reported in 1954 at Blenheim and then in 1956 at Havelock.

The Marlborough Acclimatisation Society reported that before 1960 birds were sparse and mainly confined to tidal flats. Subsequently, population growth accelerated until in 1967 the estimated total was 726. After 1965 the rate of increase reduced and numbers became relatively stable. The species by this time was widespread. A local population explosion occurred at Havelock, where numbers had risen from one bird in 1955 to approximately 100 by 1966 (N.). Elsewhere flock sizes were variable although generally small.

Latest reports indicate a continuing but diminished expansion of the White-faced Heron population in Marlborough.

Canterbury

This district lies between the Waiau and Waitaki Rivers and is bounded on the west by the Southern Alps.

White-faced Herons were first reported in 1938 at Tawai, near the Waitaki River (W.T.D.). However, there are at least two indirect references to much earlier occurrences:— at Lake Ellesmere, "one seen for some months, the first record for over 40 years from Ellesmere" (August 1945, E.F.S.), and at Sutherlands, "one, the first seen in 30 years" (1953, B.G.E.).

During the 1940s, solitary birds were reported from Halkett (O.S.N.Z. report), Ellesmere (E.F.S.), Tinwald (E.O.W., J.M.C.), Te Muka (R.A.F.), Kingsdown (L.W.McC.) and Waimate (R.A.F.). By 1950 widespread colonization was beginning, predominantly in coastal regions. Several inland occurrences were also recorded:— 1953 Sutherlands (1, B.G.E.), 1954 Albury (5, P.W.), 1955 Okuku River (present, B.D.N., W.C.C.) and 1957 Mt. Oxford (2, O.E.C.).

Nesting was first recorded at Waikuku (Oliver, 1955) then in 1958 at Springbrook (M.S.).

In North Canterbury, settlement proceeded, coastal habitats being generally utilized first. Concentrations of birds were recorded in 1962 at the Waimakariri Estuary (maximum 30 in January, when many juveniles were seen, D.G.D.) and in 1963 at the Ashley River (43, O.S.N.Z.). Between 1961 and 1963 they had spread up rivers and creeks in the vicinity of Mina and in 1968 at Leithfield the population was reported to have increased threefold during the preceding few years. A flock of 30 had been observed here in one field (M.W.). Furthest inland reports were of a solitary bird between Lake Sumner and the Hope River in October 1964 (B.D.B.), at the Poulter-Cox River junction in October 1963 (W.J.P.) and, in much the same area, two resident birds in 1967 (E.S.B.).

Near Lake Ellesmere birds appear to have been widespread for about fifteen years, usually singly or in small groups, although approximately 40 were seen at nearby Lake Forsyth in January 1961 (E.W.C.), and in 1959 they were sufficiently numerous to be accused of menacing the trout population of the Selwyn River.

In 1960 Bell wrote of the North Canterbury District, "The population has made an explosive expansion over the past few years and now appears to be commencing to level out to a more normal stable population in many districts." Barker reported in 1968, "Numbers are definitely increasing. A census conducted on August 13th showed no notable increase but this was in coastal areas. They are increasing more inland and are a reasonably common sight in comparison with previous years."

The Ashburton Acclimatisation Society reported in 1966 that birds were fairly numerous and evenly distributed throughout the district, with flocks of up to 12 frequently occurring. The 1966 report noted, "It is probably fair to say the population has trebled in recent years."

Southern South Canterbury was populated early with Whitefaced Herons. By 1952 they were so numerous along the Waitaki and Waihao Rivers that the acclimatisation society requested removal of their protection in these areas. Elsewhere birds were widely scattered, with concentrations usually restricted to coastal lagoons and rivers. Roderick (1964) (*in litt.*) reported a marked increase during and after 1956, with nesting occurring in many places. He noted that flocks of 20-40 were common and described the heaviest aggregation he had ever seen "at Tripp Settlement 1962, where on a heavily-grassed cow pasture of about a quarter of an acre approximately 180 were counted after heavy rain."

As far inland as Lake McGregor birds were recorded in February 1963 (2, H.R.McK.) and were common in the upper Waitaki Valley, especially at Lake Benmore, by 1967 (A.F.M.L.). Brady (1968) reported that a phase of rapid growth appeared to have started in the Waitaki Valley Acclimatisation District and from Waimate McLay reported in 1967 a large and expanding population which he estimated to total several hundred birds.

It appears that White-faced Herons are still actively colonizing many parts of Canterbury.

Otago

This district lies between the Waitaki and Mataura Rivers. White-faced Herons were reported to have nested at Bushey Park, North Otago, before 1939 (E.S.) but breeding was first proven for this district, and indeed for all New Zealand, in 1941 at the Shag River (B.A.E.). Nesting was not recorded again until 1950 at Blueskin Bay (L.E.W.), then in 1952 at Waikouaiti (W.L.P.) and Waitati (I.L.).

By the end of 1949 sightings had been reported from Shag River mouth 1948 (25+, G.R.H.), Palmerston 1949 (2, C.J.L.), Merton 1949 (2, L.E.W.), Dunedin 1949 (L.E.W.) and Portobello, Shelly Bay, 1940-1950 (30-40, A.R.H.). By December 1954 birds were scattered along the coast from Shag Point to Taieri Mouth, usually singly or in small groups. Larger gatherings occurred at Merton, Karitane, Waitati, Portobello and Shelly Bay.

During the next ten years the population increased rapidly around the estuaries and mudflats of Waikouaiti, Karitane, Blueskin Bay and Otago Peninsula and Lakes Waipori and Tuakitoto. In these localities flocks of from 20 to 35 birds were common. It is interesting that at Shelly Bay a recession was recorded. Harris (*in litt.*) observed that, whereas White-faced Herons had numbered 30 to 40 in the 1940s and 1950s, there were by 1964 rarely more than six present and Pied Oyster-catchers had now become the dominant species. Elsewhere throughout the Otago coastal belt, birds occurred in appreciable numbers and were known to be present as far inland as Moa Flat and Heriot.

It appears that colonization originated in the Shag Point-Dunedin area, later spreading southwards and finally inland. In 1968 the Otago Acclimatisation Society reported that the species appeared to be still increasing rapidly especially in coastal habitats.

Southland

This district extends from the Mataura River to the mountains west of Te Waewae Bay.

I have found only one early reference to White-faced Herons here — that of Buller, already quoted, recording a solitary bird driven ashore on Centre Island during a heavy storm in 1905.

Apparently nothing further was recorded until the sighting of 15 birds at Awarua, Invercargill Estuary, in 1951. This large number strongly suggested that the species had already been present here for some time before 1951.

In 1952 five birds were seen at Waituna Lagoon (H.R.O.) and one at Mokomoko entrance, Invercargill Estuary. Nesting was reported in 1954 at Invercargill Estuary. By 1955 flocks were established at Awarua Plain (13, B.D.H.), Oreti Estuary (33, B.D.H.) and Invercargill (8+, H.R.McK.) and by 1958 at the lower Mataura River (43 maximum, S.L.).

Records indicate a sudden population expansion after 1960, when colonization intensified in the Oreti-Invercargill area and spread thence north and west into new territory. The "Southland Times" reported, in 1968, that herons were "present for 30 to 40 years in small numbers until six or seven years ago, then a population explosion occurred."

Especially large flocks have gathered in lagoons and estuaries e.g. Awarua Bay, Invercargill Estuary, Oreti Estuary, the Aparima-Pourakino Estuary and Waiau Lagoon at Te Waewae Bay and at Motu Bush on the Waiau River. Elsewhere the population in Southland is generally scattered but still increasing.

THE WHITE-FACED HERON IN NEW ZEALAND Carroll

Southern Lakes

This district extends from Haast Pass to Te Waewae Bay,

thence west and north along the coast as far as Martin's Bay. The first report here was of a pair at Glendhu Bay, Lake Wanaka, by Vercoe (1950) (in litt.). In April 1951 he observed a solitary bird at Queenstown Bay and noted this to be probably the first occurrence at Lake Wakatipu. During the next ten years only occasional sightings were recorded:— in 1955 at Dusky Sound (present, W.R.O.B.), in 1956 at Doubtful Sound (present, W.A.W.), in 1956 at Timburn Station, Lindis Valley (one resident, H.W.A.), in 1957 at Lake Hayes (1, M.S.), in 1958 at Oldham's Lagoon, Queenstown (one seen, unusual visitor, M.S.) and in 1960 at Te Anau - Manapouri Road (2, A.T.E.).

By 1967 the species had penetrated most of the district. Birds occurred on nearly all lakes, along many rivers and at Milford Sound but were numerous in only a few localities. They were known to breed at Tarras and on the flats and shores of Lake Wanaka. Colonies were established or flocks of ten or more observed at the following places:— Makarora River, Matukituki River, Lake Wanaka, Ewings Flat, Tarras, Lake Te Anau, Upukerora River, Whitestone River, Kakapo Swamp and Lake Manapouri.

Field officers in this district report a gradual population expansion resulting in birds being now fairly common in many areas. As much habitat yet remains unoccupied one could reasonably expect the species to increase further in the immediate future. Islands

White-faced Herons have occurred on many inshore islands. At Stewart Island they were first recorded in 1954 (J.W.) and are now common at Paterson Inlet.

They have been reported by Sibson to be now established at Waiheke, Kawau, Ponui and Great Mercury Islands and are known to have visited Little Barrier (R.H.B., 1965), Great Barrier (S.H., 1961-63), Mokohinau (R.B.S.) and Rangitoto Islands (A.D.G.S., 1958). All these are situated off the northern half of the North Island.

They occur also on some of the outlying island groups. As early as 1882 Travers recorded their presence at the Auckland and Chatham Islands. A small resident population has been established on the Chathams, at Te Whanga Lagoon, since about 1966 (B.D.B.). At Campbell Island one was reported in April 1951 as "present for some time" (Aldridge per Sorensen). Further sightings were made here by officers of the Meteorological Station during the following seven years, since when nothing more has been recorded. Officers of a similar station at Raoul Island reported the arrival of one White-faced Heron on 20/4/69, immediately following a particularly violated to a similar be arrival of the section of the sectio violent southerly storm in New Zealand.

SUMMARY AND CONCLUSION

Although an occasional visitor and possibly restricted resident in New Zealand during pre-European times, the White-faced Heron apparently failed to establish itself as a breeding species here until approximately 1940. Population growth remained almost imperceptible in most places until about 1950, when it began to accelerate and, in many districts, was progressing rapidly by the early 1960s.

Now the species occurs throughout the country, especially in coastal areas, around lakes and near rivers. Settlement as a rule has proceeded inland from the coasts. In a few districts suitable habitat appears to be now fully exploited but colonization generally continues, the rate varying according to the kind of locality.

Although distribution is wide, birds usually occur singly or in small groups. However, after midsummer large aggregations are to be found on many shallow harbours, estuaries and lagoons.

The White-faced Heron is still establishing itself in suitable habitat throughout the country and, if this trend continues, is expected finally to become one of our more common resident species.

ACKNOWLEDGEMENTS

I wish to thank all those who have provided information for this study, especially officers of the Wildlife Service, the Ornithological Society of New Zealand, acclimatisation societies and the Department of Civil Aviation. I am particularly grateful to Mr. J. S. Sorensen, Marine Department, for allowing me to use his White-faced Heron data, to Mr. C. J. Robertson for preparing the maps and to Dr. G. R. Williams and Mr. B. E. Reid for critically reading the manuscript.

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THE WRYBILL: A FEEDING ADAPTATION

By E. G. TURBOTT, Auckland Museum

The Wrybill Anarhynchus frontalis has received much attention from field workers, with respect both to numbers and to its clear-cut north-south migration within New Zealand. Further, its standing as the only known bird with sideways-bent bill was noted and documented early in the history of New Zealand ornithology.

The present brief note merely draws attention to observations on feeding behaviour made by the writer — and by very many other observers! — on the northern New Zealand tidal harbours forming the species' wintering grounds (see Sibson 1943 (3) and 1963 (4)). Observers will readily note the feeding method used, particularly since the Wrybill does not flush readily and may often be seen at remarkably close quarters: the birds as they feed over the soft mud predominantly sweep the head sideways, the action being from right to left i.e. *against* the "righthanded" curve of the bill; such an action means that the whole side of the front (distal) portion of the bill from angle to tip becomes functional as a grasping and gathering mechanism, and it seems justifiable to suppose that the bill possesses a relatively high efficiency for mudflat feeding when used in this way.

The feeding action of a flock of Wrybills, especially if moving towards the observer, is quite marked — it may be described as



Wrybills at Karaka, Manukau Harbour (drawn by Jeanne Goulding)

"mechanical" — the birds striking repeatedly against the curve of the bill as they see and capture food items. The action has been well shown in films of waders taken by G. J. H. Moon and others. The bill, it should be noted, is not invariably used in this way although the action described is the usual one — items sometimes being picked up with the tip in dotterel fashion; but in this case the stroke is also down and to the left.

Few records of the food taken are available for this species as with most of our waders — the only sight records being of worms which are, of course, clearly visible.

The most obvious conclusion when this action is seen is that there can be no doubt concerning the adaptive significance of the shape of the bill. Other waders — notably the Pied Stilt *Himantopus leucocephalus* — will in mudflat feeding turn the bill "along the flat" to pick up food items, but with a straight bill such an action means that it is used with some effort and the bird's face may in extreme cases go down until almost touching the mud; in comparison, the Wrybill's action against the side of the bill is both deft and effective. Stilts, it should be noted, sometimes use a "scything" action, moving the bill alternatively to left and right, evidently finding the side of the bill, when used in this way, more efficient under certain circumstances than grasping or probing with the tip, possibly when larger items such as worms are abundant.

In view of the probable adaptation of the bill of the Wrybill for mudflat feeding as shown above, it may be suggested that an investigation of the head and neck musculature and associated anatomy would be of much interest, and it is likely that a trend towards general asymmetry is involved.

The only hypothesis previously advanced to explain the bent bill is that of Potts 1871 (2) (quoted and extended by Buller, in his first edition: Buller 1873 (1)): "(p. 96) A consideration of the natural

features of its favourite haunts permits us to indulge in surmises as to the convenience and adaptability of its remarkable form of beak for obtaining its food. Where we have seen it has never been far from water, and if, as we presume, this bird is peculiar to this country, we can point to our larger river beds as affording it admirable feeding grounds. These rapid shallow streams are perpetually wandering and shifting in their course, cutting new channels after every freshet, whether occasioned by heavy rainfalls or by the melting of snow from the alpine crests of the 'back country.' Anyone acquainted with our 'plains' must have observed, here and there, how certain parts (termed by geologists, 'fans'), are thickly covered with stones — as, for instance, some miles below the Gorges of the Rakaia or Rangitata; — however unpromising or useless they may appear to the inexperienced, the practical grazier is aware that those stones assist in keeping the ground cool, and in retaining beneath them a certain amount of moisture which, during the drier portion of the year (when the parching north-west winds prevail), thus invigorates the thirsty rootlets of many valuable grasses, and the result is the maintenance of a fair number of sheep on this rather barren-looking stretch of country. When any of these stones are disturbed from their bed, who can have failed to notice the commotion produced amongst the insect community thus suddenly disclosed to view; what scuttling ensues to gain fresh concealment from the garish light of day. In a somewhat similar manner, after a stream has deserted its temporary bed, in all probability numerous forms of aquatic insect life, attracted by the moisture, are to be found in the sand in which the shingle lies half imbedded. The horny point of the bill of this bird, from its peculiar form, is sufficiently strong to be used for thrusting between and under stones and pebbles.

"The flexibility of the upper mandible derived from the long grooves and flattened form (extending to nearly half its length), tends materially to assist the bird in fitting its curved bill close to a stone, and thus aids it in searching or fossicking around or beneath the shingle for its food, while at the same time the closed mandibles would form a tube through which water and insects could be drawn up, as water is sucked up by a syringe. As the flexure of the bill is lateral, the bird is enabled to follow up retreating insects, by making the circuit of a waterworn stone with far greater ease than if it had been furnished with the straight beak of the plover, or the long flexible scoop of the avocet.

"The inspection of [the specimens demonstrated] must clear away any little cloud of doubt that might remain on the minds of persons unfamiliar with the bird, and convince them that this singular form of bill, so far from being an accidental deformity, is a beautiful provision of Nature, which confers on a plover-like bird the advantage of being able to secure a share of its food from sources whence it would be otherwise unattainable."

Not only has the explanation appeared to many subsequent observers' far-fetched (see comments by Stead 1932 (6) and Soper 1963 (5)), but observations to date in the breeding range — the broad shingle river beds of the eastern South Island — suggest that food taken during this portion of the year is derived mainly from the soft muddy drifts in the river beds and softer interstices between shingle, and is comparatively rarely sought under the stones themselves.*

ACKNOWLEDGEMENT

I am most grateful to Miss Jeanne Goulding for the accompanying field sketches showing feeding Wrybills.

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- * The writer observed Wrybills on the breeding grounds during several seasons (1957-63), and made the general observations on feeding given above; his observations are supported by more recent work by Mr. B. D. Bell (pers. comm.). Stead (1932) observed pecking under stones, but this was evidently under special circumstances where a stream was drying up and had left the larger type of shingle.

SUMMER SEABIRDS BETWEEN NEW ZEALAND AND McMURDO SOUND

By M. MARIE DARBY Otago Museum

INTRODUCTION

On 8/1/68, the first of two tourist expeditions to Antarctica left Lyttelton in the m.s. *Magga Dan*. In the two months at sea, the ship made the following four traverses between New Zealand and McMurdo Base:

Traverse 1: 8-21 January 1968: Lyttelton - Chatham Is. -Bounty Is. - Ross Sea - McMurdo Base.

Traverse 2: 25 January - 4 February: McMurdo Base - Ross Sea - Campbell Is. - Bluff (N.Z.).

Traverse 3: 6 - 18 February: Bluff - Auckland Is. - Campbell Is. -Ross Sea - Cape Hallett - McMurdo Base.

Traverse 4: 21 February - 3 March: McMurdo Base - Ross Sea -Balleny Is. - Macquarie Is. - Bluff.

Landings were made on the main Chatham Island at Waitangi; the Bounty Islands; Campbell Island; Enderby Island in the Auckland Island group; and Macquarie Island; in the subantarctic — and, at Cape Hallett; Cape Royds; Cape Evans; and McMurdo Base; in the Antarctic. An unsuccessful attempt was made to land on the Balleny Islands, but the Magga Dan sailed sufficiently close inshore along the western coasts of Sturge and Buckle Islands to observe large numbers of birds.

During daylight hours, the writer kept as continuous a birdwatch as possible, and recorded sea and air temperatures and weather conditions. Table 2 is the abbreviated log.

SEABIRDS AND THEIR DISTRIBUTION

Most birds seen at sea were petrels. Throughout the four traverses of the Southern Ocean and the Ross Sea during the late austral summer of 1968, these were the only species seen far from land or ice, or to follow the ship. Penguins are much less obvious in the water and they must have been overlooked at times; they were sighted on or near the subantarctic islands, the Antarctic continent, and in pack-ice not far from land.

Neither the Southern or Antarctic Skuas were seen any distance from land, except for the unexpected occurrence of the subantarctic Southern Skua in the pack-ice. Red-billed and Black-backed Gulls and shags were not seen far from land.

Only one Arctic Tern was sighted, and this was over pack-ice on traverse 1. The Antarctic Tern was seen about its breeding islands: Bounties, Campbell, and Aucklands; and in the open ocean south of Campbell Island on traverese 2, and to the north of Scott Island on traverse 1.



FIGURE 1

FIGURE 2

LATITUDINAL DISTRIBUTION OF THE MAIN FLYING SEABIRDS

Figures 1 and 2 trace the four traverses made by the Magga Dan between January and March 1968; the approximate surface sea and air temperatures; the position of the pack-ice and northernmost limits of icebergs. Figures 3-13 show the observed distribution of 12 of the main flying seabirds. The figures are arranged in an approximate order of their southward range, except that the Antarctic Skua and Southern Skua are combined on the one figure.

Basically, one recognizes two groups of birds (see also: Falla, 1937, and Dell, 1960) — those ranging the Southern Ocean and breeding on subantarctic islands, and those which breed in Antarctica. Their latitudinal distribution at sea is meaningless unless related to other factors intrinsic to the bird's life cycle. As Falla (1937) pointed out: the results of the s.y. "Discovery" 1929 - 30, 1931 and 1932 bird logs showed that indiscriminate wandering of birds is exceptional; the range of oceanic birds in any season is determined by the position of suitable islands for breeding and the seasonal movements of macroplankton on which they feed; and that the birds seen at any particular time is related to their breeding times. Many birds seen far from land during the breeding season are non-breeding or immature individuals.

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Where the Antarctic convergence or the ice-edge in some way influences the distribution of a species, the latitudinal limits of that species will vary around the circumference of the Antarctic. The Antarctic land-mass extends different distances north, and, as the early R.R.S. "Discovery" expeditions showed, the position of the ice-edge and the convergence varies both seasonally and in different sectors of Antarctica (Mackintosh and Herdman, 1940). In the region to the north of the Ross Sea, the Antarctic convergence is well to the south of its mean latitude (Hart, 1942), and the edge of the floating ice is farthest south in February and March (Hardy, 1967). Consequently, both physical and biological factors must be considered in determining the distribution of various species.

WANDERING ALBATROSS Diomedea exulans

Diomedea exulans exulans is recorded to breed on Auckland Islands, Campbell Island and Antipodes Island in the New Zealand region; and D. e. chionoptera, the snowy form, on Macquarie Island.

Most birds sighted were mottled and some had very dark plumage. On traverse 1, when the ship passed close to Antipodes Island, the majority of Wandering Albatrosses were black, with a white face and white strip under the wings — corresponding to plumage types A and B, "young" birds described by Gibson (1967). In the region of Macquarie Island, the mature white, presumably snowy, form was predominant. All other adult Wandering Albatrosses had at least some trace of dark feathering on top of the head, or the sides of the thorax.

In immature birds, Gibson describes a temporary regression in the development of the white head and neck pattern to an earlier, darker condition where a conspicuous dark crown develops. Some birds sighted on the present expeditions had a dark crown, but this extended as a chin-strap down either side of the neck — in birds otherwise corresponding to plumage types D and E of Gibson.

(From her limited experience of Wandering and Royal Albatrosses throughout the four traverses, the writer wonders whether there is a significant difference in the shape of the head which could prove to be a useful field character — that of the Wandering Albatross appearing smaller in comparison to the size of the body, and more angular than that of the Royal Albatross.)

The latitudinal distribution of *D. exulans* showed that it was confined north of the Antarctic circle in this particular region to the south of New Zealand. It was seen furthest south on traverse 2 at $66^{\circ}21'S$; at $65^{\circ}19'S$ on traverse 1; $61^{\circ}19'S$ on traverse 3 and $61^{\circ}07'S$ on traverse 4. Dell (1960) found "somewhat variable limits" to its southern distribution, based on logs kept on two traverses between New Zealand and McMurdo in the summer of 1957-58, and two traverses made in the summer of 1958-59. However, his results, too, showed that the southern limit of the Wandering Albatross was around $66^{\circ}S$, though it sometimes dropped out several degrees further north.

A comparison of the southernmost sightings made by Falla (1937), and Dell (1960), with those of the present series, suggests that the Wandering Albatross rarely reaches within 50-60 miles of the floating pack-ice (Table 1).

Co	mparison of Positions	f the Souther of the Ice-edge	n Limits e in Diffe	erent Mor	<i>exulans</i> with oths and Longi	the Mean tudes	
	Date <u>Southernmost</u> Sighting		Air Temp. Sea Temp.		Proximity of Ice-edge		
Falla:	1. 7 Dec. 1929	58°s, 77°E	32 ° F	31 ⁰ 7	Nov 5905	Mackintosh and	
	2.29 Jan. 1930	66°s, 55°e	33°F	33° r	$Jan 66^{\circ}S$	Herdman (1940)	
	3.30 Nov. 1930	52°8, 156°E	-	-	(Nov 62 30'S		
	4.23 Feb. 1931	62°s, 69°E	34° f	34°F	(Feb 66°S		
Dell:	1.27 Dec. 1958 2. 8 Feb. 1959	65°49'5,179°22'E 66°53'5,173°10'E	:	-	Around 69°S ?Close into Ants	Dell (1960) arctic continent	
Darby:	1.17 Jan. 1968 2.29 Jan. 1968 3.13 Feb. 1968 4.26 Feb. 1968	65°19'S,179°36'E 66°21'S,168°50'E 61°19'S,170°38'E 61°07'S,159°52'E	37°F(34°) 37°F(32°) 39°F(36°) 36°F(34°)	36°F(31°) 34°F(31°) 43°F(36°) 32°F(34°)	Around 67° - 67° 68°50's Around continent	30'S , about 70 ⁰ S	
				(•)	·	Darby log (1968)	

TABLE 1

(*) — Temperatures in parenthesis are those recorded one day south (average 1* - 2°S) of the southernmost sighting.



SOOTY SHEARWATER Puffins griseus

Sooty shearwaters ranged the Southern Ocean from New Zealand to 68°22'S - just north of the pack-ice.

Their distribution was patched, with concentrations about all of their subantarctic breeding islands — except for Macquarie; also about the convergence, and in iceberg seas. (Gillham (1967) has reported the Sooty Shearwater to be scarce on Macquarie). They were never seen to follow the ship, and usually flew some distance from it. Sometimes solitary birds were recorded, but at other times

small to large groups flew past, or were seen feeding at the water surface. On 16 January (traverse 1), 200 to 300 birds appeared in the foggy twilight about the position of the Antarctic convergence, apparently feeding. On traverse 4, in iceberg seas about the Balleny Islands a group of about 150 birds appeared at 0900 hr., another of 200 birds at 1410 hr., and a third at 1500 hr., of some 80 birds. The next day, north-west of the Ballenys, and still in iceberg seas, only the occasional bird was seen.

The Sooty Shearwater breeds in south temperate zones and migrates to the northern hemisphere. From the observations made on the four traverses, it appeared that there were concentrations of *breeding* birds feeding in the vicinity of their breeding islands and *non-breeding* birds which had migrated further south to feed in areas of rich plankton south of the convergence.

BLACK-BROWED MOLLYMAWK Diomedea melanophris

Although there are numerous records of the Black-browed Mollymawk in New Zealand coastal waters (Falla et al., 1966; Norris, 1965), it was not seen to the north of its northernmost breeding island, the Antipodes. Its southern limit was immediately to the north of the ice-edge, in iceberg seas. This agrees with the findings of Falla (1937) and Dell (1960). However, while Dell's observations did not indicate any southward extension in the range of this species late in summer, those of the *Magga Dan* traverses do. On traverses 1 and 2, when the ice-edge was 67° and $68^{\circ}50'S$ respectively, the southern limits of this mollymawk were $65^{\circ}19'S$ and $68^{\circ}22'S$; while on traverses 3 and 4, when the ice-edge was close to the Anarctic continent about 70°S, the limits were $69^{\circ}02'S$ and $70^{\circ}01'S$.



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It was usually a solitary bird, sometimes following the ship for hours. Sometimes a few birds would appear about the ship and the most seen at any one time were groups of 5 to 7 individuals, once south of Campbell Island, and on several occasions about Balleny Islands and Macquarie Island.

LIGHT-MANTLED SOOTY ALBATROSS Phoebetria palpebrata

While both the Black-browed Mollymawk and the Light-mantled Sooty Albatross range widely over the Southern Ocean, the Lightmantled Sooty is not so common to the north of its breeding islands. However it is more common than the Black-browed to the south of the Antarctic circle. (Figure 5).

Falla (1937) considered that its southern limit seemed to be determined only by the coastline of Antarctica or heavy pack-ice, and the present observations support this. Dell (1960) suggests that the species tends to range further south in late summer; (his December limits being 60° - 68° S and those in February, 70° - 72° S). The southern limits observed on the Magga Dan traverses show the same trend, indicating that the dispersal of the heaviest floating pack allows the species to find suitable food in open water much further south. Thus, on traverse 1, the last palpebrata was seen about $67^{\circ}55'$ S immediately to the north of the pack-ice; on traverse 2 the southern limit was about $68^{\circ}22'$ S again on the margin of the pack-ice; on traverse 3, when the floating pack had dispersed, the limit was around 72° S off the coast between Cape Adare and Cape Hallett; and on traverse 4 several were recorded about 70° S.

As with the Black-browed Mollymawk, Light-mantled Sooties were usually solitary or in a group of a few individuals. The most seen at any one time was 11, south of Sturge Island in the Balleny group. Birds with paler mantles were noticeable at high latitudes.

GIANT PETREL Macronectes giganteus

On all traverses, the Giant Petrel showed a patchy distribution between Lyttelton and McMurdo Sound. It was commonest about its breeding islands — Chathams, Antipodes, Stewart, Snares, Auckland, Campbell and Macquarie. In the open sea, it was usually solitary but sometimes two, three or four birds were seen at one time.

Murphy (1936) lists the Giant Petrel as breeding on the Antarctic continent at Cape Adare, but Reid (1962) found no evidence of this at Adare itself. However, during 1961, Reid noted as many as 115 birds at one locality in the area and suggests that they may breed somewhere in Robertson Bay (pers. comm). The Giant Petrel extended further south than any of the other, predominantly sub-antarctic species, so far considered. On traverse 4, one bird was noted at $77^{\circ}45'S$ flying over loose sea ice, and Giant Petrels have been seen several times off Cape Bird on the northern tip of Ross Island during the past two summers (J. T. Darby, pers. comm).

All birds north of 52°S had totally dark plumage or dark with pale faces or crowns. White and dark birds were equally common around Macquarie Island. South of Macquarie Island, white-faced, white-headed and white-mottled birds were commonest, but dark birds were also sighted. Many had unusually bright chrome yellow bills. Other than at Macquarie Island, pure white birds (with a few black rump feathers) were only occasionally recorded.



SOUTHERN SKUA Catharacta lonnbergi

The Southern Skua was common about its breeding islands — Aucklands, Campbell and Macquarie — and almost confined to them. Dell (1960) recorded one skua at 58°S, well south of Campbell Island and south of its southernmost known breeding island, Macquarie; and on the Magga Dan traverses, the Southern Skua was recorded on three consecutive days to the north of, and amongst pack-ice, and at the Balleny Islands.

On traverse 1, the first sighting of several Southern Skuas in the open sea was at 64°24'S. Around 65°45'S, some 50 rose from the surface of the sea in front of the ship. Two birds were seen off Scott Island at 67°24'S, not far from the northern edge of the pack-ice. Several solitary skuas were seen flying over floes in the pack-ice. None were seen in the pack on traverse 2. On traverse 4, two Southern Skuas were seen off Sabrina Islet in the Balleny group where Kinsky (1964) has also recorded this species.

ANTARCTIC SKUA Catharacta maccormicki

This species was almost always seen close to land and its Antarctic breeding areas. Two were seen in the pack-ice on traverse 1 at 70°32'S, and a solitary bird in the Ross Sea at 74°03'S. They were then not seen until reaching Ross Island and McMurdo Sound where they were common. A few birds were seen on traverse 2 off the coast of Victoria land. On traverse 3 they were not observed until the ship neared the coast at Cape Adare. A single bird was seen off Sabrina Islet in the Balleny group on traverse 4 at the same time as two Southern Skuas were recorded.

CAPE PIGEON Daption capensis

The Cape Pigeon was a most consistent 'wake-follower' from New Zealand to the pack-ice. They were most common at sea in the vicinity of Snares, Auckland and Campbell Islands in the subantarctic and in iceberg seas around 65°S.

On traverse 1, two to four birds were recorded each day between Lyttelton, Chathams and the Bounty Islands. To the SW of Antipodes Island, a group of some 100 birds was sighted. Thence to the northern ice-edge, a few birds were seen each day. On traverse 2, the northern ice-edge again formed the southern boundary for the Cape Pigeon, which was then recorded in small numbers each day until Bluff.

On traverse 3, when the floating pack had dispersed, small groups of Cape Pigeons were common in iceberg seas south of the Antarctic circle. Here they fed, particularly about the water-interface of bergs, and were last seen at $69^{\circ}02'$ S just to the north of C. Adare. On traverse 4, their southern limit was about the same place, and on this voyage, they were also sighted abundantly about the Balleny Islands. Most birds in the vicinity of the Balleny Islands were pale mantled, with paler colouring on top of their wings. Birds with pale plumage, collected by Falla (1937), were considered by him to be adult breeding birds. Kinsky (1964) has reported the Cape Pigeon to breed on the Ballenys.

To the north of the Balleny Islands, Cape Pigeons were scarce; the last were seen at 64°20'S. None were seen about Macquarie Island, where Gillham (1967) described a few "eking out a precarious existence as breeders," on offshore Anchor, and Gorilla Head, Rocks.


Dell (1960) suggested that there may be two feeding populations of Cape Pigeons between New Zealand and the Ross Sea, and the records of the Magga Dan traverses show a similar scarcity of birds in the middle latitudes between 55° - $61^{\circ}S$. This may simply be related to the absence of breeding islands in these latitudes; and concentrations of feeding birds in waters not distant from northern or southern islands where they are known to breed. The ice-edge does seem to form the southern limit to their distribution, and the dispersal of the ice in late summer allows the Cape Pigeon to extend its range further south.

ANTARCTIC FULMAR Fulmarus glacialoides

The Antarctic Fulmar was uncommon. Its northern limit at this time of year has been reported to be within 24 to 36 hours sailing from the northern ice-edge (Falla, 1937; Dell, 1960). On traverse 1, one bird was seen at 65°19'S. On traverse 2,

On traverse 1, one bird was seen at $65^{\circ}19'S$. On traverse 2, several small groups of these fulmars were observed to the north of the pack-ice at $68^{\circ}19'S$. On traverse 4, it appeared on one day (15 February) at $69^{\circ}S$. Most Fulmars were seen on traverse 4 en route to the Balleny Islands, when the southern limit was $70^{\circ}01'S$ ($171^{\circ}03'E$). (Dell (1960) has recorded Fulmars as far south as $73^{\circ}S$, and he mentions that occasional birds have been sighted close to McMurdo Sound.) Groups of up to 25 Fulmars were common about Balleny Islands. The greater proportion of these lacked the typical black tip to the wings and were presumably immature birds. Kinsky reported Fulmars about Sabrina Islet (in the Balleny group) in March 1964, but doubted whether they actually bred there. However the reconnaissance party from *Magga Dan* observed Fulmars roosting on cliff edges on Sabrina, and Falla (1937) has noted their abundance to the north of the Ballenys, reported when the whaling ship *Sir James Clark Ross*, passed close by en route west in the 1930-31 season. After the '*Ross*' left the vicinity of the Ballenys they found that the Fulmar was scarce until approaching its breeding grounds on King George Land. All things considered, it does seem likely that the Fulmar breeds somewhere on the Balleny Islands.

WILSON'S STORM PETREL Oceanites oceanicus

The sightings of Wilson's Storm-petrel — an Antarctic breeder which migrates far north in the autumn (Dorst, 1962) — were scattered. It was not abundant anywhere, but most common south of 63°S in iceberg or pack-ice seas, close to their Antarctic breeding places. Reid (pers. comm.) records their breeding at Cape Adare, C. Hallett, and, possibly, in the Tucker Glacier region; and they may breed on the Balleny Islands.

On traverse 1, a solitary bird was seen about 64°S, and a second on the northern fringe of the pack. It was not seen in heavy pack (where it would have been difficult for it to feed), but appeared again in the southern pack fringe where floes were more widely spaced and krill-stained. Solitary birds were seen south of the pack in the Ross Sea, the southernmost sighting being 74°03'S. On traverse 2, a solitary bird was seen over leads in the pack-ice off C. Hallett, and three birds to the north of the pack around 68°S. At 64°S, two Wilson's Petrels gathered about the ship to pick up rubbish which had been discharged.

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On traverse 3, three birds were seen far to the north of their breeding grounds at $54^{\circ}41'$ S, not far south of Campbell Island. Then, as before, they became more common to the south of the Antarctic circle: four sightings in iceberg seas at $69^{\circ}02'$ S; three off C. Adare; two off C. Hallett; and one bird in flight over rough iceberg scattered seas at $73^{\circ}38'$ S.

On traverse 4, occasional sightings of Wilson's Storm-petrel were made each day from $73^{\circ}46'S$ to the Balleny Islands. Many were seen close to Sabrina Islet. To the north of the Balleny Islands, two birds were seen on separate occasions at $61^{\circ}07'S$ ($159^{\circ}51'E$), and two at $57^{\circ}22'S$ ($159^{\circ}E$) — south of Macquarie Island.



ANTARCTIC PETREL Thalassoica antarctica

The Antarctic Petrel was the characteristic species of the packice, and in seas heavy with bergs. It was not recorded north of $65^{\circ}19'S$ and was commonest between $67^{\circ}S \cdot 72^{\circ}S$, near reported or probable breeding sites. Rarely were solitary birds seen and small groups of five to 10 birds, medium groups of up to 50 birds, and large groups of up to several hundred birds were usual.

On traverse 1, the Antarctic Petrels were recorded throughout the 29 hours in the pack-ice. Some were feeding at the surface

of the water, some resting on larger, flat floes, but most in flight. Once clear of the pack, their numbers immediately dropped, except for a single large group which flew past the ship about five hours later. In the Ross Sea, as the ship circumnavigated a very large iceberg, thousands of Antarctic Petrels could be seen resting on the highest ice slopes and in wheeling flight over the berg. On traverse 2. Antarctic Petrels were seen off Cape Hallett, where they probably breed (Reid, pers.comm.), and until 68°22'S, over open water on the northern fringe of the pack ice. On traverse 3, their northern limit was further south at 69°02'S, near C. Adare. With the dispersal of much of the floating pack, they were not so abundant as earlier. On traverse 4, from Cape Adare to Balleny Islands they were consistently about the ship, and about Balleny Islands, the Antarctic Petrel was very common. Hundreds were seen at the water interface of bergs, and Falla (1937) has observed how this bird makes in the direction of an iceberg to collect in a flock under its lee where they appeared to find food. Off the Balleny coasts, groups of up to 10 birds flew about and past the ship in company with Cape Pigeons (which they rather resembled) in what was probably their subadult, non-breeding, plumage markedly pale mantles (see Falla, 1937; Orton 1968). Many Antarctic Petrels were observed on the ledges of Sabrina Islet by the reconnaissance party from Magga Dan.

SNOW PETREL Pagodroma nivea

Like the Antarctic Petrel, the Snow Petrel was a bird of the ice-pack and iceberg laden seas. It was observed furthest south of all the Antarctic flying birds, except McCormick's Skua. Dell (1960) records the northern limit of the Snow Petrel to be on the edge of the floating pack, and on traverses 1 and 2, this was true. On traverses 3 and 4, when the floating pack to the north of the Ross Sea had dispersed, the Snow Petrel was closer to its Antarctic continent breeding places, and Balleny about Islands where Kinsky (1964) has assumed that it breeds. Reid (pers. comm.) records their breeding on the steep (Ross Sea) slopes of Cape Adare, at C. Hallett, and, probably in the Tucker Glacier region.

On both expeditions Snow Petrels were seen in or near to McMurdo Sound, flying over loose sea ice. Rarely were they over open ice-free areas far from land. Unlike the Antarctic Petrel, they



were never in large groups. Most commonly they flew singly or in pairs. Small groups of four, five, and occasionally 10 to 15 were seen in the pack-ice and about the Balleny Islands where they sometimes fed at the surface of the water. Falla (1937) described the characteristic way in which Snow Petrels skimmed close to the water between and over the floes, then rose high in the air to gain elevation for the next glide. Sometimes they made shallow dives at the water, presumably to pick up surface krill.

DISCUSSION

While it is useful to consider these 12 species either as predominantly subantarctic or antarctic breeders, there is some overlap between the groups and interesting differences between species.

1. Subantarctic Species:

Sooty Shearwater and Southern Skua are species which both migrate south to breed in the subantarctic. In both, presumably nonbreeding birds range far south to feed in plankton-rich waters south of the convergence.

Wandering Albatross, Black-browed Mollymawk and Lightmaniled Sooty Albatross are typically southern ocean species. The Wandering Albatross ranges north to latitude 20°S (Alexander, 1955); the Black-browed to coastal New Zealand waters — in both species this is well to the north of their northernmost breeding localities. The Light-mantled Sooty Albatross is not often seen north of its breeding places, but it ranges further south than either of the other two species. The Wandering Albatross is rarely recorded as far south as the pack-ice in the New Zealand region, and usually disappears some 50 - 60 miles further north. The Black-browed Mollymawk and Light-mantled Sooty Albatross seem to be limited by the floating packice earlier in the summer season, but when this has dispersed both species, more particularly the Light-mantled Sooty Albatross, extends several degrees further south into the Ross Sea.

Giant Petrel and Cape Pigeon have an extensive range in the southern ocean and though they breed predominantly on subantarctic islands, they probably also breed in restricted areas of the Antarctic continent or Antarctic islands in the vicinity of the Ross Sea. The Giant Petrel ranges far into the Ross Sea and the Cape Pigeon seems to extend further south when the pack-ice disperses. There may be two feeding populations of the Cape Pigeon related to northern and southern breeding places.

2. Antarctic Species:

The Antarctic Skua and Wilson's Storm-petrel migrate from northern localities (Dorst, 1962, and Falla et. al., 1966) to breed in the Antarctic in the austral summer. Wilson's Storm-petrel is reported to be a late egg-layer (Alexander 1955) — between December and February — and birds seem to travel out to sea to feed in iceberg and pack-ice areas; whereas the Antarctic Skua kept closer to land.

The Antarctic Fulmar, Antarctic Petrel and Snow Petrel are truly Antarctic species which breed and winter predominatnly in Antarctic regions. There is some evidence that the Fulmar moves north

in the austral winter, having been recorded several times off the coast of New Zealand (Falla, et. al., 1966). Similarly, of these three species, the Fulmar's summer range is furthest north into waters not far south of the Antarctic convergence. The dispersal of the pack-ice late in the summer may restrict the Antarctic Petrel and Snow Petrel to waters nearer the continent or their breeding islands.

Antarctic Penguins

Adelie Penguins were first sighted resting on flat ice-floes at 68°S, 175°20'E on traverse 1. Initially solitary birds, they became more numerous as the ship moved south through the pack, when groups of four and five birds were seen on floes, and a single group of 10 porpoised about in the water. Once south of the pack, penguins were not sighted until off Ross Island.

On traverse 2, small groups of Adelies on ice-floes were seen consistently between McMurdo Sound and close to the Victoria Land coast until just to the north of Cape Hallett. Their distribution on traverses 3 and 4 was almost identical. Adelies were numerous in the water about the Balleny Islands.

Few Emperor Penguins were sighted. None was evident in the vicinity of the breeding site at Cape Crozier where, in 1967 the early breakout of the sea ice resulted in the loss of chicks born in 1967. Two birds were seen on traverse 2 on an ice floe in moderately thick pack off the coast of Victoria land around 77°S, 165°E. Two were seen on traverse 4 on separate floes in heavy pack at 77°45′S, 164°48′E.

Birds of the Subantarctic Islands

Observations made on the short visits to these islands will not, in most instances, add much to previous knowledge. Sightings are included in Table 2. However, it is worthwhile to record that on the Bounty Islands a single Cape Pigeon was seen with its chick on a rocky ledge about 60 ft. above sea level.

Gannet Sighting:

On the evening of February 7, the Magga Dan sheltered in Carnley Harbour, where one Australian Gannet was sighted. G. Surrey (pers. comm.) mentioned two records of this bird at Campbell Island in November 1967 and January 1968.

Prions at Sea:

These were one of the commonest groups of species seen at sea. The writer was unable to identify the various species in flight: suffice it to say that they were observed on 24 of the 52 days actually at sea, and on 24 of the 38 days between New Zealand and their southernmost observed limit of $68^{\circ}22'S$ on traverse 2 and $73^{\circ}38'S$ on traverse 3. They usually appeared as solitary birds or in small groups, skimming low over the water, sometimes feeding at the surface. Their southern limit was in iceberg seas to the north of the pack-ice — except for a single sighting of two birds in the Ross Sea, south-east of Cape Hallett. As with Sooty Shearwaters and Antarctic Petrels, prions were frequently seen flying about the water interface of bergs apparently picking up food from the water.

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TABLE 2: Summarised Bird and Weather Log From the 1968 Magga Dan Antarctic Tourist Expeditions

→ between times indicates continuous watch
→ between times indicates intermittent watches

TRAVERSE 1

8 January 1968 <u>Depart</u> <u>Lyttelton</u> Slight sea, low swell; light SE wind; cloud over Banke Peninsula, clear out to sea.	1216 hr 1300 hr 1800 hr	Bar. 1015mb Air 18°C Sea 15°C	Red-billed and Black-backed Gulls and Spotted Shags in harbour. Last Black-backed Gull seen off Banks Peninsula. During afternon: - 1 Buller's Shearwater; 1 White-headed Petrel; 1?Buller's Mollymawk; several Giant Petrels; few to 6 Cape Pigeons consistently; J Wandering Albatrosses and one group of 6-8 Fluttering Shearwaters.
9 January 1968 <u>At Sea</u> 43 ³ 55'5, 178 ⁰ 08'E Noderate sea and swell; mod. W wind; cloudy to overcast.	1100 hr 200 hr 400hr	Bar. 1020mb Air 15°C Sea 15°C	Few Cape Pigeons and Sooty Shear- waters. Buller's Shearwater Giant Petrel Buller's Mollymawk Wandering Albatross
10 January 1968 <u>Off Port Hutt,</u> <u>Chathams</u> Overcast; scattered rain; moderate to rough sea and heavy swell; moderate W wind. Proceeded to Waitangi, arr. 1430 hr, Dep. Waitangi for Bounty Island	1200 hr 2023 hr	Bar. 1008mb Air 15°C Sea 14°C	2 "young" Wandering Albatrosses; 1 Buller's Mollymawk on approach to Pt Hut. Many Giant Petrels; Black-backed and Red-billed Gulla; White-fronted Terns and Pitt Island Shage off Pt Hut, and Waitangi. Brief onshore visit; Waitangi to Owenga. Pied Cystercatchers on beach; Harrier; Goldfinch, Pipit, and Skylark about farmland; Weka wading midetream at Te Awainanga.
11 January 1968 <u>At Sea</u> 45'09'S, 178 ⁻ 17'E Initially fine and clear, later becoming cloudy and overcast; slight sea; moderate swell; wind veering SW to light NW	1200 hr	Bar. 1016mb Air 16 ⁰ C Sea 14 ⁰ C	Wandering Albatrosses consistently about ship - max. 7 birds, some at dark "young" stage. Cape Pigeons - few birds all the time. Prion Giant Petrel Unidentified small grey ?shearwater at distance from ship.
12 January 1968 Towards Bounty Is. Slight to moderate Nw wind; overcast, some drizzle and reduced visibility. Anchored off Bounty Is. in 38 fm close to large islet 47°43'S, 179°5'E	0625 hr 0700 hr 1100 hr 1200 hr	Air 12°C Sea 10°C Bar. 1013mb	Approaching Bounty Islands there was an increase in bird life: several Wandering Albatrosses; Bounty 1s. Mollymarks; Cape Pigeons; Stoty Shearwaters; prions; one Grey-backed Storm- petrel; Antarctic Terns; Red- billed Gulls; Bounty Island Shags; Giant Petrels; several groups of Erect-created Penguins porpoising in water. (3 unident- ified dolphing and many Fur Seale in water.)
Anchors aweigh Cburse set for Scott Island.	1655 hr 1730 hr		Ashore Bounty Is, 1130-1630hr. Erect-created Penguins with late down stage chicks; Bounty Island (Salvin's) Mollymasks with chicks; prion chicks; adult prions in flight; Cape Pigeon, one breeding adult and chick; Bounty Island Shag; Antarctic Terns. Numerous Fur Seals and pups on most rocky platforms.

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13 January 1968 <u>At Sea</u> (Passed off Antipodes at 0500 hr). Fog; drizzle and rain; low to moderate swell and slight to moderate sea; mod. NW wind. control and openant	1045 hr			Wandering Albatrosess - 15-20 dark "young" birds and one with mottled head and back. Cape Pigeons - 100 or so about ship Grey Petrel Sooty Shearwaters
50 ⁻ 54'S, 178 ⁻ 57'E	1200 hr J 1 <u>300</u> hr	Bar. Air Sea	996mb 12 [°] C 10 [°] C	
14 January 1968 <u>At Sea</u> Cloudy, fine and clear. Moderate sea and swell mod. W wind.	1035 hr			Adult and immature stages Wandering Albatrosses Grey-backed Storm-petrel White-headed Petrel Scoty Shearwaters - one group of six birds Prion Cape Pigeon
54 ⁰ 29'5, 179 ⁰ 12'E	1200 hr	Bar. Air Sea	999•5mb 11°C 6°C	Grey-headed Mollymawk Black-browed Mollymawk Giant Petrel
15 January 1968 <u>At Sea</u> 57 55'S, 179'27'E Overcast; light rain; mod. to rough sea; mod. to high swell; wind veering W to E and veering W to E and	1200 hr	Bar. Air Sea	992.6mb 10°С 7°С	Black-browed Wollynawk "Young" Wandering Albatross White-headed Petrel Cape Pigeon Prions - several
58°48's, 179°30'E	1800 hr	Sea	6°c	
16 January 1968 <u>At Sea</u> 60°24'S, 179° <u>36'E</u> Overcast; fog; rain and poor visibility ({ to 1 mile). Sea	<u>0600</u> hr	Sea	5°c	Several Black-browed Mollymawks all day; small groups of prion feeding at water; single Light- mantled Sooty Albatross:
rough to moderate and high swell. E wind strong, becoming moderate. 61 ⁰ 43'S, 179 ⁰ 41'E Twilight	1200 hr 1800 hr 2230 hr	Bar. Air Sea Sea Air Sea	964mb 6°C 4°C 5°C 5°C	Groups 50 and more Sooty Shearwaters in flight at distance from ship during day and around 2230 hr a group of about 250 birds feeding at the water-surface.
	2400 hr			
17 January 1968 <u>At Sea</u> 64 ⁰ 24*S, 179 ⁰ 24*E	0235 hr 0400 hr 0600 hr	Air Sea	2°C 2°C	Prions; solitary Cape Pigeons; first sightings Wilson's Storm- petrel at 0250 hr; solitary L.m. Sooty.
65 [°] 19'S, 179 [°] 36'E	1200 hr	Bar.	965•2mb	<pre>2 solitary Wilson's Storm-petrel; Black-browed Mollymawk; several Southern Skua in flight; L.m. Sooty; 2 prions; solitary Cape Pigeon.</pre>
decreasing visibility; slight to moderate sea; mod. to low swell; light SF wind vering to ENE	1545 hr	Sea	2°C	First Ant. Fulmar sighted 1255 hr; prions - 2 to 5 birds; Southern Skua - group 50 birds; Blue Petrel: Black-browed Mollynmark
D.R. 66 ⁰ 15'S, 179 ⁰ 57'E Small ice blocks in water. First iceberg 1850hr. Crossed Ant.circle 2033 hr. 24 hr daylight; twilight 2300 hr - 0100 hr	1800 hr 1830 hr 2359 hr	Sea Air Sea	1°C 1°C 1°C	Black-browed Mollymawk in flight and on water; last sighting Wandering Albatross at 1953 hr; first sighting Ant. Petrel.at 2058 hr; Antarctic Tern; Wilson's Storm-petrel; L.m. Sooty; prions.

18 January 1968 <u>At Sea</u> Off Scott Island Visibility j mile. Small blocks ice in water.	0000 hr 0027 hr 0350 hr 0730 hr		Prion; 2 Southern Skua; groups of up to 50 Ant. Petrels contin- uously passing ship and feeding at water surface; solitary Cape Pigeon; solitary, then 2, L.m. Sooty.
Entered 6/10 pack-ice at 0800 hr; slight sea; long low swell; mod. NE wind decreasing.	0830	Air 1 [°] C Sea -1 [°] C	(2 whales reported 0700 hr) 4 Wilson's Storm-petrels
67 ⁰ 55'S, 175 ⁰ 41'E Light snow and sleet.	1200 hr	Bar. 959.6mb Air 1°C Sea -1°C	Throughout afternoon increasingly numerous Ant. Petrels in small and large groups in flight and on floes; Southern Skua and Wilson's Storm-petrels regularly sighted; Snow Petrel first sighted at 1320 hr; first sighting of Arctic Tern at 1730 hr; first sighting of Adelie Penguins on ice-floe. (walca)
Ship beginning to ice up - 2200 hr.	2000 hr 2400 hr	Air -1 ⁰ C Sea 0 ⁰ C	Thick layer of diatoms at water- interface of ice-floes.
19 January 1968 <u>At Sea</u> 69°20'S, 173°10'E 0300 hr - steady snow and thick pack-ice; 0545 hr open pack-ice; slight swell and increased bird unbeast	0020 hr 0255 hr	Air -1 ⁰ C Sea -1.3 ⁰ C	Smaller numbers of Antarctic Petrels in the middle of "might" and early morning; by 0500 hr there was an increase and throughout morning, groups of up to 30 birds.
0610 hr - driving sleet, snow, sea chop; 0930 hr - hcavier ice; 1130 hr - momentary sun. 70°32'S, 173°18'E Loose pack (2/10)	1200 hr	Bar. 993mb Air O°C Sea O°C	small groups up to 6 birds amongst floes in flight. Southern Skua - solitary birds Wilson's Storm-petrels - solitary birds amongst floes. Adelie Penguins - initially solitary birds increasing to
19 January 1968 <u>At Sea</u> (cont.) At 1300 hr pack-ice cleared. Overcoast sky, light enow; good visib- ility; calm sea and light S wind.			4's And 5's on floes. Red krill stains on ice noticeable mid-moring. Newly moulted Grabeater Seal seen. Open sea 1300-2400 hr coincided with a marked decrease in bird life. No birds recorded 1400-1515 hr Wilson's Storm-petrel - 2 birds at 1840 hr Southern Skua - solitary bird Adelie Penguins - groups of around 10 birds porpoising in the water. Antarctis Petrels - one group of about 100 birds flew cross- ship at 1713 hr.
Open sea	1742 hr 2400 hr	Air -1 ⁰ C Sea -1 ⁰ C	Antarctic Skua - first sighting at 1845 and again at 2300 hr. (2 whales sighted)
20 January 1968 <u>At Sea</u> 71°40'S, 173°40'E Open sea; ship detoured to pass round very large iceberg at 0020 hr, in brilliant sugshine.	<u>0020</u> hr	Air -1 ⁰ C Sea -1 ⁰ C	1000's of Antarctic Petrel resting on summit slopes and in flight above large berg.
74°03'S, 172°12'E Open sea; partly cloudy clearing to fine and clear; clight to calm sea; low to slight swell; no wind.	1200 hr	Bar. 987mb Air O ^C C Sea O ^C C	Few birds Antarctic Skua Wilson's Storm-petrel

21 January 1968 <u>Ross</u> <u>McMurdo</u> Approached ice-shelf around 0500 hr. Fine; clear; cloudless; calm sea; no wind. 77° 15'5, 167°43'E Off Ross Island coast between C.Crozier and C.Bird. Moderate to heavy ice 1400 hr - 1700 hr. Arrived Rut Point, McMurdo Sound at 2030 hr.	0500 hr 1200 hr 2030 hr	Bar. 986mb Air -3°C Sea -1°C	Adelie Penguins and Antarctic Skuas off Ross Island C. Crozier and Cape Bird. Weddell Seals in water
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END OF FIRST TRAVERSE

(22 January-24 January. Berthed at McMurdo Base; visited Scott Base and Weddell Seals nearby on ice shelf. Antarctic Skuas about McMurdo and Scott Base dumps. Weddell Seals and Killer Whales about McMurdo berth. Adelie Penguins on sea ice.)

TRAVERSE 2

25 January 1968 <u>Departed</u> <u>McNurdo Base</u> Calm sea; faint breeze; sunny; occasional snow. Anchored off Cape Evans. Anchored off Cape Royds. Entered pack-ice, increas- ing in density off coast of Victoria land (8/10; 9/10) 77° 17'S, 164°55'E	0040 hr 0306 hr 0930 hr 1030 hr 1200 hr	Air -2 [°] C Sea -1 [°] C	Antarctic Skuas, few to about 10 birds in flight near land and about sea ice. Adelie Penguins on sea ice in water and on shore at C. Evans and C. Royds. Group 15 Antarctic Skuas in water off C. Royds. Solitary Emperor Penguin and Adelie Penguins on ice-floes around 1030 hr; occasional Antarctic Skuas in flight.
Thick pack several miles off Beaufort Island lessening around 2340 hr	1900 hr 2400 hr		Solitary Snow-Petrels in flight Antarctic Skuas - solitary to groups of 6 in flight and resting on ice-floes.
25 January 1968 (cont.)			Adelie Penguins - occasional birds on ice-floes. Emperor Penguin - one on ice-floe at 2200 hr. (Weddell Seal on ice-floe)
26 January 1968 <u>At Sea</u> 76°30'S, 168°55'E	0010 hr	Air -3 ⁰ C Sea -1 [°] C	Few Antarctic Skua in flight (Weddell Seal in water)
At 1000 hr in mod. dense pack-ice (6/10-9/10) 74 ⁶ 28/8, 169 ⁰ 3/E Cloudy, overcast clearing to fine and clear; calm sea: light NW wind.	1200 hr 1800 hr	Bar. 999.3mb Air -3°C Sea O°C	in flight over lose ice. (Weddell Seal on ice-floe)
Off Coulman Is. 73 ⁹ 20'S, 172 ⁹ 03'E	1930 hr 2200 hr	Air O ⁰ C Sea O ⁰ C	Snow Petrels - solitary to 4 birds about floes Adelie Penguins - small groups on floes Antarctic Skua - solitary birds in flight (2 whales sighted)
27 January 1968 <u>At Sea</u> 14 miles off C.Hallett in thick pack; unsucces- sful attempt to reach Hallett. Overcast;	0300 hr 0530 hr		2 Wilson's Storm-petrel
calm sea, no swell; calm sea, no swell; faint S. wind. 70 ⁴ 55/S. 172 ² 15/E During afternoon the wind increased and enow blown steadily across ship.	1200 hr	Bar. 994.9 Air -2°C Sea 0°C	Antarctic Petrels - group of about 50 birds in flight 2 Giant Petrels Single group Adelie Penguins on floe Snow Petrels - continuously about the pack-ice until morning of 26th

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28 January 1968 <u>At Sea</u> Pack-ice 0000-0730 hr	0 <u>600</u> hr			1 Light-mantled Sooty.
68 ⁰ 50'S, 170 ⁰ 17'E Overcast, foggy and reduced visibility. Slight sea, low swell; light NE wind.	0900 hr	Air Sea	o°c -1°c	Antarctic Fulmar - solitary and small groups (one group of 12) in flight Wilson's Storm-petrol - 1 2 L.m. Sooty most of morning Sooty Shearwaters - group 20 in flight 1 Giant Petrol 2 Antarctic Petrol at 1200 by
68°22'5, 170°18'E	1200 hr 1240 hr	Bar. Air Sea	998.1mb -2°C -1°C	L.m. Sooty - 6 about
67°30'S, 169°12'E	1940 hr 2100 hr 2145 hr	Air Sea	+2 [°] C +1 [°] C	ehip Black-browed Hollymawk - 1 Antarctic Fulmar - 1 Wilson's Storm-petrel - 2 at 1940 hr Antarctic Fulmar - solitary birds most of evening L.m. Sooty - solitary birds Prion - thoughout evening Cape Pigeon - 1 Sooty Shearwaters - few Grey-backed Storm-petrel - 2 eighting of solitary birds
29 January 1968 <u>At Sea</u> 66 ⁶ 21'S, 168 ⁰ 50'E Overcast; strong N wind; rough sea; heavy swell. Proceeding towards Campbell Is.	1000 hr 1200 hr 1 1 1 2030 hr	Bar. Air Sea	984.6 3°C 1°C	Grey-headed Mollymawk - 1 Black-browed Mollymawks Wandering Albatross - mature plumage and "young" birds L.m. Sooty Giant Petrel - dark plumage Giant Petrel - white plumage at 1720 hr Cape Pigeon - solitary bird Prion
30 January 1968 <u>At Sea</u> 64 S, 168 45 E Overcast changing later to fine and clear. Slight sea; low swell. Light wind veering to SSW	0900 hr 1000 hr	Air Sea	3°C 2°C	Wandering Albatrosses Black-browed Mollymawks Cape Pigeon Ship hove to at 1000 hr for an hour; rubbish discharged attracted birds: 6 Wandering Albatrosses; 1 Giant Petrel-dark with pale crown and face; 2 Wilson's Storm-petrels; 2 Cape Pigeons; few prions - noticeably small;
63°56's, 168°42'E	<u>1200</u> hr	Bar. Air Sea	990.1 3°C 2°C	7 <u>P. crassirostris</u> Sooty Shearwater distant from ship L.m. Sonty
Þ	<u>135</u> 2			Wandering Albatross
31 January 1968 <u>At Sea</u> 59 50'S, 169 03'E Overcast becoming fine later in the day. Slight sea; low swell. Light SSW-S wind.	1200 hr 1 1 1 1 1 1 1 1 800 hr	Bar. Air Sea Air Sea	987.5 6°c 4°c 6°c 7°c	Black-browed Mollymawk Prions Wandering Albatrosses Sooty Shearwater Giant Petrel Cape Pigeon
1 February 1968 <u>At Sea to</u> <u>South of</u> <u>Campbell Is</u> . 55°25's, 168°55'E Overcast, cloudy sky becoming fine and clear in the afternoon. Calm sea changing to slight then moderate smell NW wid increased	0600 hr 1 1200 hr 1 1	Bar. Air Sea	986mb 8°C 8°C	Wandering Albatrosses all day Sooty Shearwaters - few Black-browed Mollymawk Giant Petrel Antarctic Tern - 1 A small Shearwater & Cape Pigeon L.m. Sooty
"" #IUG INCLEADING	2000 hr.			

2 February 1968 Off	0630 hr		
Steaming along E coast of Campbell awaiting rendevouz with N.Z. meteor- ological station personnel. Entered Perseverance Hb.	0815 hr		Approaching Campbell Campbell L.m. Sooty Southern Skua
Anchored	0850 hr		Royal Albatrosses Cape Pigeons Black-browed Mollymawk: Antarctic Tern Campbell Island Shag Southern Skua Black-backed Gull
Perseverance Hb. 52 30'S, 169°8'E Cloudy, overcast during day; party climbed to St.Col to ere nesting Royal albatrosses <u>Anchor aweigh</u> : Departed Harbour mouth. Open sea rough; moderate to high swell; moderate WSW veering W wind.	1200 hr 1945 hr 2000 hr	Bar. 980.1mb Air 11°C Sea 8°C	Southern Skua about meteorological station Royal Albatrosses Silvereyes in <u>Dracophyllum</u> (Young bull Elephant Seals in moult on shore near station)
J February 1968 <u>At Sea</u> 49 [°] 45'S, 168 [°] 46'E Cloudy, clearing in afternoon. Slight sea; low swell; light SSW wind.	0600hr 1200 hr 1 1 1 2000hr	Bar. 996.8mb Air 13°C Sea 9°C	Cape Pigeons abundant all day
4 February 1968 <u>Bluff</u> Pilot boarded Line ashore	0600 hr 0700 hr		Cape Pigeons Giant Petrels Black-backed Gulls Red-billed Gulls

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END OF SECOND TRAVERSE

END OF FOURTH WEEK, END OF FIRST EXPEDITION

TRAVERSE 3

6 February 1968 <u>Departure</u> From Bluff Beginning of second expedition.	0150 hr	Air Sea	11°C 11°C	
Course set for Campbell Island	0218 hr 0900			2 Giant Petrels Sooty Shearwaters - groups 15-20 birds Wandering Albatrosses - solitary and several birds (max. 6) Grey-backed Mollymawk Kingfisher came aboard 0930 hr (and disappeared late afternoon in heavy seas)
47°48'S, 168°11'E Rough sea; heavy swell; ship rolling violently. Altered course to Auckland Islands	1200 hr 1410 hr	Bar. Air Sea	992.5mb 14°C 10°C	Wandering Albatrosses Cape Pigeons Giant Petrels Sooty Shearwaters (2 dolphins)
7 February 1968 <u>At Sea</u> Weather cloudy, fine and clear. Rough sea; heavy swell; ship rolling violently. 50°08's, 167°02'E	0615 hr 0900 hr 1200 hr	Bar.	990.8ть	Royal Albatross Wandering Albatrosses Cape Pigeons Sooty Shearwaters Shy Mollymawk L.m. Sooty Giant Petrel ?White-chinned Petrel
1700-30 Off Enderby Is. Rough seas prevented safe entrance to Pt.Ross; course altered to Carnley Harbour. Misty, windy NW.	1700 hr	A1r Sea	11 ⁻ C 10 [°] C	Prion White-faced Storm-petrel Diving Petrel Auckland Island Shag Giant Petrels Sooty Shearwaters Royal Albatrosses

Darby SUMMER SEABIRDS BETWEEN N.Z. AND McMURDO

7 February 1968 (cont.) Proceed along E coast of main Auckland Islands to Carnley Harbour. Anchored overnight.	1730 hr 2150 hr		L.m. Sooty Wandering Albatrosses Shy Mollymawk Diving Petrel Prions Sooty Shearwaters Australian Gannet (Carnley Harbour)
8 February 1968 <u>Auckland</u> <u>Islands</u> Proceeded to Enderby Is.	0230 hr 0545 hr 10730 hr		2 Grey-backed Storm-petrels flew on to bridge Penguins porpoising in water
Off Enderby Island Fine; warm; clear; sunny; very little wind.	1115 hr 1200 hr	Bar. 997.6mb	Cape Pigeons Giant Petrels Antarctic Terns Auckland Island Shag Red-billed Gulls Black-backed Gulls Southern Skuas
,			Ashore Enderby-Auckland Island Shage on cliffs near beach. Southern Skuas and few Sea- lions on beach. On grassy clopes and sand-dunes to E of beach were a few harems of Sea-lions - males with about 14 females, and pups. Skuas about periphery of harems. Numerous Pipits from shore to top of island - noticeably pale plumage. Rabbits numerous on grass. Red-crowned Parakest and Auckland Island Tomitis on fringes of rata forest. Few Yellow-eyed Penguing seen in scrub at forest edge.
8 February 1968 (cont.) Enderby Island	1730 hr		Ashore Bellbirds with almost fully fledged young in rata forest and scrub near the top of the island. Female Sea-lions with young numerous throughout rata. On top of island, two cattle seen. 4 Royal Albatrosses on nests - 2 examined - were banded and had eggs. One unidentified wader on peaty yegetation at top of island. (Field notebook lost on Enderby Is.)
9 February 1968 At Sea	1200 hr	Bar. 983.9mb	Wandering Albatross
<u>Towards</u> <u>Campbell Is</u> . Overcast; continuous light rain; reduced visibility; moderate sea and swell; moderstrong NE wind		Air 9 ⁻ C Sea 10 [°] C	rinoyal Albarross Prions Cape Pigeons Giant Fetrels Sooty Shearwaters Black-browed Mollymawk L.m. Sooty Mellymawk
Off Campbell Island Entrance to Perseverance Harbour	1750 hr		Hack-browed Mollymawk Royal 'Albatrosses Giant Petrelo Capo Pigeons Sooty Shearesters (Giant Petrels Black-backed Gulls Red-billed Gulls Royal Albatrosses L.s. Sooty Albatrosses (2 Fur Seals in water) Southern Skums
In Harbour			Cape Pigeons Antarctic Tern L.m. Socty and Royal Albatrosses Discrementation
Anchored	<u>1945</u> hr		Company and and a second

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10 February 1968 <u>Ashore</u> <u>Campbell</u> : 52°30'3, 169'8'E Ralked from present Net. station, coastwise to Tucker Cove, then via old Met. station to St.Col Fk. From there to summit of Beeman Hill and back to Met. station Almost continuous rain, sleet, and strong winds.	1 <u>8</u> . 1200 hr	Bar. Air	992.2mb 9°C	(Male Elephant Seals moult in Tucker Cove Silvereyes in <u>Dracophyllum</u> Hedge-sparrow in flight ov scrub Royal Albatrosses with new hatched chicks L.m. Sooty chicks on Beema Hill	in) er ly n
Perseverance Harbour. Cpen sea - rough; heavy swell	2400 hr			Numerous Cape Pigeons	
11 February 1963 <u>At.Sea</u> (Campbell Island - C.Hallett) 54 ⁰ 4115, 169 ⁰ 35'E Overcast; occasional rain; mod. rough sea; ship rolling in short, high swell.	0600 hr 1100 hr 1200 hr 1 1 1700 hr	Bar. 9 Air 9 Sea 9	987.5mb 9°C 9°C	Black-browed Mollymawk - 6 about ship Cape Pigeon Wandering Albatross - soli bird Wilson's Storm-petrels - 3 birds 2 prions L.m. Sooty Albatross	-8 tary
12 February 1968 <u>At Sea</u> 58 52'S, 1700 14'E Fartly cloudy; occas- ional showers; slight sea and mod. swell. Light Nx% wind.	0600 1200 1 1 1 1 1 1 1700 hr	Bar. 9 Air 7 Sea 7	973.6mb °C °C	Black-browed Mollymawk - s bird all day Wandering Albatrosses - 1- inmature Sooty Shearwater - 1 bird noon Cape Pigeon - solitary bir all day L.m. Sooty Albatross - 1 Giant Petrels - 4 in late Prion - 1	olitary 2 at d afternoon
13 February 1968 <u>At Sea</u> 61 ² 19'S, 170 ³ 38'E Complete cloud cover bui clear; moderate to roug sea; moderate swell.	0600 hr 1200 hr t I gh I I I <u>I</u> <u>1800</u> hr	Bar. Air Sea	996.1mb 4°c 6°C	Black-browed Mollymawks Wandering Albatrosses Cape Pigeons L.m. Sooty Sooty Shearwaters - small Giant Petrel - occasional of solitary birds (Group 30 plus dolphi 6 - 7 ft long)	Solitary birds throughout watch groups sighting ins
14 February 1968 <u>At Sea</u> 65 ⁵ 04'S, 171 ⁰ 00'E Moderate sea and swell; reduced visibility; some snow; cloudy sky; mod. 7NW wind. First iceberg sighted (65 ⁵ 52'S, 170'E at 0300 hr).	0600 hr 1200 hr <u>185</u> 0 hr	Bar. Air Sea	997•9mb 2°C 2°C	Black-browed Mollymawks - and 2's all day. L.m. Sooty - all day 1-4 birds Cape Pigeons - few all day especially about berg at 7 Prions - a small group abo an iceberg, feeding at wat surface	1's 1425 hr Dut Ser
15 February 1968 <u>At Sea</u> 69'02'S, 1710'39'E Cloudy sky; reduced visibility some snow; moderate wnW wind; moderate sea and swell; continuously passing ice bergs. By 1645 hr sunny clear, no snow.	0530 hr 1200 1 1 1 1 1 1 1 1 1 1 1 2400 hr	Bar. (Air - Sea -	981-1mb 2°C 1°C	Antarctic Fulmar - first a 0550 hr increasing to grou 6 birds that day Black-browed Mollymawks - birds Cape Pigeon - up to 5 bird during day Lum. Scoty - 1-4 birds during day Giant Petrels - 3 dark plu birds at 0930 hr Antarctic Petrels - up to birds during day Wilson's Storm-petrels - 4 at 1830 hr Snow Petrels - 2-3 birds d afternoon and night	sighted up of solitary He mage 6

 16 February 1968 <u>At Sea</u> Snow falling early in the morning; clear and sunny by 0900 hr off Cape Adare. Calm sea and swell; light changeable wind. Entered close (10/10) ice at 1030 hr. 12 miles NE C.Hallett Anchored off C.Hallett Anchors aweigh, proceeding to C.Crozier. Mod.'S wind; heavy ice, cleared 2250 hr. 	0500 hr 1030 hr 1200 hr 1400 hr 1510 hr 1800 hr 2100 hr 2250 hr	Bar. 990.2mb Air -3°C	<pre>L.m. Sooty Albatrosses and 3 Wilson's Storm-petrels Antarctic Stumas Snow Petrels - few Antarctic Petrels - few Snow Petrels - ones and twos over the ico-floes Antarctic Skummas increasing in number near C. Hallett Adelie Penguin on ice-floe (Leopard Seal on flow at 1115 hr; Crabester Seal at 1305 hr) Sea Inick with green distoms- like jelly Onshore: visited few Adelies, the main population having left for the sea. Antarctic Skums. Weddell Seals on ice-floes. 2 Wilson's Storm-petrels and Antarctic Skums over ice off Hallett,</pre>
17 February 1968 <u>At Sea</u> 73 ³ 28's, 171 ³ 36'E Cloudy sky: fog; reduced visibility; moderate head sea; mod. swell; mod. strong S wind; some snow; occasional icebergs.	9600 hr 1200 hr 1200 hr 2400 hr	Bar. 988.1mb Air -3°C Sea -2°C	Snow Petrel - occasional birds throughout day Wilson's Storm-petrel - occas- ional birds throughout day 1 White-faced, mottled Giant Petrel 2 prions seen on a few occas- ions
18 February 1968 <u>Ross Sea</u> Off Ross Ice-shelf, near Ross Island Cloudy; cold; Clear. Mod. SE wind. New sea ice forming off C.Royds and C.Evans Anchored off McMurdo Base	0600 hr 1200 hr 1 1 1 1 1 2245 hr 2240 hr	Bar. 988mb Air -9 [°] C	(Several ?Sei Whales off Ross Ice-shelf; Weddell Seals in water near C. Crozier) Snow Petrels - few off Ice-shelf and around Ross Island; J at 2100 hr Antarctic Skuas - increasing frequency of mainly solitary birds about Ross Island and towards HoKNurdo Base. (Group of about 30 Killer Whales off Cape Bird at 1800 hr)

END OF THIRD TRAVERSE

(Berthed at McMurdo Base, 19-20 February: visited Scott Base. Two fine, cold days)

TRAVERSE 4

21 February 1968 <u>Departed</u> <u>MCMurdo Base for</u> <u>C.Evans and</u> <u>Cape Royds</u> Snow; fog; increasing winds precluded landing	0710 hr 		Few Antarctic Skua and Snow Petrels over open water
at either place. 77'45'5, 164'48'E Rough sea; moderate swell; fog; inter- mittent snow and eleet; clearing later in after- noon to fine and clear; cloudy sky. Ice (7/10) from 2045-2300 hr.	1200 hr	Bar. 995.1mb Air -7°C	Ice-floes stained with red- brown krill Several Adelie Penguins on floes Emperor Penguins - 1 at 2240 hr, 1 at 2250 hr, both on floes Snow Petrels 1,2 and 3 birds in flight over floes Giant Petrel - 1 at 1730 hr

22 February 1968 Ross Sea 73 ⁰ 46'S, 170 ⁰ 03'E Overcast; alcet; snow; SSW wind increasing from breeze to near gale; rough sea; long, mod. heavy swell; ship rolling heavily; reduced visibility. Entered ice at 1300 hr (9/10); off C.Wadworth 1420 hr	0 <u>600</u> hr 0800 hr 1200 hr Bar. 984.8mb Air -4°C Sea -2°C 1800 hr 1800 hr 2800 hr	(diant Petrel - white; chrome yellow beak; few dark rusp feathers Snow Petrel - 1 bird Antarctic Skua - 1 bird Snow Petrels 1 - 4 birds over ice Antarctic Skua - occasional solitary birds Adelie Penguin - group of 15 on ice-floe Wilsow's Storm-petrel - 1 at 1440 hr Cape Pigeons - 1 at 1800 hr
23 February 1968 <u>At Sea</u> 70 ⁰ 01'S, 171 ⁰ 03'E Mod. sea; mod. high swell; overcast; mod. S wind; iceberge cont- inuously all day. Course altered at 2100 hr towards Balleny Islands	0600 hr ↓ 1200 hr Bar. 987.6mb Air 0°C ↓ Sea -1°C ↓ ↓ 1 2400 hr	Several L.m. Sooty Albatrosses all day Cape Pigeon Antarctic Petrels - 100's around larger bergs Antarctic Fulmar Wilson's Storm-petrel - several all day Black-browed Mollymawk
24 February 1968 <u>Approach to</u> <u>Balleny</u> Icebergs all day. 0600 hr calm sea, slight swell, fine and clear, cloudy sky. 0840 hr Balleny Islands visible at 35 miles; 0900 hr, anow; 0945 hr Balleny Islands 18 miles distant - southern ice-cliffs of Sturge Island approached. At 1120 hr off western coast of Sturge Island, mure clear	0600 hr 9940 hr	Antarctic Fulmars - increasing numbers: groups up to 6 birds Cape Pigeons - groups of 2 to 6 birds Antarctic Petrels - 2-10 esp. about bergs Wilson's Storm-petrels - 2 at 0600 hr L.m. Sooty Albatrosses - usually solitary; 11 at 0840 hr Sooty Shearwaters - first at 0750 hr then group 150 plus birds feeding at water surface
67°26's, 164°25'E Fine and clear; slight see; low swell; light N wind	1200 hr Bar. 980mb Air -1°C Sea -1°C	Antarctic Fulmars - groups of up to 25 birds - many of which lack black wing tips Sooty Shearwaters - occasional birds Antarctic Petrels - small groups of birds about equally common as the Cape Pigeons and contin- uously about the ship Wilson's Storm-petrel 1 at 1145 hp 1200 hr: Adelie Penguin - group in water Snow Petrels - continuous sight- ings of solitary and groups of about 5,10 and 15 birds, increasing in number through to 1700 hr Giant Petrels - 2 birds, dark plumage and white faces Wilson's Storm-petrels - continuous sightings of 1-3 birds throughout
TO MADE OF DERLEE TRIBUG		Black-browed Mollymawks - few birds all afternoon Light-mantled Sooty Albatrosses - occasional birds Antarctic Petrels and Cape Pigeons - numerous and about equal numbers Antarctic Fulmars - small groups of 5-6 birds thoughout after- noon

24 February 1968 (cont.) At 1525 hr. between Sooty Shearwaters - few small (5) groups, then group 200 birds at 1416 hr, and 85 birds at Sturge Island and Sabrina Islet, the sky clouded, 1500 hr fog advanced and visib-1642 hr ility very much reduced; increased swell. 1700 hr - 1800 hr ship Antarctic Skua - 1 recorded at 1700 hr 1700 hr stopped while small party Southern Skua - 2 recorded at unsuccessfully attempted to land on Sabrina Islet; 1700 hr Black-browed Mollymawk - 1 prevented by then heavy Wilson's Storm-petrel - solitary swell. hirds Cape Pigeon - mainly solitary, but group of 200 birds at 1800 hr Sooty Shearwaters - occasional birds Giant Petrels - 2 sightings Sabrina Islet - Buckle Is. Snow Petrels - solitary to coast. Darkness fell as 10 birds between 1700 hr - 2000 hr nearing the tip of Buckle L.m. Sooty - 1 Is. and south of Young Is. Antarctic Fulmar - 1 Course altered to Macquarie Decreasing number of birds as Island ship left the coast of Balleny Islands 2000 hr L.m. Sooty Albatrosses - 4 feeding 25 February 1968 <u>At Sea</u> Towards Antarctic Fulmar - 1 Cape Pigeons - 6 feeding Macquarie Is. Prion - 1 feeding Light snow early in the 0600 hr Black-browed Mollymawks - 6-8 morning. feeding 0730 hr Giant Petrels - occasional dark plumage birds 64°20'5, 161°00'E 200 hr 978mb 1°C 1°C Bar. Sooty Shearwaters - occasional Continuously passing large icebergs. Mod. sea with Air birds Sea heavy swell; ship rolling and pitching heavily; mod. SSW wind 2000 hr 26 February 1968 At Sea 0600 hr L.m. Sooty Albatrosses - 2-4 most of day 989mb 2 C 3°C 61°07'S, 159°52'E Bar. 1200 hr Black-browed Mollymawks - 4-6 Fine, sunny day; clear sky; 'warm'; slight most of day Air Sea Wandering Albatross - 1 elight to mod. Bea; Prions ~ 2 swell. No appreciable Wilson's Storm-petrel - 1 at wind. 1100 hr; 1 at 1945 hr (So little wind that mollymawks 2000 hr unable to glide) 27 February 1968 <u>At Sea</u> Early in the morning sea 0650 hr L.M. Sooty Albatross flew past in half-darkness at 0650 hr was quiet, slight swell; snow began at 0800 hr. 57 22'S, 159 00'E Wandering Albatrosses - several, 1200 hr 959•5mb 4°C 5°C snowy form Wilson's Storm-petrel - 2 Bar. Rough sea; high swell; ship rolling heavily from Air Sea Prions - several at water surface 2100 hr; strong NE wind. A small shearwater - 1* (Few birds early in morning, increasing thoughout day) 2000 hr 0600 hr 28 February 1968 At Sea Wandering Albatrosses - 6 ? snowy form 55°17'S, 159°08'E 1200 hr 975≡ъ 5°с 6°с Unidentified storm-petrel Bar. Overcast; rough sea; Air Prions ~ 4 L high swell; reduced visibility; strong WNW Grey-headed Hollymawk - 1 Sea Giant Petrels - several very wind increasing as dark plumaged birds with chrome Macquarie Island yellow beaks and one dark with approached. Off sthn. white head and sev. white plumage birds off Macquarie end Macquarie at 1545 hr. Off Buckles Bay at 1900 hr. Sea calm in the lee of Black-browed Mollymawks - several L.m. Sooty Albatrosses - several the island. off Macquarie Is. (At 1800 hr we could see 100,000's penguins on shore colonies on E coast of Macquarie Island)

NOTORNIS .

29 February 1968 <u>Macquarie Isl</u> Tour parties visited the ANARE station; Nuggets and to Wireless Hill. Warm overcast day. 54°37'8. 158°54'E.	and: On	shore as guests o	f ANARE personnel <u>Shore</u> Stewart Island Wekas - foraging amongst kelp on beach Several Southern Skuas - along beach and about penguins Giant Petrels - white and dark plumage in flight off coast Wandering Albatrosses - in flight L.m. Sooty Albatrosses - in flight Gentoo Penguins - small groups along beach
(Elephant seals; bulls and cows in moult along beach - both adults and subadults)			King Penguins - small groups 8-12 birds along beach and sev. hundred at Nuggets Royal Penguins - several hundred on beach at Nuggets: in late stages of moult Rockhopper Penguins - a few
Anchors aweigh	<u>1800 hr</u>		amongst rocks on Wireless Hill
1 March 1968 <u>At Sea Towards</u> Bluff	0600 hr	Bay 1008 1mb	Wandering Albatrosses - mainly immature: dark brown across dorsal wing surface, dark crown and thin' strap - about stage "C" of Gibson (1967) Black-browed Mollymawk - 1 Giant Fetrel - 1 to 3 birds: 1 dark; 1 white-faced Prions - several throughout
Sunny, fine and clear; mod. sea and swell; light SW wind.	1 1 2000 hr	Air 10°C Sea 9°C	day Light-mantled Sooty Albatrosses - 2 sightings
2 March 1968 <u>At Sea</u>	0 ^{(*} 00 hr		?Royal Albatrosses - 2
49 ⁰ 26'S, 165 ⁰ 43'E Fine, becoming cloudy with rain; N wind increasing to strong; rough sea, moderate swell.	1200 hr 1 1 2000 hr	Bar. 1013.9mb Air 12 C Sea 11 C	Giant Petreis - several dark plumage Socty Shearwaters - several Prions - several Black-browed Mollymawk - 1 L.m. Socty - 1
3 March 1968 <u>Stewart Is.</u> to Bluff Early in morning, weather overcast, rain; slight sea and swell; mod. strong WSW wind; improved later. Off Stewart Is. at noon. Awaiting pilot. Bluff 1400 hr.	0600 hr	Bar. 1017.0mb Air 16°C	Sooty Shearwaters - abundant and in groups about 30 in number Wandering Albatross, - immature (as seen on March 1) Buller's Mollymawk - 1 Giant Petrel - several Pied Shag) Red-billed gull) off Bluff Black-becked gull
1620 hr proceeding to Bluff. 1715 hr berthed.	₩ 1700 hr.	Sea 12°C	Preva-paving Part)
END OF FOURTH TRAVERSE			

END OF SECOND EXPEDITION

* Small unidentified shearwater, most closely resembling <u>Puffinus assimilis</u>

TABLE 3: Summary of the Observed Distribution of the Flying Seabirds

Species	Traverse	Northern	most Sighting	Southernmost Sighting									
		Date	Position	Date	Position								
Wenderind	1	8 ton 1968	Off Banks Ban	17 Jan 1068	65 ⁰ 1019 170 ⁰ 7618								
Albetroed		1 Eab 1968	55°2510 16895515	20 Jan 1068	66°7119 168°5019								
A104 01 080	3	6 Feb. 1968	47°4818 168°1118	13 Fab 1068	61° 101 0 170° 381 F								
	4.	3 Mar. 1968	Off Stewart Is.	26 Feb. 1968	61°07'S, 159°52'E								
Black-browed	1.	14 Jan. 1968	54°29'S, 179°12'E	17 Jan. 1968	65°19'S, 179°36'E								
Mollymawk	2.	2 Feb. 1968	52,30'S, 16908'E	28 Jan. 1968	68°22'S, 170°18'E								
	3.	9 Feb. 1968	51°51'S, 168°17'E	15 Feb. 1968	69°02'S, 171°39'E								
	4.	2 Mar. 1968	49°26's, 165°43'E	23 Feb. 1968	70°01'S, 171°03'E								
Grey-headed	1.	14 Jan. 1968	54°29's, 179°12'E										
Mollymawk	2.		-	28 Jan. 1968	68°22'S, 170°18'E								
	3.		-		-0.0.0								
	4.		-	28 Feb. 1968	55°17'S, 159°08'E								
Buller's Mollymawk	1.	8 Jan. 1968	Off Banks Pen.		-								
	2.		-		-								
	3.				-								
	4.	3 Mar. 1968	Off Stewart Is.		-								
Shy (White-capped)	1.		-		-								
Mollymawk	2.				-								
	3.	7 Feb. 1968	50°08'S, 167°02'E		-								
	4.		-		-								
Grey-backed	1.	12 Jan. 1968	47°43'S, 179°05'E		-								
MOILYMAWK	2.				-								
	3. 4.	6 Feb. 1968	47 48'S, 168 11'E		-								
Light_mentled	1	16 Jan 1968	6104319 1700411F	18 Jan 1968	6705515 17504115								
Sooty Albatross	2.	2 Feb. 1968	52°30'S, 169°08'E	28 Jan. 1968	68°22'S 170°18'E								
See of management	3.	7 Feb. 1968	50°08'S 167°02'E	16 Feb 1968	72°1916 170°131E								
	4.	2 Mar. 1968	49°26's, 165°43'E	23 Feb. 1968	70°01'S, 171°03'E								
Giant Petrel	1.	8 Jan. 1968	Off Banks Pen.	14 Jan. 1968	54°29'5, 179°12'E								
	2.	4 Feb. 1968	Off Bluff	27 Jan. 1968	71°55'S, 172°15'E								
	3.	6 Feb. 1968	47°48'S. 168°11'E	17 Feb. 1968	73°38'S. 121°36'E								
	4.	3 Mar. 1968	Off Stewart Is.	21 Feb. 1968	77°45'S, 164°48'E								
Cape Figeon	1.	8 Jan. 1968	Off Banks Pen.	18 Jan. 1968	67°55'S, 175°41'E								
	2.	4 Feb. 1968	Off Bluff	28 Jan. 1968	68°22'S, 170°18'E								
	3.	6 Feb. 1968	47,48's, 168,11'E	15 Feb. 1968	69°02'S, 171°39'E								
	4.	25 Feb. 1968	64°20'S, 161°00'E	22 Feb. 1968	73°46'S, 170°03'E								
Silver-grey Fulmar	1.	17 Jan. 1968	65°19'5, 179°36'E		-								
	2.		- 0	28 Jan. 1968	68°22'S, 170°18'E								
	3.	15 Feb. 1968 25 Feb. 1968	69°02'S, 171°39'E	23 Feb. 1968									
D1				2) 1001 ()00	10 01 01 111 09 2								
Dine better	1.	17 Jan. 1968	05 19'S, 179"36'E		-								
	2.		-		-								
	2.		-		-								
	+.		-		•								
Antarctic Petrel	1.	17 Jan. 1968	65,19'S, 179,36'E	20 Jan. 1968	74°03'S, 172°12'E								
	. 2.	28 Jan. 1968	68 22'S, 170 18'E	27 Jan. 1968	71°55'S, 172°15'E								
	3.	15 Feb. 1968	69 02'S, 171 39'E	16 Feb. 1968	72 19'S, 170 13'E								
	4.	24 Feb. 1968	67°26'S, 164°25'E	23 Feb. 1968	70°01'S, 171°03'E								
Buller's	1.	8 Jan. 1968	Off Banks Pen.	•	-								
Snearwater	2.		-		-								
	3.		-		-								
	4.		-		_								

Species	Traverse	Northern	most Sighting	Southern	most Sighting
		Date	Position	Date	Position
		0 7 4069	1797510 40900010	46	(+0)
Sooty shearwater	2.	9 Jan. 1960 1 Feb 1968	5502510 1680551P	10 Jan. 1960 28 Jan. 1968	61°43'S, 179°41'E
	3.	6 Feb. 1968	47°48'S. 168°11'E	13 Feb. 1968	61º19'S, 170º18'E
	4.	3 Mar. 1968	Off Stewart Is.	24 Feb. 1968	67°26'S. 164°25'E
Fluttering					
Shearwater	1.	8 Jan. 1968	Off Banks Pen.		-
	2.		-		-
	3.		-		-
Unidentified	۰.		-		•
7 Allied (Little)	1.		-		-
Shearwater	2.	1 Feb. 1968	55°25'S, 168°55'E		-
	3.		-		-
	4.		-	27 Feb. 1968	57°22'S, 159°00'E
Grey Petrel		47 1 4069			
	2.	15 Jan. 1960	50-54-S, 170-57-E		-
	3.		-		1
	4.		-		-
White-headed					
Petrel	1.	8 Jan. 1968	Off Banks Pen.	15 Jan. 1968	57°55'S, 179°27'E
	2.		-		-
	2.		-		-
0	4.		-		-
Show Petrel	1.	18 Jan. 1968	67°55'S, 174°41'E	19 Jan. 1968	70°32'S. 173°18'E
	2.	28 Jan. 1968	70°00'S, 170°18'E	25 Jan. 1968	77°17'S, 164°55'E
	3.	15 Feb. 1968	69°02'5, 171°39'E	18 Feb. 1968	77°15'S, 167°43'E
	4.	24 Feb. 1968	67°26'S, 167°25'E	21 Feb. 1968	77°45'S, 164°48'E
Wilson's Storm-	•	17 1-4 1068	(r ⁰ 4010 400 ⁰ -(1-		
petrel	2.	17 Jan. 1960	63°5610 168°4010	20 Jan. 1968	74 03'S, 172 12'E
	3.	11 Feb. 1968	54°41'S 169°35'E	17 Eab 1968	71 33.5 172 13.6
	4.	27 Feb. 1968	57°22'S, 159 00'E	22 Feb. 1968	73 46'S, 170 03'E
		-,	,		19 10 51 110 69 2
Grey-backed Storm	1.	12 Jan. 1968	47°43'S, 179°05'E	14 Jan. 1968	54°29'S, 179°12'E
petrel	2.		-	28 Jan. 1968	68°22'5, 170°18'E
1 1	3.	8 Feb. 1968	52°00'S, 165°00'E		-
	4.		-		-
White-faced Storm	1.				-
petrel	2.		-		-
-	3.	.7 Feb. 1968	50°08'S, 167°02'E		-
	4.		-		-
N					
Diving Petrel	1.		-		-
	3.	7 Feb. 1968	50°08'S. 167°02'E		-
	4.	,	-		-
Southern Skua	1.	17 Jan. 1968	65°19'S, 179°36'E	19 Jan. 1968	70°32'5, 17 3 °18'E
	2.	2 Feb. 1968	52°30'S, 169°08'E		-
	3.	0 Feb. 1960	51-00'S, 165-00'E	9 Feb. 1968	52-30'S, 109-00'E
	٠.	29 Feb. 1900	J+ J/ 5, 100 J+ 5	24 160. 1900	07 20 3, 104 27 8
Antarctic Skua	1.	19 Jan. 1968	70°32'5, 173°18'E	24 Jan. 1968	McMurdo Base
	2.	26 Jan. 1968	74°28'5, 169°03'E	25 Jan. 1968	77°17'S, 164°55'E
	3.	16 Feb. 1968	71°00'S, 170°15'E	18 Feb. 1968	McMurdo Base
	4.	24 Feb. 1968	67-26'S, 164-25'E	21 Feb. 1968	McMurdo Base
Antarctic Tern	1.	12 Jan. 1968	47°43'S. 179°05'E	17 Jan. 1968	65°19'5. 179°36'E
	2.	2 Feb. 1968	52°30'S, 169°08'E	1 Feb. 1968	55°25'S, 168°55'E
	3.	8 Feb. 1968	51°00'S, 165°00'E	9 Feb. 1968	52°30'S, 169°08'E
	4.		-		-
Amotia Mann	:				600 cc + c 400 01
VLCATE LOLU	1.		-	10 Jan. 1965	07 22'8, 174 41'5
	2.		-	, t	-
	4.		-		•
	••				

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SHORT NOTE

ALTITUDINAL RANGE OF THE ROCK WREN

Until recent years I had always thought the habitat of the Rock Wren Xenicus gilviventris to range from about 3000ft. to 6000ft. in suitable rocky places above the bushline. The lowest I knew was at the western portal of Homer Tunnel (Milford Sound) at ca. 2600ft.

However, on several occasions since 1960 I have seen Rock Wrens above 6000ft., and on 21/2/65 found a pair right on the bouldery summit of Black Peak (7566ft.) in the lower Matukituki Valley, Wanaka. This height was surpassed on 17/1/70 when a pair was observed on the rocky summit of Mt. Aeolus, Wilkin Valley, at 7706ft. Just a month prior to this, on 23/12/69, my family and I had watched a pair in a bouldery stream below the snout of the Fox Glacier at an altitude of only 800ft. a.s.l.

It seems that suitable terrain, together with its characteristic plant associations, food resources and nesting sites, is a more important limiting factor than altitude in the distribution of the Rock Wren.

- PETER CHILD

BIRDS OF THE "TAKAHE STUDY AREA"

By BRIAN REID New Zealand Wildlife Service

INTRODUCTION

Following the rediscovery by Dr. G. Orbell of Tahake in the upper reaches of the Tunnelburn (since renamed Takahe Valley) during November 1948, an official party visited the locality in January 1949. Takahe were found to be also present in the neighbouring Pointburn Valley immediately south of Takahe Valley and some 4,300 acres (6.7 sq. miles) of the upper reaches and head basins of these two valleys in the Murchison Mts. form the "Study Area" where field research on *Notornis* is carried out. In the 20-year period between January 1949 and February 1969 research and inspection parties compiled 21 species lists during visits to the area.

The first 15 volumes of "Notornis" contain about 85 lists of species noted in various localities in New Zealand and on its off-shore islands. Some being compilations of observations from several visits, are probably fairly complete. Others, although titled — "Birds of . . . " are a record of only those birds that the observer(s) could identify among the species seen and heard during what frequently was a short visit. Consequently these lists represent only an unknown portion of the total resident and visiting birds associated with the area.

The incompleteness of a list based on a single visit to an area is convincingly shown from records made in the Takahe Study Area. Whereas the 21 individual lists contain from 16 to 33 species (average: 22), a total of 42 species (excluding Takahe) have been reported by visitors to Takahe Valley and the Pointburn.

FREQUENCY OF RECORDS

Not one species was recorded on all 21 lists. Four (Chaffinch, Kea, Kiwi and Tomtit) were recorded 20 times; four (Bellbird, Blackbird, Grey Warbler and Rifleman) were recorded 19 times; three (Paradise Duck, Scaup and Hedge Sparrow) were recorded 18 times and five (Brown Creeper, Grey Duck, Pipit, Redpoll and Weka) were listed during 17 visits. At the other end of the scale, three species (Shining Cuckoo, Falcon and Black-backed Gull) were recorded four times; the Robin was seen during three visits; three species (Greenfinch, Harrier and Black Shag) were recorded twice and five species (Canada Goose, Crested Grebe, Brown Duck, Goldfinch and Starling) were seen during one visit only. The first bird list, compiled by B. Wisely during January 1949,

The first bird list, compiled by B. Wisely during January 1949, recorded 17 species. The second, based on observations by K. H. Miers, E. G. Turbott and G. R. Williams during August 1949, lists 16 species including five (Brown Creeper, Grey Warbler, Kaka, Pigeon and Rifleman) that were not noted by Wisely. Alternatively, Wisely saw six species (Blackbird, Paradise Duck, Fantail, Redpoll, Thrush and Tui) that were not found by K.H.M., E.G.T. and G.R.W. By the end of the second visit the bird list for the area had increased to 22 species but only 11 of these were recorded by both parties. Table 1 summarizes bird lists made during the last 20 years. Observers, recording the presence of a species, have frequently made qualitative estimates (i.e. rare, common, plentiful, etc.) of numbers. A total of 29 such terms were used but in Table 1 numerals have been substituted to show subjective abundancy rating — i.e. 1 = 'rare' or 'one or two' and successive digits indicate progressively greater numbers of a species until number 9 = 'very abundant' or 'very plentiful.'

In some instances when a species (i.e. Chaffinch, Tomtit, Grey Warbler, etc.) has not been recorded it is doubtful if that species was, in fact, absent from the area at the time. It may have been in lower numbers than usual or the observers may have omitted to note the occurrence. Such oversight does happen with common species. Observers who are quick to note 'first sight or sound of furtive forms' frequently do not record the familiar at the time because they 'will remember.' Alternatively, some species may not be listed by the recorder because 'everyone knows they are common in the area.'

An important adjunct to a bird list is the *negative record* stating that certain species, although expected, are absent. Both Blue Duck and Yellowhammer were seen during all visits prior to February 1950. The species list compiled by a party during that month mentions that neither of these species was seen. Other species recorded as being absent include Long-tailed Cuckoo (Jan. 1965); Robin (Nov. 1952); Rockwren (Nov. 1952); and Weka (Oct. 1950).

Two species reported from the Takahe Study Area but excluded from the list are Orange-wattled Crow (Jan. 1949) and Fernbirds (April 1962). The former identification has been discounted and the latter sighting was shown subsequently to be Hedge Sparrows.

A comparison of records made during the first six years (1949-1954) with those made from 1964-1969 suggests that whereas some species have remained at roughly the same level, others have seemingly either increased or decreased. The method used (mean abundancy rating x number observations), being based on data from different individuals, can be only approximate. It indicates no difference in numbers of Grey Warbler, Kea, Pipit, Redpoll, Robin, Rockwren and White-eye. There has, however, been an increase in the number of Weka, Yellowhammer and Yellowhead, and Long-tailed Cuckoo are much more plentiful now than 15-20 years ago. Conversely, records show there are now apparently fewer Bellbird, Blackbird, Brown Creeper, Chaffinch, Fantail (big decrease), Hedge Sparrow, Kiwi, Rifleman (big decrease), Thrush, Tomtit and Tui.

NOTES ON SOME SPECIES

Shining Cuckoo: Recorded in the forest below Takahe Valley on four separate occasions between November 1952 and January 1954. Never more than one or two birds.

Black-backed Gull: Two birds first seen in Takahe Valley in January 1964. A pair present in January 1968. During 1968-69 a pair reared two chicks on the Takahe Valley flats. Extensive deer culling operations may have attracted this species.

Reid

Kaka: Although recorded during 17 visits, is rare in the study area and is confined mainly to the bush between Takahe Valley and Te Anau.

Kakariki: During six visits Kakariki were recorded but the species was not identified. Four parties have listed Yellow-crowned Parakeet in the area ond two parties record Red-crowned as present.

Kea: Numbers recorded have varied from 21 to as few as one bird in Takahe Valley.

Kiwi: In January 1949 and October 1950 six pairs were heard in Takahe Valley. In 1969 Kiwi were in five different areas of the valley. K. H. Miers recorded them as being "more numerous than Takahe . . . three pair within 300 yards of the camp . . . and estimate 10 Kiwi in area A" in November 1949 and in December 1952 he noted "at least 10 pair in Takahe Valley."

Big Black Shag: One bird seen in February 1968 and two birds the following summer.

Weka: Were not seen during the first two visits and a party in November 1949 recorded 'one visitor, no resident birds.' In October 1950 F. Woodrow looked for Weka in Takahe Valley and reported them as 'not present.' By December 1952 there were 5 pairs in the valley. During January 1965 twenty-five (including 10 juveniles) were seen but in January 1969, following a very severe winter, not more than four families were located.

SPECIES NOT RECORDED IN "TAKAHE STUDY AREA"

Excluding groups (i.e. most sea birds and vagrants) one would obviously expect to be absent, at least 19 species (White-throated Shag, the two common herons, Bittern, Kingfisher, Black Swan, Grey Teal, Mallard, Shoveler, Pukeko, *Kakapo, Little Owl, Laughing Owl, Bush Wren, Fernbird, South Island Thrush, House Sparrow and Red-billed and Black-billed Gulls) occurring in the Fiordland National Park have not, as yet, been recorded in the study area. In time some of these species will, doubtless, be noted in Takahe Valley.

Preston's (1960) studies on segments of the rich continental avifauna of North America demonstrate the equivalence of time and area by showing that a comparable extension of either of these dimensions will increase the number of species found breeding in an area by approximately the same amount. His work shows that if the duration of each following observation period is doubled, or if the extent of the area under observation is progressively enlarged at the same rate, then the number of breeding species added to the initial list with each successive doubling of either time or area, tends to remain constant.

Caughley (1965) tested that part of the theory relating to the number of species observed with the extension of time. His bird lists, compiled in the Kaweka Range, confirm that the same rule applies to a depauperate island fauna — viz. — the number of species, irrespective of breeding status, added to the record with each doubling of time does remain roughly constant.

The 21 bird lists from the 'Study Area' span 21 years but observations were not regular. Whereas three lists were made in 1949 and four years (1952, 1959, 1960, 1961) have two lists each; records were not kept during visits in 1955, 1956, 1957, 1958, 1963 and 1966. Although these data, because of inconsistent sampling, are not ideally suited to test whether the effect of comparable extensions to units of time and area give equivalent increases in the number of bird species, they do suggest that this relationship does probably apply within New Zealand.

The first bird list gave 18 species (including Takahe). By February 1969 forty-three species were known from the Study Area. Therefore a further 20 (approximately comparable) periods of observation added another 25 species. This represents an additional 5.8 species for each doubling in time. If the same order of increase occurs with each doubling of area 46 species would be recorded by observers placed simultaneously in all valleys of the Murchison Mountains for a period of two weeks. The cumulative time spent by Wildlife exploration parties in these mountains would be equivalent to about 10 days in each watershed and the bird lists from these parties give 45 species — a very close agreement.

Likewise, if 5.8 species are added with each doubling of area, the Fiordland National Park species list should contain 72 different birds. Excluding various sea-birds and vagrants, lists made by Wildlife parties in numerous valleys during the last 12 years have shown at least 63 species present — a mean increase of 4.8 with each doubling. Although this is one less species per doubling than should be expected if time and area are comparable, the agreement is really closer than this discrepancy indicates, as lists have not been made in many regions of the Park.

With an area of 66 million acres New Zealand equals 14 doublings of the Study Area and should contain 99-100 species if most families of sea-birds and vagrants are excluded. The check list gives 107 species, but it is probably valid to exclude the six introduced Galliformes (Pheasant, Quail, Chukor, etc.). Therefore, the number of species present in New Zealand is only one or two more than the number obtained from using the first bird list and the mean rate of species increase with time in Takahe Valley — and then from regarding time and area as equivalent.

ACKNOWLEDGEMENTS

I thank my colleagues for making bird lists and for frequently including fuller details in the text of their reports.

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NOTES RE TABLE 1

Number of days refers to length of time each party was in the Study Area.

Detail on Species Lists

- = Species not yet recorded for the first time.
- O = Not seen, although previously recorded in the area.
- X = recorded as "absent" or "not present."

1 = "rare; one or two" etc.

- 2 = "few; infrequent" etc.
- 3 = "several," "scattered," etc.
- 4 = "quite plentiful," "frequent," etc.
- 5 = " common," " fairly numerous " etc.

6 ="widespread."

- 7 = "many," "quite abundant," etc.
- 8 = " abundant," " plentiful," " numerous " etc.
- 9 = "very numerous" etc.
- S = Species seen but numbers not mentioned.
- B = One bird, P = one pair, C = one chick, E = eggs i.e. P/1C = pair with one chick 13B/E = 13 adults, one nest with eggs 2P/7C = 2 pair and total of seven chicks

Notes on Waterfowl

In addition to the 24 records of waterfowl included in Table 1, counts of these were also made in February 1963, when three Blue Duck (one on Lake Orbell, pair in Point Burn) and seven Grey Duck, including one with three ducklings, were in the Study Area.

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Total Recorded

New Species

No. Spec. Seen

NOTES ON THE BIRDS OF NORTH EASTERN FIORDLAND

By R. E. LAMBERT New Zealand Forest Service

INTRODUCTION

During the summer of 1966-67 the writer assisted in a study in North Eastern Fiordland conducted by the Forest and Range Experiment Station of the New Zealand Forest Service.

The area is forested throughout to about 3,500 feet with high tussock grasslands above. The ranges are seldom over 5,000 feet.

During this work the writer recorded observations on the birds in the area bounded by the Glaisnock in the north, the Doon in the south, the Fiordland divide in the west and Lake Te Anau in the east.

Nomenclature and presentation order follow Fleming (1953).

THE BIRDS

KIWI Apteryx spp.

Probings were found in the Wapiti and Glaisnock Valleys and occasional calls were heard. The species were unidentified. A tramping party captured a juvenile Little Grey *A. oweni* in George Sound and *A. australis*, which was recorded in the Caswell Sound/ Stillwater area by the N.Z. American Fiordland Expedition in 1949 (Bull and Falla 1951), may also be present.

SOUTHERN CRESTED GREBE Podiceps cristatus

Two pairs were seen — one on Lake Te Anau at the mouth of the Lugar Burn and the other on the Bid Burn lake. The latter pair was tending a clutch of 4 eggs (29/1/67), half of which were eventually destroyed by a rise in lake level in early February.

DABCHICK P. rufopectus

A possible sighting on Lake Thomson was reported by a member of the team in November. No further sightings were made. Dabchicks were recorded by the Fiordland Expedition on Lakes Thomson and Sutherland.

BLACK SHAG Phalacrocorax carbo and

WHITE-THROATED SHAG P. melanoleucos

Occasional sightings of both species were made on Lakes Te Anau, Hankinson and Thomson. The White-throated Shag was recorded more frequently and was sometimes seen on the larger rivers.

CANADA GOOSE Branta canadensis

A group of 4-12 adults and young was frequently seen on Lake Sutherland. This lake has substantial areas of swampy flats around its perimeter that provide an excellent habitat for waterfowl. Five adult geese were seen on Lake Thomson.

BLACK SWAN Cygnus atratus

A pair of adults with two cygnets were observed during November and December on Lake Sutherland.

PARADISE DUCK Tadorna variegata

Pairs of Paradise Ducks were frequently seen on the lakes and river flats of the main valleys and tributaries. A group of 4 - 10 adults were often present on the flats at the head of Lake Sutherland. One pair near the outlet of this lake hatched a brood of ten ducklings.

BROWN TEAL Anas castanea

The only record of this uncommon species was provided by a single female, frequently observed at close range, in association with a pair of Grey Ducks and young on Lake Sutherland.

BLUE DUCK Hymenolaimus malacorhynchos

Pairs of these ducks were seen frequently along all the rivers in the survey area. Juveniles and young were observed occasionally throughout the summer.

GREY DUCK Anas superciliosa

There were a few adults and young on the lakes and larger rivers but nowhere was the species numerous.

NEW ZEALAND SCAUP Aythya novaeseelandiae

Adults and young were common on all lakes in the area. Groups of up to twenty were observed on Lake Hankinson. This species was not recorded by the Fiordland Expedition. It is the most abundant duck in the study area.

NEW ZEALAND FALCON Falco novaeseelandiae

Falcons were seldom seen but a few were heard calling in flight.

WEKA Gallirallus australis

Wekas were abundant in all watersheds from valley floor to the scrub line. A considerable range of colour variation was noted, individuals ranging from light brown to almost black. Most of those in the Hankinson/Thomson area were of the dark phase whereas the ratio of light to dark approximated unity in most other areas. Chicks and fledglings were frequently observed accompanying the parent birds.

TAKAHE Notornis mantelli

One adult pair and a chick were seen and photographed in early February in the Doon Valley by two members of the party who had previously been advised by Mr. D. Stack, Wildlife Division Ranger, that Takahe sign had been reported in this area.

The birds were seen on the tussock and scrub flat at the head of Lake Wapiti and additional sign was discovered in the true right branch of the Doon.

It is possible that Takahe have a much wider range in Fiordland than was formerly suspected and that small populations in unfrequented valleys remain undetected.

BLACK-BACKED GULL Larus dominicanus

Black-backed Gulls were frequently seen flying over the "tops." Five individuals in the Lugar Burn were seen to feed from a deer carcase. These gulls seldom descended to the valley floor.

BLACK-BILLED GULL Larus bulleri

Occasionally seen flying over Lakes Te Anau, Hankinson and Thomson.

NEW ZEALAND PIGEON Hemiphaga novaeseelandiae

Pigeons were widely distributed throughout the area, being abundant in areas of *Hoheria* where they fed on shoots and flowers. They also were seen feeding in Kowhai *Sophora*, *Fuchsia* and Wineberry *Aristotelia*.

KAKA Nestor meridionalis

Kakas were in fair numbers in most of the watersheds and were usually observed flying across the valleys in the evenings. The largest group recorded (near Hankinson Hut), contained ten birds.

KEA Nestor notabilis

Although only occasional sightings were made in the forest, this parrot was common above the bush-line in all areas. A flock of 21 was seen on the Wapiti/Edith saddle in early December.

YELLOW-CROWNED PARAKEET Cyanoramphus auriceps

Parakeets heard or seen on the wing were unidentifiable, but on three occasions individuals were approached to close range and positively identified as the yellow-crowned species. In the Lugar Burn four parakeets were observed feeding on the bush floor among a flock of Yellowheads.

SHINING CUCKOO Chalcites lucidus and

LONG-TAILED CUCKOO Eudynamis taitensis

In no areas were either of these species abundant. Most of the records were of calls heard in low altitude forest. The frequency of records declined from the beginning of February, presumably because both species began their northward migrations.

MOREPORK Ninox novaeseelandiae

Although no birds were sighted, the frequency of calls heard in all valleys indicates a relatively high density.

RIFLEMAN Acanthisitta chloris

Riflemen were very comman in lowland beech forest and pairs were often seen accompanied by young of the year.

ROCK WREN Xenicus gilviventris

Common above the bush-line, especially in the tussock/scrub basins of valley heads. Although usually in pairs, groups of 4-6 were sometimes seen.

FANTAIL Rhipidura fuliginosa

Nowhere were Fantails abundant, about 60 individuals being seen during the three months, 12% of which were of the melanistic phase. (13% melanistic were recorded by the Fiordland Expedition). Groups of up to six birds of both phases were recorded in areas of Ribbonwood.

YELLOW-BREASTED TIT Petroica macrocephala

Adults and juveniles were very common in all localities from valley floor to the scrub-line. The intensity of the yellow coloration on the male's breast ranged from off white to a rich orange, the most usual being a lemon or pale cream. **ROBIN** *Petroica* (Miro) australis

One bird was seen at the mouth of the Lugar Burn; no further sightings were made. However, Robins are relatively abundant in the Grebe Valley, south of Lake Manapouri.

BROWN CREEPER Finschia novaeseelandiae

This species was seldom recorded possibly because of its retiring habits. Occasional individuals or groups were seen in the Lugar Burn, Mid Burn and Glaisnock.

YELLOWHEAD Mohoua ochorcephala

The number of observations varied greatly between watersheds. Few were recorded in the Wapiti River but they were common in the Lugar Burn, although seldom found away from the valley floor. A flock of approximately 40 individuals (with four Parakeets) was seen feeding on ground in the Lugar Burn.

GREY WARBLER Gerygone igata

Grey Warblers were recorded in large numbers from all valleys. Young birds were seen on several occasions.

SONG THRUSH Turdus ericetorum

Seen only rarely and appeared to be confined to lower altitudes. BLACKBIRD Turdus merula

Common throughout the area from river level to the scrub-Blackbirds were frequently observed foraging on the bush floor. line. PIPIT Anthus novaeseelandiae

Common on tussock grasslands, open head-basins and areas of moraine.

BELLBIRD Anthornis melanura

Bellbirds were abundant in Ribbonwood stands throughout the Noisy flocks of 12-15 juveniles were common in such areas. area.

TUI Prosthemadera novaeseelandiae

An uncommon species, seen occasionally in forested areas of all watersheds except the Mid Burn.

WHITE-EYE Zosterops lateralis

Flocks of White-eyes were common in open bush and scrub at all altitudes.

REDPOLL Carduelis flammea

Redpolls, although abundant, appeared restricted to the alpine scrub zone and the lower snowgrass slopes. A nest with young was discovered in the Wapiti River (4/12/66).

CHAFFINCH Fringilla coelebs

Chaffinches were seen at all altitudes below scrub line. Nests and young were occasionally seen in Ribbonwood stands.

YELLOWHAMMER Emberiza citrinella

This introduced species was only seen rarely and appeared to be confined to higher altitudes.

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TAKAHE FOUND IN STILLWATER RIVER CATCHMENT

By MICHAEL C. T. SMITH Department of Zoology, University of Canterbury Christchurch, New Zealand

During the period 27/3/69 to 4/4/69 I accompanied a party of three deerstalkers that established a base camp on the true left bank of the Stillwater River, approximately 1 km upstream from the point where Waterfall Creek enters the main river. The camp was located in a 50 m wide wooded strip situated between a swampy clearing of 1.5 ha (3.7 acres) and the river.



[Michael C. T. Smith

Plate I — Takahe sighted in Stillwater River, 30th March, 1969.

Smith

At 7.00 a.m. on 30/3/69 a Takahe Notornis mantelli approached the camp and walked to within 3 m of our tents. It was a full-grown bird, to judge by size and plumage, and exhibited no fear at our slow movements. The bird remained in the immediate vicinity for about 15 minutes, ample time for numerous photographs.

What was assumed to be the same bird was seen on four separate occasions during the next four days. Normally the bird appeared early or late in the day, but was sighted once at mid-day. It approached and departed from the downstream direction, both within the wooded area and through the swampy clearing. On three occasions, when Wekas *Gallirallus australis* in the surrounding area began a chorus of calling, the Takahe immediately joined in with its similar, but much deeper and more powerful call. Wekas, usually constant companions around such camps, were absent from ours. One Weka, occasionally seen on the upstream side of the camp, never approached closer than 40 m.

Although three of our party were familiar with Takahe droppings, methods of clipping the vegetation and other sign, no evidence of the bird's existence was found during the five-days period we were aware of its existence. This encounter was approximately 12 km from the closed Notornis area, and numerous other sightings of Takahe sign have been reported recently from catchments located around the periphery of the closed area. I suspect visual confirmation of these reports will come as these areas are increasingly frequented by man.

SHORT NOTE

- * ____

UNUSUAL FEEDING STATION OF TUI

During December 1957 while on holiday at Mahitahi, South Westland, I was able to observe the behaviour of a Tui as it fed from white clover flowers in a well grazed paddock. My attention was first drawn by a large black bird which was walking in a very awkward fashion on the ground. The bird was clearly a Tui, being only 100 feet away. It appeared most ungainly and had considerable difficulty in maintaining an upright stance, rocking forwards on to its beak and then backwards on to its tail, all the time feeding on the white clover flowers. It would feed within a radius of about 8 feet for about 2 minutes and then fly off into a patch of second growth, possibly to feed nestlings. The bird would reappear in half an hour and then repeat the performance. This Tui fed regularly on the ground over a period of about five days and then discontinued this unusual trait. Although I have occasionally observed Bellbirds on the ground extracting nectar from flowers, they appear to have far less difficulty in maintaining their balance than this Tui had.

- S. C. SPARROW

A SMALL WOODHEN FROM NEW ZEALAND

By R. J. SCARLETT Canterbury Museum

ABSTRACT

A new woodhen, smaller than Gallirallus minor (Hamilton) is described.

DISCUSSION

At some time in New Zealand's past, probably in the late Pleistocene or early Holocene, an "explosion" of Ralline forms seems to have taken place. A number of these small birds are at present known from one or two bones only. It is unwise to give them names when the material is so scanty; e.g. a humerus from one cave may or may not be of the same species as a femur or tibio-tarsus from another cave. Nearly all this new material is of limb or wing bones: the cranial, pelvic and sternal bones have yet to be found.

However, there is sufficient material of one new species, although

represented only by limb bones, for it to be described and named. The bones all came from the one cave, which the late W. H. (Bill) Hartree named "Te Waka No. 1."



Plate II — Larger bones: R. femur, L. tibio-tarsus, R. tarso-metatarsus, R. humerus of Gallirallus australis greyi AV 22,575, Anterior aspect. Smaller bones: Ditto of AV 18,475, Holotype of Gallirallus hartreei. Scarlett



Plate III — Larger bones: R. femur (posterior), L. tibo-tarsus (side), R. tarso-metatarsus, R. humerus (posterior) of Gallirallus australis greyi AV 22,575. Smaller bones: Ditto of AV 18,475, Holotype of Gallirallus hartreei.

The cave is in a deep formation of Waitotaran limestone, at the side of a valley, in the Te Waka area, about 30 miles from Napier, and about 12 miles in a more or less northerly direction from Patoka, Hawke's Bay, at a height of 4,500 feet. Bill Hartree had a map reference, but it is not available to me now. The stratification is as follows: A foot or two of post-Hatepe soil and debris, followed by two feet to two feet six inches of the greyish pumice lapilli of the Hatepe shower. Below this is an accumulation of varying deposits of limestone dust, fallen limestone rock and slabs from the roof, plentifully interspersed with bone, then the coarse, purplish lapilli of the Waimihia pumice shower. Beneath the Waimihia the deposits extend to an unknown depth. Bill Hartree had worked down to a depth of sixteen feet near the entrance, having to break large slabs of limestone with a sledge hammer, for removal, before his death. The bones to be described were gathered by Bill and myself in 1958 and 1959. It is unlikely that I shall be able to visit the cave again to search for more.

- AV 18,475: R. and L. femora, L. tibio-tarsus, R. tarso-metatarsus, R. and L. humeri, of an individual bird. Te Waka No. 1, below the Hatepe lapilli of 1900 ± 50 B.P. (50 A.D.). 27 to 29 May 1958. W. H. Hartree and R. J. Scarlett.
- AV 18,476: Proximal and distal ends of a R. tibio-tarsus (part of the shaft is missing). Te Waka No. 1, below the Waimihia lapilli of 3430±50 B.P. (1480 B.C.). 25 May 1959. W. H. Hartree. AV 18,477: L. femur. Te Waka No. 1, below the Hatepe lapilli.
- 27 to 29 May 1958. W. H. Hartree and R. J. Scarlett.
- AV 18,478: L. femur. Te Waka No. 1, below the Hatepe lapilli. 1959. W. H. Hartree.

The bones are similar in size to, but differ in shape from, the bird I described as Rallus hodgeni (Dr. W. R. B. Oliver placed the later in a new genus, Pyramida, but I now know that it belongs in Dr. R. A. Falla's genus, *Capellirallus*). Although much smaller than the living woodhens or wekas, and the extinct *Gallirallus minor* (Hamilton), the bones otherwise are so typically of Gallirallus form that I have no hesitation in placing the new bird in that genus, despite the absence of cranium and bill, pelvis, and sternum, and have much pleasure in naming it in honour of the late Bill Hartree, as Gallirallus hartreei.

AV18,475, is the Holotype, and AV18,476, 18,477 and 18,478 are Paratypes.

		L.	<u>Р.</u>		M.	D.
Femur						cm
Right	AV18,475	5.9	1.025		0.410	1.1
Left	AV18,475	5.925	1.0 + *		0.410	1.1
Left	AV18,478	5.6	1.0		0.4	1.0
Left	AV18,477	5.4	1.0		0.45	1.0
	,			Cnemial		
Tibio-I	tarsus			crest		
Right	AV18.476	7.510	1.10	1.4	0.4	0.775
Left	AV18,475	7.510	1.10	1.4	0.4	0.8
Tarso-	metatarsus					
Right	AV18.475	4.125	0.8		0.4	0.85
Humer	rus					
Right)	1110 475		0.0		a a -	
Left	AV18,475	4.2	0.8		0.25	0.6
	* `	Very slight	tly abraded	on articular	r head.	

Gallirallus hartreei n.sp.

All the limb bones are miniatures of those living wekas, as will be apparent from the photographs.

The femur is expended proximally and distally, with a typical twist or torsion of the shaft. On the dorsal surface, the trochanter major is well produced, with a distinct "lip." On a straight line drawn on the proximal end the inner curve of the trochanter major occurs at approximately 4/10 of the total width. The upper condule or articular head is a flattened curve on the lower surface. The lower condyles are expanded in typical Galliralline fashion. The differences between the limb bones of Gallirallus and other rails are subtle, and although apparent to the eve, are difficult to describe in words. The tibio-tarsus is straight shafted. The cnemial process or cnemial crest is well produced above, and almost square in shape, as in the living wekas. The roughening for muscular attachment, where the crest is attached to the shaft, is pronounced. On the two specimens available, that of the Holotype and the broken AV18,476 the upper process for attachment of the fibula is 1.4 cm. in length, about the same proportion of the total length of the bone as in modern wekas.

The tarso-metatarsus also compares well with the living Gallirallus in shape, but is much harder to distinguish from other small rails, such as Capellirallus hodgeni, of approximately the same size, and with isolated bones, it would be difficult to decide which genus one was handling. On the Holotype tarso-metatarsus of Gallirallus hartreei the protuberance on the upper inner side of the shaft is very slightly less than in Capellirallus hodgeni, but in both these genera is proportionately more distinct than in most Gallirallus australis. Considering the range of variation in such features usually discernible in a series from any one species, and that only one tarso-metatarsus of the new species is available, one hesitates to use this as a diagnostic feature.

Otherwise, the bone is again a miniature representative of the corresponding one in the living wekas.

The humerus is slightly more slender and a little more curved in the shaft than in the corresponding bone in many Gallirallus australis, although the latter varies somewhat in this respect. The lateral crest is pronounced, curving slightly inward. Although the humerus of Capellirallus hodgeni is similar to Gallirallus hartreei in size and shape, this crest extends further down the shaft in the former, and differs in shape. In Gallirallus hodgeni it is very close to Gallirallus australis, but slightly more pronounced in proportion, and although distally it is hard to distinguish between C. hodgeni and G. hartreei, the small distal tubercle on the outer side of the shaft is less pronounced in the new species, just as it is in Gallirallus australis.

Measurements of the corresponding bones of living subspecies of *Gallirallus australis* and extinct *Gallirallus minor* are appended for comparison. So far as I am aware, no such list has so far been published, except one table in Hamilton (op. cit).

All measurements are in centimetres; maximum and minimum measurements are given in each case, taken over a wide range of specimens.

D.
1.6
1.325
1.2
1.15
1.1
1.35
1.15
0.95
0.9
0.8

Gallirallus australis greyi (Buller)
NOTORNIS

AV22,575 and 22,576 are recent skeletons, sex unknown, from the Gisborne district. AV22,576 is the smallest recent weka I have seen, being close to the upper range of *Gallirallus minor*, except in the tarso-metatarsus. AV18,326 is subfossil from "Hukanui No. 3," a Hawke's Bay Cave. AV18,817 from a sub-fossil part individual skeleton from "Cut-throat" cave, Te Kuiti district.

Gattratius austratis dustratis (Spartman)					
	L.	<u>Р.</u>		М.	D.
Femur			1		•
AV5,629	7.825	1.6		0.675	1.65
AV22,413	7.325	1.45		0.625	1.425
			Cnemial		
Tibio-tarsus			crest		
AV5,629	11.3	1.7	2.25	0.65	1.2
AV22,413	10.4	1.525	2.0	0.55	1.125
AV16,710	10.125	1.3	-	0.5	0.9
Tarso-metatars	us				
AV5,629	6.825	1.3		0.6	1.4
AV22,413	6.225	1.2		0.525	1.225
Humerus					
AV16,709	5.9	1.3		0.425	0.9
AV5,629	5.5	1.3		0.410	0.975
AV22,413	5.325	1.175		0.410	0.9
AV16,694	5.2	1.15		0.425	0.85

Gallirallus australis australis (Sparrman)

AV5,629 is a skeleton collected in 1899 at Motunau, North Canterbury, and merely labelled "weka." It is possibly G. a. hectori. AV22,413 is a recent skeleton from the Nelson district, AV16,709, 16,710 from "Pothole 3," Canaan, Takaka; AV16,694 from "Kiwi Hole," Takaka, are part individual skeletons, subfossil.

Gallirallus australis hectori (Hutton)

In the author's opinion "hectori" is merely a colour variant of G. *a. australis*, as the *weka-pango*, the blackish form from Fiordland is recognised to be.

	L.	Р.		М.	D.	
Femur						
AV12.770	7.95	1.65		0.625	1.6	
AV5 187	7 7 2 5	1 575		07	1 55	
	1.123	1.575	Cnemial	0.7	1.55	
Tibio-tarsus			crest			
AV12.770	11.5	1.8	2.225	0.65	1.2	
AV5,187	10.9	1.65	2.1	0.625	1.1	
Tarso-metatars	us					
AV12.770	6.610	1.3		0.6	1.4	
AV5,187	6.325	1.2		0.6	1.3	
Humerus						
AV12.770	5.7	1.2		0.4	1.0	
AV5,187	5.5	1.2		0.410	1.0	

AV12,770 is a skeleton from the Chatham Islands, AV15,187, a female, is from a South Island, probably Canterbury, locality, collected many years ago.

Sca	rlett
ocu.	rien

Gallirallus australis scotti (Ogilvie - Grant)						
	L.	Р.		M.	D.	
Femur						
AV13,457	7.7	1.5		0.6	1.525	
AV13,490	7.6	1.5		0.65	1.6	
,			Cnemial			
Tibio-tarsus			crest			
AV13.457	10.6	1.6	2.0	0.575	1.1	
AV13,482	9.9	1.3	-	0.4	0.975	
Tarso-metata	rsus					
AV13,457	6.225	1.15		0.55	1.275	
AV13,471	6.0	1.1		0.525	0.975	
Humerus						
AV21,485	5.5	1.3		0.4	0.9	
AV13.457	5.5	1.2		0.4	0.875	
AV22,793	4.95	1.0		0.4	0.775	

AV13,475 is a recent part skeleton from sand-dunes on Native Island, Stewart Island. The others are odd midden bones from Old Neck and Native Island.

Gallirallus australis all subspecies

Maximum and minimum lengths:

Femur: AV12,770, 7.95; AV12,576, 6.5.

Tibio-tarsus: AV18,326, 12.2; AV12,576, 9.6. Tarso-metatarsus: AV5,629, 6.825; AV22,576, 5.9.

Humerus: AV16,709, 5.9; AV22,576, 4.9.

Gallirallus minor (Hamilton)

Hamilton's Type bones were from a cave at Castle Rock, Southland. He gave the following length measurements, in centi-metres. Femur: 6.4, tibio-tarsus: 9.3, tarso-metatarsus: 5.3.

This small weka, unfortunately extinct, was formerly widespread in both North and South Islands, and occurred also on Stewart Island.

It was a more slenderly built, gracile bird than the living woodhens, and its bones are usually discernible at first glance in a mixed group of subfossil bones.

L.	Ρ.		М.	D.
6.7	1.3		0.525	1.275
6.65	1.3		0.575	1.310
6.325	1.2		0.55	1.25
6.225	1.3		0.575	1.3
		Cnemial		
		crest		
9.625	1.310	_	0.575	0.95
9.325	1.325	1.85	0.5	1.0
$9.0\pm$	1.2	_	0.5	0.95
5				
5.55	0.95		0.5	1.0
5.4	1.05		0.475	1.125
5.25	1.0		0.45	1.0
4.8	1.15		0.375	0.8
4.6	1.025		0.325	0.75
	L. 6.7 6.65 6.325 6.225 9.625 9.325 $9.0\pm$ 5.55 5.4 5.25 4.8 4.6	L.P. 6.7 1.3 6.65 1.3 6.325 1.2 6.225 1.3 9.625 1.310 9.325 1.325 $9.0 \pm$ 1.2 5.55 0.95 5.4 1.05 5.25 1.0 4.8 1.15 4.6 1.025	L. P. 6.7 1.3 6.65 1.3 6.325 1.2 6.225 1.3 Cnemial crest 9.625 1.310 $-$ 9.325 1.325 1.85 9.0 \pm 1.2 $-$ 5.55 0.95 5.4 1.05 5.25 1.0 4.8 1.15 4.6 1.025	L.P.M. 6.7 1.3 0.525 6.65 1.3 0.575 6.325 1.2 0.55 6.225 1.3 0.575 6.225 1.3 0.575 9.625 1.310 $ 0.575$ 0.575 9.325 1.325 1.85 $9.0 \pm$ 1.2 $ 5.55$ 0.95 0.5 5.4 1.05 0.475 5.25 1.0 0.45 4.8 1.15 0.375 4.6 1.025 0.325

NOTORNIS

AV19,112 is an almost complete skeleton from a limestone cave, Puketiti Station, 7 miles west of Pio-Pio, Waitomo County, AV17,412, almost complete skeleton from Prouses Cave, north of Paturau River, West Nelson. AV21,335 are mixed bones from a limestone cave near Canaan Road, Nelson. The only recent skeleton I have seen that in any way approaches G. minor is AV22,577.

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SHORT NOTES

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THE "PORIRUA YELLOWLEGS" AGAIN

On November 11th, 1962, Dr. C. A. Fleming discovered a strange wader in the vicinity of Porirua, which was subsequently seen and repeatedly observed by numerous New Zealand and Australian ornithologists. On the basis of available evidence at the time, Fleming (1963) identified the bird as a Greater Yellowlegs Tringa melanoleuca, and published his findings, together with photographs by I. G. Andrew, in "Notornis."

The evidence presented in Fleming's paper was commented on by Dr. R. A. Falla (1964), who suggested that the bird concerned could just as well have been a Lesser Yellowlegs Tringa flavipes. Since then much discussion as to the identity of the above bird has taken place within New Zealand ornithological circles. Additional sightings of Yellowlegs in New Zealand were reported during the same year (Mackenzie, 1964, and Tunnicliffe, 1964).

An eminent North American ornithologist, Dr. R. W. Storer, Professor of Zoology at the University of Michigan and Curator of the university's Museum of Zoology, visited New Zealand recently to study the New Zealand Dabchick *Podiceps rufopectus*, as part of his comprehensive study of the grebes of the world. During his visit to Wellington, the writer had the opportunity to discuss with him inter alia the question of sight identification of the two species of Yellowlegs in the field. Dr. Storer pointed out that the best way to distinguish one Yellowlegs from the other in the field on sight alone (i.e. not including call notes), is by comparing the length of their bills with the length of their legs (feet). The length of bill of the Greater Yellowlegs is about as long as the bird's tarsometatarsus (tarsus) whereas the length of bill of the Lesser Yellowlegs is only as long as the exposed part of its tibiotarsus (tibia). This statement was checked on specimens in the Dominion Museum collections and was found to be correct.

This simple and straightforward method of identification was then applied to check the identification of the disputed Porirua bird, and for that purpose I. G. Andrew's photograph (Notornis 10: 279, plate XXVa) was used. The comparison of length of bill with the length of the bird's exposed tibia (and with the length of tarsus), all clearly discernible on this photograph, may indicate that the bird in question was a Lesser Yellowlegs Tringa flavipes (Gmelin, 1789).

REFERENCES

SHORT NOTES

SIGHTINGS OF WHITE-BELLIED STORM-PETRELS IN COASTAL WATERS

(a)

On 4/11/69 in position 40° 35' South, 171° 42' East, which is 47 miles to the west of Cape Farewell, two unfamiliar storm petrels were seen. These birds followed closely in the wake for 20 mins. and good views were obtained at distances of 40 to 50 feet in excellent light. They did not appear to be feeding, their flight being very erratic as they flipped continuously over from one side to the other. I did not see the feet used for walking on the surface of the water. However, on a number of occasions the two birds seemed to launch off the surface as though they had hit it with their breasts. The flight and movement were so swift that this could not be verified and it could well have been that the feet were put down momentarily without being seen.

The time of observation was 1200 - 1220 and the weather — Wind SW 24 knots. Sea rough. Swell SW moderate. 4/8 Cloudy. Air temperature 56°. Sea temperature 56°. The vessel crossed the 100 fathoms line shortly after 1200 hours.

The following notes were taken at the time of observation. 8 x 50 binoculars were used. The head and neck were very black, being much darker than the rest of the black on the bird. The head reminded me of a Tom-tit, there being the same sharp contrast between the black head and white lower breast.

The lower breast and belly were white, there being no sign of black marking on the belly either in the form of a line or flank patches.

The under tail was white with a black tip, the tail being either square or slightly concave, as though the two outer feathers were slightly longer than the rest.

The underwing was mainly white about the coverts with black primaries. There was a black line right around the underwing, and



this seemed to be narrower at the fore end than at the after end, where it was quite wide.

The upper tail was black with a greyish-white rump. The white rump though being definite did not appear to stand out so much as in the darker storm petrels. The upper wing showed black primaries with a black line along the fore end which contrasted slightly with dark greyish-brown secondaries. The bill and legs were black.

After discussing the above field notes with R. B. Sibson and F. C. Kinsky, who showed me a skin of the bird, it would appear that the birds were White-bellied Storm Petrels Fregetta grallaria.

- JOHN JENKINS

(b)

On the crossing from Tutukaka to the Poor Knights Islands on 6/12/69 two storm petrels, predominantly black above and white below, were seen. Both birds, seen within 200 yards of each other, behaved in an identical manner. They "skipped" over the surface of the water, with both feet together, touching water on the down-The wings were fluttered continuously and on about every swing. third upswing were raised completely. The flight was relatively direct, with little zigzagging. Only one bird, however, came close enough (10-15 yards) for a certain identification to be made.

The accompanying illustration is based on field notes and sketches made at the time. The bird was observed through 8 x 30 binoculars for three to four minutes.

Description: Bill and feet black. Head, throat and upper breast and back a grey-black colour. The tail was square and appeared slightly browner, with a prominent white band across the upper tail coverts. The underwing was strikingly bicoloured — outer coverts grey-black, inner ones white. On the upperwing the proximal part was distinctly paler (grey-brown) than the primaries and wing margins (grey-black). The lower breast, abdomen, flanks and under tail coverts were white, with a few dark marks on the darks. There was no sime of any dark markings on the abdoment There was no sign of any dark markings on the abdomen. flanks.

The absence of a dark line through the abdomen distinguishes White-bellied Storm Petrel Fregetta grallaria from the normal (dark) phase of Black-bellied Storm Petrel F. tropica. The rarer pale phase of F. tropica lacks a dark line through the abdomen. In both phases of this latter species, however, the upperparts are sooty (not greyblack) and the median and greater wing coverts are sooty-black (not grey-brown). It should be noted that even this latter distinction can only be appreciated at fairly close range and under favourable conditions.

As all relevant plumage details could be distinguished on one of the two individuals seen, I had no hesitation in identifying it as White-bellied Storm Petrel F. grallaria.

On the same crossing the following day the only storm petrels seen were White-faced Stormed Petrels Pelagodroma marina and, most surprisingly, a single Grey-backed Storm Petrel Garrodia nereis. It is probable that the latter was a non-breeding bird, as the breeding season at the subantarctic islands is from October to March.

Zoology Dept.,

— J. P. CROXALL

Univ. of Auckland

SONG THRUSHES FORAGING ON MUDFLATS

Following a short field trip to Golden Bay and the base of Farewell Spit early during October, 1969, the writer was able to spend one day in the Nelson area. Together with F. Boyce (Regional Representative, O.S.N.Z., Nelson) and F. Climo (Conchologist, Dominion Museum), a trip to Rabbit Island, Tasman Bay, was planned for the 10th October to search for waders and to investigate the tidal flats surrounding this island.

When we reached Rough Island the tide had just started to go out and small mud banks were emerging from the otherwise still flooded mudflats between the island and the mainland. On one of these small exposed banks of mud, a few small birds were sighted, which turned out to be Song Thrushes *Turdus philomelos*. This unexpected sight prompted the writer to make further observations. The tide was going out rapidly at this stage, exposing larger areas of mud, and Song Thrushes in increasing numbers came flying out of the pine plantation on Rough Island and settled on the freshly exposed mud areas, picking up objects and returning to the plantation carrying them in their bills. It was soon realised that the Song Thrushes were collecting Mudsnails *Amphibola crenata*, which they picked up from the mud, and either carried to a nearby stony area, or to the shore, where the snails were broken by hitting them repeatedly against a stone, in the usual manner Thrushes break land snails. After extracting the body of the snail from its shell, it was either carried away into the pine plantation, where it was presumably fed to nestlings, or the body of the snail was swallowed and the bird returned to the mudflat to forage again.

The impression given by the increasing numbers of Thrushes coming out onto the mudflat to feed as the tide receded was that the entire thrush population of the island was waiting for the tide to go out, and when this occurred, feeding started. It was, however, impossible to make an accurate count of the numbers of Song Thrushes feeding on this comparatively small area of mudflat, as presumably the same birds were flying to and fro from the pine plantation to the mudflat. Nevertheless, their number was estimated to be at least two dozen, and the largest number seen feeding on the mudflat at one time was 13 birds.

During a short walk at the western end of Rough Island it was noted that the population of Song Thrushes on the island was unusually high, whereas only one Blackbird was seen. On returning to the beach, about one hour following the first observations, Thrushes were still seen collecting mudsnails on the now completely exposed mudflats, and large numbers of broken snail shells were found along the entire shoreline bordering the mudflats.

The only explanation for the high population density of Song Thrushes on Rough Island is their unusual adaptation to feeding on the surrounding mudflats, where the supply of mudsnails is plentiful all the year round. The island on its own, because of its very dry sandy and gravelly nature, would not be able to support more than a few pairs of Thrushes if they were dependent on their normal food, such as earthworms, landsnails and insects.

NOTORNIS

FURTHER RECORD OF ORIENTAL CUCKOO

An unusual corpse was found in debris on the beach at Muriwai, west coast of Auckland, on 21/12/69. The body had been largely cleaned by beach crustaceans, but plumage (except for back of head and upper back) was mostly intact, the bill and feet being little faded. The bird had probably fallen exhausted into the surf offshore, and come up with petrels and other derelicts picked up at the same time.

The bird as shown by the plumage is an adult of the rufous phase of the Oriental Cuckoo *Cuculus saturatus horsfieldi*, and therefore a female (Mayr 1945, Birds of the Southwest Pacific), the head and back having dark brown bars on a cinnamon to chestnut-brown ground, and the tail being similarly barred; underparts white, barred black; bill dark brown, orange-yellow at gape and dull yellow along the lower ridge of lower mandible; feet yellow, claws brown.

Measurements: Culmen 21 mm., wing 183, tail 147, tarsus 19, third toe 27.

There are no pale tips to the feathers dorsally, i.e., the bird is not immature.

The specimen has been placed in the Auckland Museum (No. AV. 1229.1).

-SYLVIA M. REED

LETTERS

THE FUTURE OF ORNITHOLOGY IN NEW ZEALAND: ANOTHER VIEWPOINT

A recent appraisal of priorities in New Zealand ornithology (Hamel, 1969) concludes that insufficient attention is being paid to matters of theory. I have no argument with the topics raised as significant questions worthy of more active exploration. It would however be a loss to the long term study of ornithology if those currently fashionable questions, essentially the province of professionals, should detract from the continued recording of phenological and numerical data which form a large part of the output of Notornis.

The recording of species lists, numbers, and isolated observations on behaviour can seem plodding and without intellectual merit beside the sophisticated goings on of professional biology. But there are significant areas of biology that can only be approached through the long term accumulation of reliable data, and it is of greatest importance that this work should not be regarded as less respectable or worthwhile. Changes in bird populations, extinctions and diversifications of faunas in relation to quaternary changes. for example, can only be studied through the patient accumulation of data, largely by generations of amateurs, who need no quick return on their investment of time.

The New Zealand ornithological scene is of special significance here, given an insular fauna under observation by a group within which some quality control is possible. Perhaps the data are not as uniform as could be desired, perhaps more could be done to systemtize observation, but nothing should be done to discourage the recording of simple facts, regardless of theory, or the perpetuation of a corps of competnent observers. To paraphrase the words of the great neurologist Ramon Y. Cajal, theories may come and go, but facts go on forever. The utility of such data is hard to predict. A good example here comes from the present concern with the contamination of the environment by pesticides: few could have predicted that bird counts of earlier years would become significant data in documenting the population changes caused by this ecological misadventure, surely one of the most significant aspects of contemporary biology.

When some future biologist comes to analyse the fate of other species in the face of man's rapacious onslaught on the biosphere, it will be to data recorded for its own sake that he will turn, and if volume C of Notornis still carries records of birds washed up along the coastline, numbers and times of appearance of waders, and the like, these data will be more useful than tests of what by then will be the naive hypotheses of Lack, Tinbergen, MacArthur, and others.

When ways of expending a finite amount of energy and curiosity are considered, we should not forget that the "biological backwaters" of today may be the substrate of tomorrow's "hot" biology.

REFERENCE

HAMEL, J., 1969: The future of ornithology in New Zealand. Notornis XVI, 206.

— JOHN S. EDWARDS

Department of Zoology, University of Washington, Seattle, Washington 98105

The Editor, Sir.

re Preparation of book on "Australasian Seabirds"

I am engaged in preparing a book covering seabirds in the region of Australasia (Penguins; Albatrosses and Petrels; all the Gannets, Shags, Frigate and Tropic birds, etc.; Terns, Gulls and Skuas).

The book is intended as essentially a photographic and descriptive field guide, the emphasis on plumages and field descriptions, and geographic ranges.

This note is to solicit 35 mm colour transparencies of any N.Z. seabirds from the above categories. Ideally, studies of stationary birds, head studies of hand-held birds, and flight shots showing wing patterns and general flight appearance are required. Adults, wintering plumages, immature plumages, sexes and phases all welcome.

Area to be covered includes from Timor to Balleny Islands, and from Kerguelen to Kermadecs, including Australia, N.Z. and the islands to the Antarctic coast. A first draft of the text is anticipated by the end of August, 1970, all being well.

Please write to me, if interested, at one of the addresses below, and I shall be pleased indeed to supply further information.

Many thanks for your consideration. KEN G. SIMPSON

National Museum of Victoria 285-321 Russell Street Melbourne, Vic. 3000

or care Victorian Ornithological Research Group 27 Kingswood Drive, Dingley 3172, Victoria, Australia.

NOTICES

On the recommendation of the Fauna Protection Advisory Council a status study of the kiwi is being undertaken by the Wildlife Service. A history of the distribution and numbers of all species will be built up from published records and first-hand accounts.

The latter are the more difficult of the two to obtain so a request for help on this aspect is addressed to all members. In particular, the information required is the date and location of any kiwi record, the species concerned (if known) and any short or long term trends in numbers. Please send any such records to:—

M. Harrison, Research Section, Wildlife Service, Internal Affairs, Wellington.

REQUEST FOR INFORMATION

At Kaikoura during the 1968-69 breeding season approximately 500 breeding pairs of Red-billed Gulls *Larus novaehollandiae scopulinus* have been individually colour marked.

Would members of the Ornithological Society who sight these colour marked gulls please send the combination, date and place sighted to:—

James A. Mills, Zoology Department, University of Canterbury, Christchurch.

If any member is willing to search regularly for colour marked Gulls in their locality would they contact me at the address given for further particulars.

An example of how the band should be read:—

GULL LEFT LEG Green over Yellow over White

Green over Yellow over Aluminium Band

*

LITERATURE AVAILABLE

The following are available on order from Mrs. H. R. McKenzie, Box 45, Clevedon:

Back Numbers of Notornis at 50c each. Large orders for full or part sets at special prices.

O.S.N.Z. Library Catalogue, 70 pp., 50c.

Banding Reports, Nos. 8 to 14, 50c each. Nos. 1 to 7 are incorporated in early issues of 'Notornis.'

Kermadecs Expedition, 1964, by A. T. Edgar. Reprints at 45c.

From all bookshops:

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A Field Guide to the Birds of New Zealand, by R. A. Falla, R. B. Sibson and E. G. Turbott. \$4.50.

From O.S.N.Z., Box 40-272, Upper Hutt:

A Biology of Birds, by B. D. Heather. \$1.33 post free.

From B. A. Ellis, 36 Hartley Avenue, Christchurch 5:

Field Guide to the Waders, by Condon and McGill. Price 65c.

NOTICE TO CONTRIBUTORS

Contributions should be type-written, double- or treble-spaced, with a wide margin, on one side of the paper only. They should be addressed to the Editor, and are accepted on condition that sole publication is being offered in the first instance to "Notornis." They should be concise, avoid repetition of facts already published, and should take full account of previous literature on the subject matter. The use of an appendix is recommended in certain cases where details and tables are preferably transferred out of the text. Long contributions should be provided with a brief summary at the start.

Reprints: Twenty-five off-prints will be supplied free to authors, other than of Short Notes. When additional copies are required, these will be produced as reprints, and the whole number will be charged to the author by the printers. **Arrangements for such reprints must be made directly between the author and the printers, Te Rau Press Ltd.**, **P.O. Box 195, Gisborne, prior to publication.**

Tables: Lengthy and/or intricate tables will usually be reproduced photographically, so that every care should be taken that copy is correct in the first instance. The necessity to produce a second photographic plate could delay publication, and the author may be called upon to meet the additional cost.

Illustrations: Diagrams, etc., should be in Indian ink, preferably on tracing cloth, and the lines and lettering must be sufficiently bold to allow of reduction. Photographs must be suitable in shape to allow of reduction to 7" x 4", or 4" x $3\frac{1}{2}$ ".

Abstracts: All papers exceeding 500 words are to be preceded by an abstract, briefly indicating the contents of the paper.

Proofs: First proofs of papers will be sent to authors at the discretion of the Editor, or upon request. They should be returned without delay.

Nomenclature: Contributors should follow the Checklist of N.Z. Birds for both the scientific and vernacular names. Scientific names of species and genera are printed in italics, and in the script should be underlined; and the specific or subspecific name should be enclosed in brackets if following the vernacular name, thus: Stewart Island Kiwi Apteryx australis lawryi. It is necessary to give the scientific name as well as the vernacular the first time the latter is mentioned, but thereafter only one of the names. Capital letters should be used for vernacular names.

References: If listed, these should be in the form of the following examples:

1. Atkinson, I. A. E., 1964: Feeding stations and food of the North Island Saddleback in August. Notornis 11, 2, 93-97.

2. Buller, W. L., 1888: A History of the Birds of New Zealand (2nd ed.) 2 vols., the author, London.

- The references should be serially numbered, and in the text, should be shown thus: Atkinson 1964 (1), and Buller 1888 (2). If references are cited in the text, the following shortened form may be used: Atkinson 1964, Notornis 11, 2: 93-97.

Publication: Contributions will normally be published approximately in the order in which they are received by the Editor, but at his discretion. He may seek the opinion of the Editorial Committee, appointed by the Council of the Society, on any matter including the general suitability of the contribution for publication.

Authors are requested to take care that the submitted text is correct. Only too often the Editor is asked to make a number of alterations or additions, which are not always clearly expressed or tidily presented.