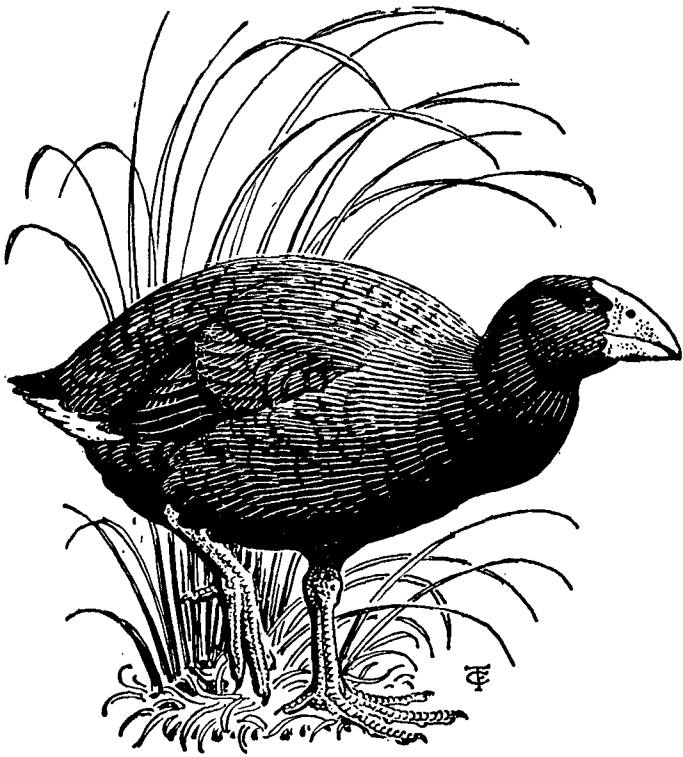


NOTORNIS

*Quarterly Bulletin of
The Ornithological Society of New Zealand*



Volume Seven, Number Eight : April 1958

NOTORNIS

In continuation of New Zealand Bird Notes

BULLETIN OF THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND
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NOTORNIS

VOLUME SEVEN NUMBER EIGHT : APRIL NINETEEN FIFTY-EIGHT

NOTES ON THE HEIGHT REACHED BY SOME SPECIES OF BIRDS ON THE MOUNTAINS OF THE NORTH ISLAND

By R. B. SIBSON

These notes are mainly the outcome of observations made since 1954 in the National Parks of Tongariro and Egmont. I have also thought it worthwhile to include jottings from Waikaremoana, and from Tauhara, the isolated volcanic cone situated near the northern end of Lake Taupo.

During three visits to the Tongariro National Park, January 10-20, 1954, January 21-23, 1955, January 20-26, 1957, I have covered by walking much of the country between 3,000 and 5,000 feet on the northern slopes of Ruapehu. In 1955 I stayed at the Dawson's Falls Hostel on the south-eastern side of Egmont from January 9-13; and on 9/5/56 a hasty visit was paid to the mountain immediately above the North Egmont Hostel, when a howling southerly was blowing. In 1956 I was at Waikaremoana from January 26-31; and on 19/1/57 I climbed Tauhara.

A.A. maps have been most helpful in obtaining the height above sea-level of conspicuous features of the landscape; and for the south-east sector of Egmont a splendid little map is issued by the Dawson's Falls Hostel. In estimating how high different birds go on the mountains of the North Island, I have found the following fixed points most useful.

(a) Tongariro: Junction of Mountain Road with National Park - Turangi Road, 2,900 feet; The Chateau, 3,710 feet; Salt Hut, 5,080 feet.

(b) Egmont: Dawson's Falls Hostel, 3,100 feet; Hooker Hut, 3,850 feet; Kapuni Lodge, 4,700 feet.

(c) Waikaremoana: Lake Waikareiti, 2,900 feet; Ngamoko trig, 3,644 feet.

(d) Tauhara, 3,608 feet.

In the Tongariro National Park between approximately 3,000 and 5,000 feet, great stretches of the northward-facing slopes of Ruapehu are open 'steppe' or moorland, where the scrub which may reach a height of three or four feet is a mixture of stunted manuka, *Dracophyllum*, *Hebe* (*buxifolia* and *tetragona*), *Olearia nummularifolia*, *Senecio bidwilli*, etc, with more open patches of tussock and bog.

Pipit, Skylark, Dunnock and Lesser Redpoll are the only birds which have a general distribution on these open slopes. The valleys of the mountain streams, e.g. the Wairere, below the Taranaki Falls and the numerous streams to the west of the Chateau are filled with forests in which beech (*N. cliffortioides*) is dominant, and there is a sprinkling of sizable toa-toa (*Phyllocladus alpinus*), Kaikawaka (*Libocedrus bidwilli*), pink pine (*Dacrydium bifforme*), papaumu (*Griselinia littoralis*), five-finger, etc. The upper edge of the beech forests is at about 4,200 feet. Lower down they may end sharply at the rims of the valleys, so that the abrupt change from beech forest to open country is a characteristic feature of this landscape. Rifleman, Pied Tit and Grey Warbler are plentiful throughout the beech forest in summer, and the Chaffinch has made itself thoroughly at home. Are they still there in winter when the snow on the mountain comes below the 4,000-foot level? In the shelter of the gully-heads above the beech-line there is often a dense scrub, including bog-pine (*D. bidwilli*), which harbours the hardiest of the

arboreal passerines, Grey Warbler, Redpoll, Dunnock, Chaffinch and Blackbird. Above 4,500 feet, except in a few sheltered niches, the vegetation quickly thins out till by 5,000 feet there is little but bare rock. Here are found the highest Pipits.

The mixed forest of the lower levels, e.g. at Ohakune, Erua, Waimarino, does not come within the scope of this paper.

The difference between the mixed forest of Egmont at 3,000 feet and the beechwoods of Ruapehu at the same height is quickly discernible even to the veriest amateur among botanists. On Egmont, towai (*Weinmannia racemosa*) and Kotukutuku (*Fuchsia excorticata*) are abundant up to, c. 3,500 feet, and probably account for the abundance of Tuis, Bellbirds and Silvereyes above 3,000 feet as contrasted with their scarcity even in the lower fringes of the Ruapehu beechwoods. But Rifleman, which are lovers of the beech and are common up to 4,000 on Ruapehu, are scarce at 3,000 feet on Egmont. As one ascends through the upper Egmont *Weinmannia-Fuchsia* forest, with its sprinkling of totara, kaikawaka, papaumu, etc. and the height of the trees declines, one reaches a distinct zone of tangled vegetation, 15-20 feet in height, in which, evidently attracted by the konini, Bellbirds are still common in summer. Above this is a well-marked zone of six-foot scrub dominated by woody *Senecio eleagni-folius*, *Hebe buxifolia* and *Cassinia fulvida* also being plentiful. This is the realm of the Dunnock and the Lesser Redpoll, whose breeding population between 3,500 and 4,000 feet on Egmont must be considerable. Grey Warbler, Chaffinch, Blackbird and Songthrush also breed in this scrub.

The track to the top of Ngamoko leads through mixed forest, which includes podocarps, nectar-producing trees such as rata and tawari (*Ixerba brexioides*) and many fine beeches. This rich variety is missing from Tauhara, on which there is no beech, podocarps are inconspicuous and the dominant tree is kamahi or towai. For help in the identification of plants, my thanks are due to Mr H. R. McKenzie.

In *Birds and Men* (1951) E. M. Nicholson mentions some heights in Britain and on the continent of Europe up to which he has found some of the species which are among the introduced birds of New Zealand. It is interesting to compare his figures with mine. In Britain he comments upon Skylarks at 2,000 feet in the Cheviots and Blackbirds at 1,400 feet in the Scottish Highlands. It is sometimes said that above 1,000 feet in Britain the Blackbird is replaced by the Ring Ousel (*Turdus torquatus*). Nicholson describes the Greenfinch as a lowland bird, his highest record being at 780 feet on the South Downs; Goldfinches are 'not much met with above the 1,000-foot contour', and of the Yellowhammer he says that he has never found it above 1,000 feet in England and Scotland. However, in the French Alps Goldfinch and Chaffinch went all the way from 2,370-5,300 feet, stopping lower than the Yellowhammer, which went up to 5,500 feet. In the High Pyrenees I have myself found Chaffinches just below 6,000 feet. In the Tirol and Switzerland, Dunnocks were present in conifer scrub at 6,500 feet.

These notes are only a beginning and make no claim to completeness. A critical reader will easily find gaps which he may be able to fill. There is no mention of certain species of which I have no personal experience, e.g. Kiwi (*A. australis*), which has a widespread, if discontinuous, distribution, Piopio (*Turnagra capensis*) and Bush Wren (*Xenicus longipes*), both of which have recently been reported from Waikareiti. Even petrels of one or more species qualify for inclusion, for there are old 'muttonbirding' sites on Ruapehu, Pihanga, Panekiri Bluff and probably elsewhere.

It is hoped that other observers will be spurred to make similar notes elsewhere, not only in the North Island, where Hikurangi (5,606 feet), near the East Cape, and the tops of the Kaimanawas, Ruahines and Tararuas should prove interesting; but also in the South Island, where the scope is unlimited.

NOTES ON VARIOUS SPECIES

- NEW ZEALAND DABCHICK.** The lakes of the volcanic plateau at c. 1,000 feet are a stronghold of this bird, which reaches its greatest height at Waikareiti. On 28/1/56 I was taken over much of this lake, but only noted one pair and a single bird. In 1946 K. M. Sorby saw a pair on Roto-pounamu under Pihanga. The Dabchick ought to be on Rotoaira; but there are no recent records.
- BLACK SHAG.** Visits Waikareiti and Rotoaira. Reported from Dawson's Falls by Mr and Mrs J. Prickett.
- WHITE-THROATED SHAG.** Present on Rotoaira.
- PARADISE DUCK.** I have never seen any in the Tongariro National Park, but am told that a pair breeds every year near The Chateau golf course.
- GREY-DUCK (and GREY-MALLARD CROSS).** Present on Waikareiti and Rotoaira.
- BLUE DUCK.** I have failed to find any on the higher streams among the beech forests of the National Park. There are said to be some lower down in the gorges.
- NEW ZEALAND SCAUP.** A flock of 26 and two separate pairs on Waikareiti on 25/1/56, where they evidently breed. These must be the highest Black Teal in the North Island. Another high lake where they breed is Rotoaira, where on 26/1/57 in one bay I saw c. 40, including three broods of four, three and two ducklings.
- HARRIER.** Widely distributed but not numerous in the Tongariro National Park, where it ranges up to c. 5,000 feet. On Egmont one was seen just below Fantham's Peak.
- BUSH-HAWK.** My only record of this bird above 3,000 feet is of one near the top of the Desert Road on 12/5/52. I had expected to find the Bush-hawk near The Chateau; but it seems that the beech forest is too sparsely populated with the larger forest birds on which it prefers to prey.
- BANDED DOTTEREL.** Though Oliver (*New Zealand Birds*, Ed. 2, 261) reports them from 4,500 feet on Mt Tongariro, I have not been able to find any; but I have not visited the shingle fan of the River Wangaehu to the east of Ruapehu. Dr O. F. Lamb was surprised to find a loose flock of about 20 birds daily during the third week of November, 1957, on the Chateau golf-links. In January, 1957, D. H. Binney saw a pair of Banded Dotterels, evidently breeding, in a bleak wilderness of bare rock near the top of Mt Tarawera at c. 3,600 feet.
- RED-BREASTED DOTTEREL.** According to Oliver (*New Zealand Birds*, Ed. 2, 258) this species 'has been observed at a height of 6,000 feet on Mt Egmont'. This is very puzzling, for such a habitat is so very different from the coastal dunes and beaches where this fine dotterel continues to thrive in the far north and the far south of New Zealand.
- BLACK-BACKED GULL.** c. 10 drifting over Rotoaira on 26/1/57 are the highest I have seen. This gull breeds on Lake Taupo; and may well do so at Rotoaira. I once wrote (Bulletin of the O.S.N.Z., II, 1941-1942, 8) 'I have been told that there is a small and rather inaccessible lake on Tongariro where "small" gulls nest. These might well be *L. bulleri*.' Black-billed Gulls and Red-billed Gulls visit Taupo. I have yet to find either species on or near Tongariro.
- BLACK-FRONTED TERN.** Reported (Buller: *History of the Birds of New Zealand*, 2nd Ed., 1888) formerly to have bred in some numbers on the upper reaches of Wangaehu; and seen by Stead (*Life Histories of New Zealand Birds*, p. 25) on the 'Waiouru plains'. Both authors may be referring to the same locality, the shingle fan and the Rangipo desert, east of Ruapehu. No recent records.

NEW ZEALAND PIGEON. Though the Pigeon is well distributed in the forest at c. 2,500 feet, e.g. near Erua and Pokaka, I have been unable to find it in the beech forest near The Chateau. On Egmont a few may be found in the mixed forest immediately above Dawson's Falls, two at c. 3,200 feet being the highest. Pigeons were seen near the top of Tauhara at c. 3,500 feet, but could not be found above c. 3,000 feet in the Waikaremoana bush.

N.I. KAKA. I have not been able to find the Kaka either in the Ruapehu beech forests or on Egmont. They are not uncommon in the bush around Waikareiti and have recently been reported by J. C. Clarke from the top of Tauhara.

YELLOW-CROWNED PARAKEET. The common Parakeet of the forest above Waikaremoana is the Yellow-crowned (*C. auriceps*); but according to G. E. Sopp the Red-fronted (*C. novaezelandiae*) also occurs, but is very rare. All the Parakeets which I could positively identify around Waikareiti, up the old Gisborne road and on Ngamoko were Yellow-crowned. In the Tongariro National Park I have seen only a single Parakeet. It was in flight above an isolated patch of bush near the Tawhai Falls at c. 3,100 feet.

SHINING CUCKOO. I have not heard a single Shining Cuckoo in the beech forest of the Tongariro National Park, where, in view of the abundance of the Grey Warbler, it is a surprising absentee. On Egmont it was frequently heard above 3,000 feet; and from one in the six-foot scrub at c. 3,500 feet came both the characteristic whistle and also the 'tsiu' call notes. Singing continued to the end of January at Waikaremoana.

LONG-TAILED CUCKOO. In mid-January a few Long-tailed Cuckoos are usually present in the Ruapehu beech forest on a level with the highest Whiteheads, i.e. 3,700 - 4,000 feet. In 1954 I located only one bird. In 1955 and 1957 calls were heard more frequently, but it is likely that they were made by only two or three birds, the highest being at Tirohanga Pai. On Egmont it was difficult to find Whiteheads at 3,000 feet; and I had to go as low as 2,600 feet to locate a Long-tailed Cuckoo. Both Whiteheads and Long-tailed Cuckoos were present near the tops of Ngamoko and Tauhara in mid-January.

MOREPORK. Occasionally heard on Ruapehu at 3,800 feet and up to 3,000 feet in Egmont.

NEW ZEALAND KINGFISHER. The highest birds I have seen have been near Pokaka and Erua at c. 2,500 feet.

RIFLEMAN. Plentiful in the beech forest to its upper limit on Ruapehu at c. 4,200 feet, probably outnumbering any other native passerine. Occasionally they may be seen in the scrub outside the beech forest. On Egmont they are not common above 3,000 feet. In mid-January, 1955, I saw only three family parties near Dawson's Falls, the highest being at 3,200 feet. There are a few on Tauhara and they reach the top of Ngamoko.

FANTAIL. Apparently not common anywhere above 3,000 feet. On my first two visits to The Chateau I was struck by the scarcity of Fantails in the beech forest, through which it is possible to walk for miles without seeing or hearing one. During several visits to the woods below the Taranaki Falls, I have seen only one Fantail in them. On my third visit to The Chateau, the only two Fantails I found were at 3,700 - 3,800 feet. On Egmont my first impression was that Fantails were scarce above Dawson's Falls, and this was confirmed as I walked the numerous tracks on subsequent days. The highest was at c. 3,500 feet in the sub-alpine scrub. Both on Tauhara and Ngamoko, Fantails are inconspicuous, at least in mid-January when I have visited them.

PIED TIT. One of the three commonest native passerines in the beech forest of Ruapehu. In mid-January as one comes down the mountain, the

'wheedle' song of the Pied Tit is heard as soon as the forest is entered, so that many Pied Tits must breed as high as 4,000 feet. On Egmont Pied Tits are plentiful at 3,000 feet and just reach into the 15 - 20-foot zone of bush; but though Fleming (T.R.S.N.Z. 78; 35, 1950) allows it up to 4,000 feet in Egmont National Park, I have not seen one above c. 3,500 feet on the south side of the mountain. On the north side P. W. Law recently recorded one at 4,000 feet. On Tauhara and Ngamoko Pied Tits are generally distributed all the way to their tops.

N.I. ROBIN. The beech forest at 3,000 feet is evidently unsuitable for this bird. The highest localities where, according to Fleming (T.R.S.N.Z. 78; 133, 1950), it may be found in the mixed forest to the west and south of Ruapehu are at c. 2,000 - 2,500 feet.

N.I. FERNBIRD. In the Tongariro National Park there is a flourishing colony of Fernbirds just above 3,000 feet in the swampy ground, now much overgrown with Ling (*Calluna*) and Bell-heather (*Erica*) to the west of the Tawhai Falls. I heard a Fernbird calling here on 19/1/54, and my wife and I located several on 24/1/57.

WHITEHEAD. Not a common bird in the beech forest, but a few may usually be found in mid-January near The Chateau at c. 3,700 feet and occasionally up to c. 4,000 feet. Thus on a walk westwards to Tirohanga Pai on 25/1/57, Whiteheads were seen in four places, but the total number of birds was only 10 - 12. As they are so noisy, there is no excuse for missing them; yet I have only once met with Whiteheads in the pleasant beechwoods which fill the valley below the Taranaki Falls. On the south-east slopes of Egmont, Whiteheads scarcely reached 3,000 feet in mid-January, 1955. The highest I could find were along Cossey's Track. They were noisily present at the tops of both Tauhara and Ngamoko when I climbed them.

GREY WARBLER. This small hardy bird has a strong claim to be recognised as the most successful of the native arboreal passerines. It is one of the three commonest indigenous birds in the beech forest of Ruapehu and is present up to 4,500 feet in nearly every sheltered gully-head where bog-pine and mixed scrub reach a height of c. six feet. On Egmont it is not uncommon in the sub-alpine scrub, dominated by *Senecio eleagnifolius*. Below Warwick Castle, Grey Warblers were singing in sheltered gullies not far below 5,000 feet.

NEW ZEALAND PIPIT. Widely distributed in the open country up to c. 5,000 feet and perhaps sometimes higher, the New Zealand Pipit has shown remarkable ability in adapting itself to a variety of habitats from sea-level to the snowline in the mountains, so that it is quite at home as a breeding bird in the different ecological niches which in Europe are occupied by Rock (*A. petrosus*), Meadow (*A. pratensis*), Tree (*A. trivialis*), Alpine (*A. spinoletta*) and Tawny (*A. campestris*) Pipits. The New Zealand Pipit freely perches. I have seen one alight 30 feet up in a dead tree, and in the sub-alpine scrub Pipits often perch, chatlike, on bushes of hebe, senecio and olearia.

BELLBIRD. On Ruapehu I have occasionally found them up to c. 3,800 feet, but they are uncommon above 3,000 feet in the beech forest. In mid-January, 1957, I did not hear a single Bellbird near The Chateau, though I thought they might be attracted by the prolific flowering of the Red Mistletoe on the beeches. On Egmont, Bellbirds are plentiful above 3,000 feet, where their upward range extends into the 15 - 20-foot zone of mixed forest at c. 3,000 feet, where the Fuchsia (*F. excorticata*) is still abundant. The calls of Bellbirds were often heard in the crater at the top of Tauhara.

TUI. Rare on Ruapehu above 3,000 feet. I have twice located single birds just above the Tawhai Falls, where the attraction seems to be a small quantity of Flax (*P. tenax*) growing in a swamp. From the beech forest

proper they seem to be entirely missing. On Egmont, Tuis are much more in evidence at 3,000 feet than on Ruapehu; but they are outnumbered by the Bellbirds. I did not find any Tuis in the 15-20-foot zone. When I was on the top of Tauhara two Tuis flew overhead.

WHITE-EYE. Scarce in the beech forest, where a few may occur up to 3,800 feet. The biggest flock I saw in January, 1954, was 10; there was a small flock by the Chateau tennis courts on 23/1/55; but in mid-January, 1957, no such flocks were seen and Silvereyes were generally very scarce, and none was seen feeding at the flowers or the Red Mistletoe. On Egmont, White-eyes are plentiful above 3,000 feet and up into the sub-alpine scrub at 3,600 feet. One party was seen in stunted *Senecio eleagnifolius* at c. 4,000 feet. On 9/5/56 hundreds were seen in cold, wet weather at 3,200 feet above the North Egmont Hostel. White-eyes were plentiful on Tauhara and Ngamoko to their tops.

INTRODUCED SPECIES

SKYLARK. Generally distributed in the open country on Ruapehu up to about 4,500 feet. On 18/1/54 I was surprised at the number singing between the Taranaki Falls and the Tama Lakes. I have no note of Skylarks high on Egmont, but feel they must occur in the tussock country, e.g., near Warwick Castle.

SONGTHRUSH. The volume of song in mid-January indicated a flourishing population along the edge of the Ruapehu beechwoods up to c. 4,000 feet. On Egmont they are plentiful in the mixed forest at 3,000-3,500 feet. I have heard one singing at 3,800 feet and once saw a single bird in open country not far below 5,000 feet.

BLACKBIRD. Outnumbers the Songthrush both on Ruapehu and Egmont and generally goes higher. On Ruapehu they extend into the scrub of sheltered gullies up to c. 4,500 feet. I have seen one feeding on the open steppe above Silica Springs, probably on the berries of *Podocarpus nivalis*. On Egmont they are not uncommon in the six-foot scrub zone. On 11/1/55 I heard full song at c. 4,200 feet.

DUNNOCK. Widely distributed on Ruapehu, where the scrub reaches a height of a few feet. Above Silica Springs I have found them in sheltered gullies nearly up to 5,000 feet. On Egmont the Dunnock is one of the common birds of the six-foot scrub zone at 3,500-4,000 feet. At their highest I have heard them near Kapuni Lodge (4,700 feet) and a little below Warwick Castle. On Tauhara, Dunnocks have reached the summit crater.

GREENFINCH. Breeding in some numbers near Lake Rotoaira at c. 2,000 feet in January, 1957.

GOLDFINCH. I have not found this bird in the Tongariro National Park, nor in the vicinity of Dawson's Falls in January. A single wind-blown bird was seen above Stratford House at c. 3,200 feet on Egmont on 9/5/56.

LESSER REDPOLL. Thinly distributed on Ruapehu up to c. 4,500 feet. A common bird high on Egmont, breeding in the six-foot scrub at 3,500-4,000 feet. A small flock was seen at c. 5,000 feet.

CHAFFINCH. Undoubtedly the most successful of the introduced birds both in the beech forest of Ruapehu and in the mixed forest of Egmont. The frequency of song is a sure guide to its abundance; and at some times of the day in mid-January it is the dominant singer above 3,000 feet. Around The Chateau it is not confined to the beech forest, but occurs in small isolated pockets of stunted trees, e.g. near the Tama Lakes and in the scrub of gully-heads at c. 4,500 feet, some hundreds of feet above the upper level of the beechwoods. On Egmont it is still plentiful in the six-foot scrub zone at c. 3,500-4,000 feet. Needless to say, there are Chaffinches at the tops of Tauhara and Ngamoko.

YELLOWHAMMER. Does not appear to be common above 2000 feet, i.e. above Rotoaira, though I have found it breeding at c. 2,700 feet near National Park. On 12/5/53 I noted a small flock on the Desert Road at c. 3,000 feet. On Egmont I have not found it above c. 1,700 feet. On 27/1/56 Yellowhammers were singing up the old Gisborne Road, Wai-karemoana, at c. 2,200 feet.

HOUSESPARROW. A colony is attached to The Chateau village. Some breed in the beech forest nearby, but they do not wander far. There were none at Dawson's Falls in mid-January, 1955.

STARLING. A few pairs breed near The Chateau. In January, 1954, the greatest number seen together was six; but on 25/1/57 I counted 15 homing to roost in a beech copse just behind The Chateau. None noted near Dawson's Falls in January, 1955.

MYNA. In recent years I have several times travelled over the Mamaku. It was not till January, 1957, that I saw Mynas along the highest stretch of the road at a little over 2,000 feet.

WHITE-BACKED MAGPIE. A few have frequented the golf course at The Chateau for some years. They do not increase. I saw four on 17/1/54 and two on 23/1/57.

THE DISTRIBUTION OF *DIOMEDEA* IN EASTERN AUSTRALIAN WATERS: NORTH OF SYDNEY

By L. AMIET

It would appear that there is some scope for field observations on the movement of oceanic birds during the different seasons; especially those species breeding in high latitudes and wandering far from their breeding islands after rearing their young.

Between April, 1954, and October, 1956, I made some 22 return voyages between Sydney and Mackay, Townsville or Cairns, and during that period a comprehensive log was kept of all oceanic birds identified through 7X binoculars. For many months of each year the different species of albatross following the ship were a feature, and as for the most part they were readily identified, detailed notes were taken on their distribution.

Some four species of *Diomedea* were identified with certainty, and on the description of D. L. Serventy and H. M. Whittell (1951; 112) it was considered that a fifth, *D. chrysostoma*, was seen on two occasions. Though it is difficult to differentiate between this species and *D. chlororhynchos* in the field, the two birds observed differed from the normal adult Yellow-nosed Mollymawk to such a degree that it seems highly probable that they were Grey-headed Mollymawks.

The northern distribution of the species under consideration seems to be primarily controlled by the general weather conditions, air and sea temperatures and the breeding season. It is doubtful if natural food would be a governing factor of those birds ranging farthest north as they followed and fed on the ships' refuse.

Marshall Laird (1956; 226) advances from his own observation, the highest tolerated sea and air temperatures of 71° and 70° respectively, for both *D. exulans* and *D. melanophris*. Except for isolated instances in the case of the former species, this air temperature is roughly in accordance with my findings, while the sea temperature would be some two to four degrees higher in the present case. The air temperature toleration of *D. chlororhynchos* would be five degrees below Laird's reading for the previous species, and that of *D. chrysostoma* and *D. cauta* apparently lower by a further three to five degrees. All species were sighted farthest north during strong south-easterly or south-westerly winds, usually during or immediately

after a polar cyclone with consequent strong gales, further south in Bass Strait and the Tasman Sea. In calm weather, even in June or July, on occasion no albatross would be seen during a voyage through an area where they were plentiful in a moderate south-easterly gale even as late in the season as October. The northern movement must also be effected by the breeding cycle of these species. Apart from the Shy or White-capped Mollymawk, they breed well to the south of the area of this survey. L. E. Richdale (1952; 101) tabulates the various dates of apparent arrival at breeding stations of all species under review. If the controversial question of the breeding cycle of the Wandering Albatross is dismissed for the time and only the Mollymawks are considered, breeders of one or other of these species are at their breeding stations between August and the following June according to this table.

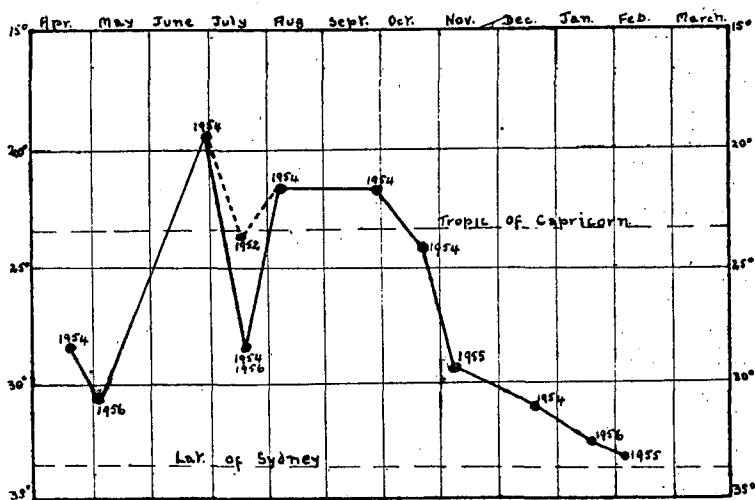
During the period of my log it was found that most oceanic birds breeding in sub-Antarctic and Antarctic waters moved furthest north during 1954. Such findings are in agreement with facts published by K. A. Hindwood and A. R. McGill (1955; 148) and by J. C. Davenport and R. B. Sibson (1955; 155). The former authors reported the recovery of southern breeding oceanic birds rarely seen in Australian waters, from the beaches of central New South Wales; the latter writers discuss the recovery of rarely seen species from the west coast of New Zealand, near Auckland. Both articles stress the apparent irruption of great numbers of the more commonly seen species and their many casualties on the beaches after storms during the winter of that year. In 1954, apart from the different species of *Diomedea*, upwards to 20 Cape Petrels (*Daption capensis*) followed the ship as far north as Brampton Island (Lat. 20° 35' S) on July 28, and a Prion (*Pachyptila* sp.) was seen off Green Island (Lat. 16° 45' S) near Cairns on August 22. This was many degrees to the northward of the usual range of these birds.

WANDERING ALBATROSS (*Diomedea exulans*)

This species was observed in the area under observation during every month of one year or another, except March. In a review of the seabirds off Malabar, Sydney, K. A. Hindwood (1955; 213) makes mention of hundreds of this species present between May and mid-November, with the December population seldom exceeding 30 or 40 birds; while only a few or none at all were present during January and February; birds again returning by the end of April. It will be noted that no mention was made of the species during March. In January and February I did not record the species north of Newcastle (Lat. 32° 55' S), and then it was seen on only one occasion in each month. R. B. Sibson (1951; 158) on a voyage from Sydney to Wellington first noted the species in the vicinity of Lat. 36° S on February 10, 1951. Thus it would appear that Lat. 33° S is about the northern limit of the species under the usually prevailing conditions in those two months and that the northerly range is further restricted in March. My most northerly sighting was on June 29, 1954. The previous day four birds had followed as far north as Brampton Island. Apparently one of these, an immature bird, followed the ship through the Whitsunday Passage and finally left at Holbourne Island (Lat. 19° 43' S). It must be mentioned that my vessel anchored for several hours in the Whitsunday Passage during the night. This was by far the most northerly observation, and even under conditions most suitable to the species, birds were on no other occasion seen north of High Peak (Lat. 21° 57' S). Several birds followed as far as that island on both August 6 and September 28, 1954. There would appear to be a sequel to my most northerly observation. I quote Marshall Laird (1956; 223): the parentheses are his. 'It was pointed out by the second officer that the ship's log carries an entry to the effect that an "albatross" was following behind on the previous southward voyage from Singapore (June 30, 1954) in 19° 34' S, 148° 06' E (75 miles E.S.E. of Townsville). Some of those on board remembered the occurrence quite well

and from their descriptions it would appear that the bird was almost certainly a Wandering Albatross.' This ship, the M.V. *Wairimu*, was south bound and on the day following my observation from a north-bound ship, it sighted this albatross some nine miles north of the point where such a bird had left our vessel; probably it was the same individual. The fact that a log entry was made on the M.V. *Wairimu* would indicate that an albatross in these waters was an unusual occurrence. Another episode, which tends to bear out that it was a stranger thereabouts, was an attack made on the bird by a pair of ospreys in the Whitsunday Passage. They made a combined stoop on it. The albatross immediately sat on the water and with neck and bill upturned prepared to defend itself. It apparently looked formidable to its attackers, as after circling closely for about a minute they flew off towards land, about a mile distant.

L. E. Richdale (1952; 119) suggests that the Wandering Albatross breeds every two years; W. R. B. Oliver (1930) and others state that it is a yearly breeder; all seem to agree though that nesting begins about the same time of the year, in December and January. In either case, whether it is an annual or biennial breeder, the breeding season would have a definite effect on the northern distribution of the species, and would be one of the factors governing the small numbers seen north of Sydney between late November and February. As no birds were seen during March and if Richdale's assumption, on the authority of others, that birds breeding the previous year have all left their breeding stations by mid-January (1952; 101) and that fledglings have left by early February (1952; 98) is correct; it would seem that some other factor retards the northern movement at this time of the year. My notes show that young birds in dark plumage were commonly seen during the late autumn and early winter months. Such birds seldom ranged north of Cape Moreton (Lat. 27° 02' S), nor in any part of the area later than September. W. B. Alexander (1955; 7) describes the female as having a dark cap on the crown. It was seldom that birds marked in this manner were observed in the survey area and when seen were always towards its



southern limits. Possibly adult females do not usually wander far from breeding stations. It was the adult male and immature of unknown sex that ventured farthest north, though old males in the 'Snowy' phase were not seen north of Lady Elliott Island (Lat. 24° 07' S). Those birds whose

upper wings contained more dark than white feathers, in accordance with Alexander's drawing (1955; pl. 4), were considered immature. It was birds in this phase that were commonly seen between October and February. The only bird seen in the last-mentioned month was in this plumage phase. Whether birds in this plumage breed is a debatable question; more data is required from the breeding stations before the effect of the breeding cycle and season on the northern dispersal of this species can be satisfactorily explained.

The graph of the distribution of this species explains the fluctuation of northern movement during the time under review. It must be stated, though, that the voyage made during July, 1954, was under unusually calm conditions following cyclonic weather experienced off the central New South Wales coast between July 11 and 14 and reported by K. A. Hindwood and A. R. McGill (1955; 148), and the steep drop in the distributional curve for that month is hardly a true indication. The inserted broken line representing a former observation in 1952 is indicative of a more northerly movement in that month.

Hereunder are tabulated some definite distributional information appertaining to the northern movement of the species, together with my most northerly observation for each month present in the survey area. It will be noted that the only records available for north of the Tropic of Capricorn are those for the eastern coast of Australia and inside the Great Barrier Reef.

**DISTRIBUTIONAL DATA ON NORTHERN LIMITS OF RANGE OF
WANDERING ALBATROSS**

Month & Year	Position	Authority
January 1956	32° 55' S 151° 54' E	Own Observation
February 1955	33° 48' S 151° 20' E	Ditto
*February 1951	36° 00' S 156° 30' E	R. B. Sibson (1951)
March 1951	36° 52' S 143° 43' W	Marshall Laird (1956) ¹
April 1954	28° 37' S 153° 47' E	Own Observation
May 1956	30° 55' S 153° 08' E	Ditto
May 1955	31° 25' S 152° 57' E	Ditto
June 1954	19° 24' S 148° 06' E	Marshall Laird (1956) ¹
June 1954	19° 43' S 148° 24' E	Own Observation
June 1956	26° 23' S 153° 38' E	Ditto
June 1955	27° 02' S 153° 39' E	Ditto
July 1952	24° 03' S 152° 48' E	Ditto
July 1954	28° 16' S 153° 46' E	Ditto
July 1956	28° 16' S 153° 40' E	Ditto
July —	28° 18' S 177° 00' E	P. Jespersen (1933) ²
July —	31° 48' S 144° 55' W	C. A. Fleming (1950) ²
July 1955	32° 24' S 152° 38' E	Own Observation
August 1954	21° 57' S 150° 15' E	Ditto
August 1955	29° 25' S 153° 39' E	Ditto
*September 1926	20° 00' S 149° 00' E	W. MacGillivray (1927)
September 1954	21° 57' S 150° 15' E	Own Observation
September 1956	25° 04' S 153° 28' E	Ditto
September 1951	25° 30' S 169° 00' W	J. D. MacDonald & P. A. Lawford (1954) ²
*September 1941	27° 00' S 166° 00' E	Own Observation
*September 1954	27° 20' S 154° 00' E	Marshall Laird (1956)
September 1955	30° 55' S 153° 10' E	Own Observation
September —	32° 00' S 125° 00' W	C. A. Fleming (1950) ²
October 1954	24° 07' S 152° 50' E	Own Observation
October 1955	27° 02' S 153° 43' E	Ditto
October 1956	27° 27' S 153° 43' E	Ditto
October —	29° 20' S 136° 45' W	C. A. Fleming (1950) ¹
November 1955	29° 30' S 153° 31' E	Own Observation
November 1954	33° 48' S 151° 20' E	Ditto
December 1954	30° 55' S 153° 16' E	Ditto

*Position approximate but correct to 30'

1. Authorities quoted by Marshall Laird (1956; 226)

2. Authorities quoted by J. D. MacDonald & P. A. Lawford (1954; 14)

BLACK-BROWED MOLLYMAWK (*Diomedea melanophris*)

This species was observed in the area under review in all months except February and March. Except for January, May and November, the most northerly sightings were in 1954. In 1956 the species was rather poorly represented, though it was seen as far north as Breaksea Spit light vessel

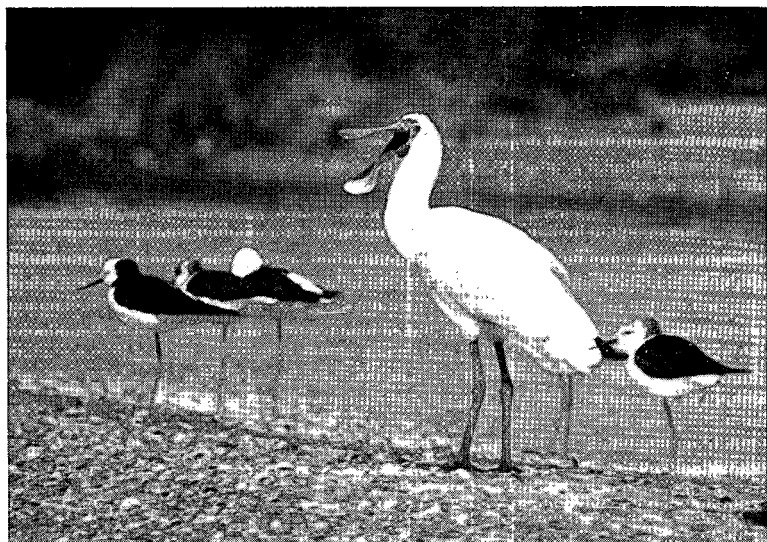


PLATE XIII: ROYAL SPOONBILL

A few pairs of Royal Spoonbills nest at Okarito and a dozen or so birds now winter regularly in the Manawatu estuary; but the unusual number of reports from northern New Zealand in 1957 suggests a further minor invasion from Australia.

All photographs by G. J. H. MOON

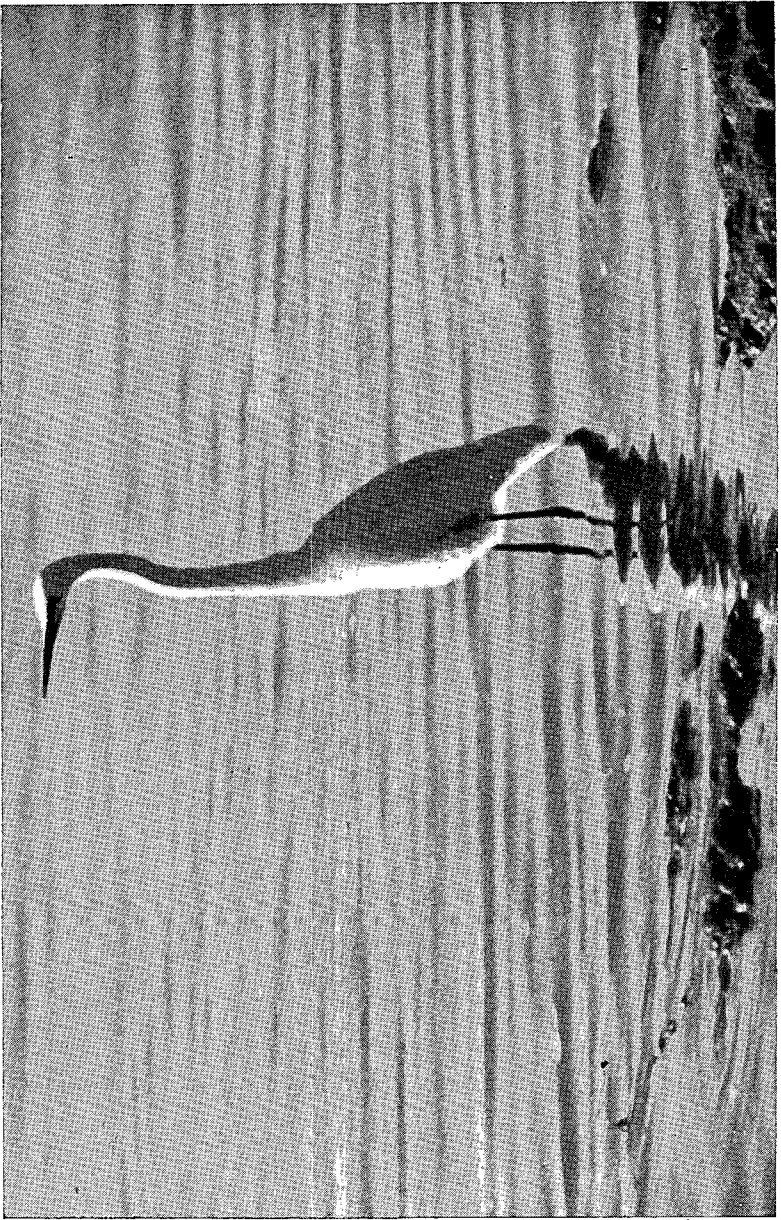


PLATE XIV: GREAT WHITE HERON (KOTUKU)

Unprecedented numbers of Great White Herons were reported during the winter of 1957; and in some coastal areas enough have remained throughout the summer to justify talking of 'flocks of non-breeders'. In this picture the typical kink in the neck is well shown.



PLATE XV: WHITE-FACED HERON

The recent remarkable spread of the White-faced Heron throughout New Zealand has been noted in Notornis. It is now the commonest heron in the country.

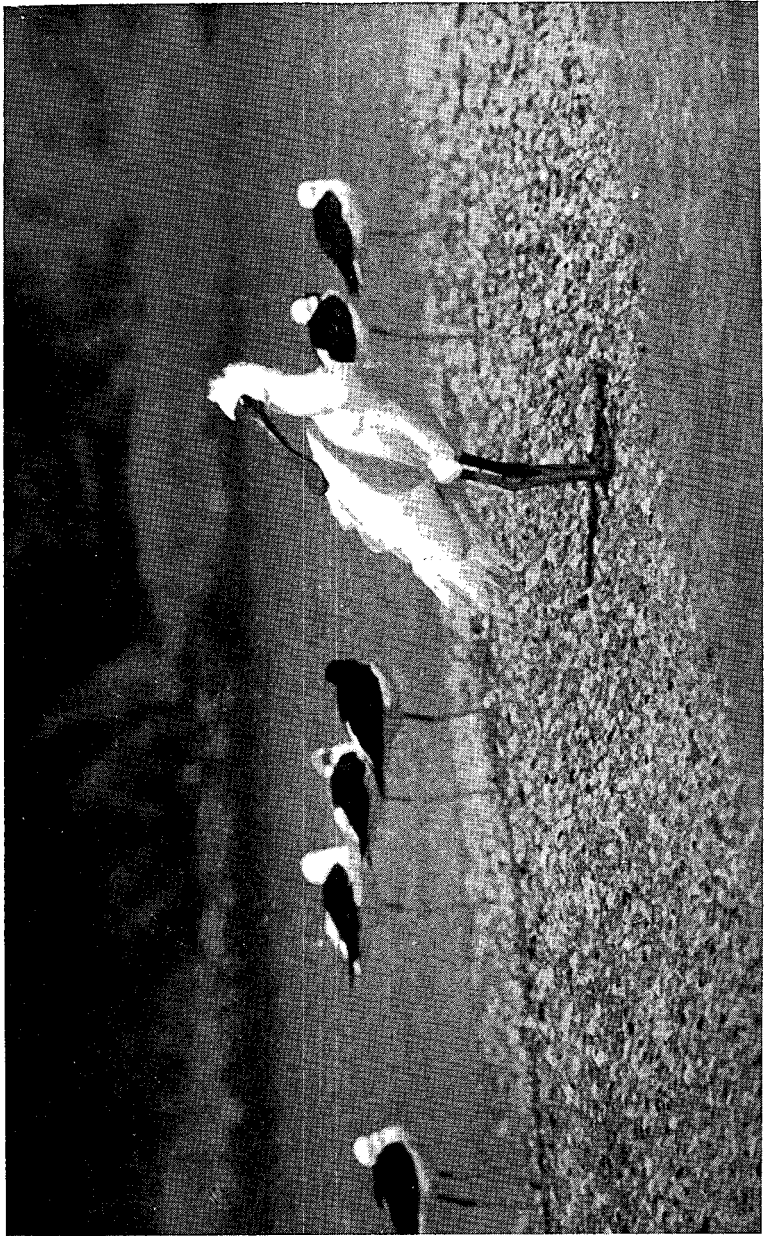


PLATE XVI: ROYAL SPOONBILL

The Royal Spoonbill shown in these photographs frequented Matakana Sandspit, near Warkworth, from May to September 1957. Pied Stilts were its constant companions.

(Lat. 24° 24' S). The absolute northern limit during this survey was off Lady Elliott Island, some 40 miles south of the Tropic of Capricorn. There is some similarity between the distributional curve of this species and that of the Wandering Albatross, particularly in the gradual downward incline between August and the end of the year.

L. E. Richdale (1952: 101), on the authority of Sorensen, states that this species, a yearly breeder, arrives at the breeding stations during early October and departs in early June. My observations show that a very high percentage of birds in immature plumage were present between August and December; this would tend to illustrate that most of the adult population had left for their breeding stations by August. Again, it was the immature birds that were usually seen furthest north in any season. Possibly a greater percentage of the young of the season, said to leave their nests in early June, and others that have not yet attained full sexual maturity wander further from the breeding stations than fully adult birds.

It would appear that at least some birds undergo a form of moult during August and September. During those months individuals were seen with wing primaries missing. This was the only albatross heard. When disputing with skuas the possession of refuse thrown overboard, a bird uttered a harsh call which could be described as 'Yarr-rak'. On another occasion a bird of this species, with much wing flapping, totally submerged when attempting to feed on ship's scraps.

The northern limits of *D. melanophris* as observed under different months of the survey, together with some observations of other field workers, is tabulated below.

DISTRIBUTIONAL DATA ON NORTHERN LIMITS OF RANGE OF
BLACK-BROWED MOLLYMAWK

Month & Year	Position	Authority
January 1956	32° 56' S 151° 53' E	Own Observation
January —	44° 23' S 176° 40' E	P. Jespersen (1933) ²
*February 1951	35° 30' S 156° 15' E	R. B. Sibson (1951)
March —	39° 52' S 156° 50' W	Marshall Laird (1951) ¹
April 1954	28° 37' S 153° 45' E	Own Observation
May 1956	28° 37' S 153° 42' E	Ditto
May 1955	28° 50' S 153° 42' E	Ditto
May —	33° 32' S 153° 04' W	C. A. Fleming (1950) ¹
June 1954	24° 24' S 153° 15' E	Own Observation
June 1955	28° 11' S 153° 42' E	Ditto
June 1956	30° 50' S 153° 10' E	Ditto
July 1954	24° 07' S 152° 48' E	Ditto
July 1956	24° 24' S 153° 15' E	Ditto
July 1955	27° 02' S 153° 39' E	Ditto
July 1951	28° 48' S 169° 26' E	J. D. MacDonald & P. A. Lawford (1954) ²
July —	36° 00' S 156° 50' W	C. A. Fleming (1950) ²
August 1954	24° 07' S 152° 48' E	Own Observation
August 1955	29° 25' S 153° 30' E	Ditto
September 1951	25° 30' S 179° 00' W	J. D. MacDonald & P. A. Lawford (1954) ²
September 1954	25° 57' S 153° 18' E	Own Observation
September 1955	28° 51' S 153° 38' E	Ditto
September 1956	29° 25' S 153° 26' E	Ditto
October 1954	28° 02' S 153° 38' E	Ditto
October 1956	31° 25' S 153° 06' E	Ditto
October 1955	31° 51' S 152° 48' E	Ditto
October —	38° 00' S 145° 00' W	C. A. Fleming (1950) ²
November 1955	32° 45' S 152° 18' E	Own Observation
November 1954	33° 51' S 151° 20' E	Ditto
December 1954	31° 51' S 152° 48' E	Ditto

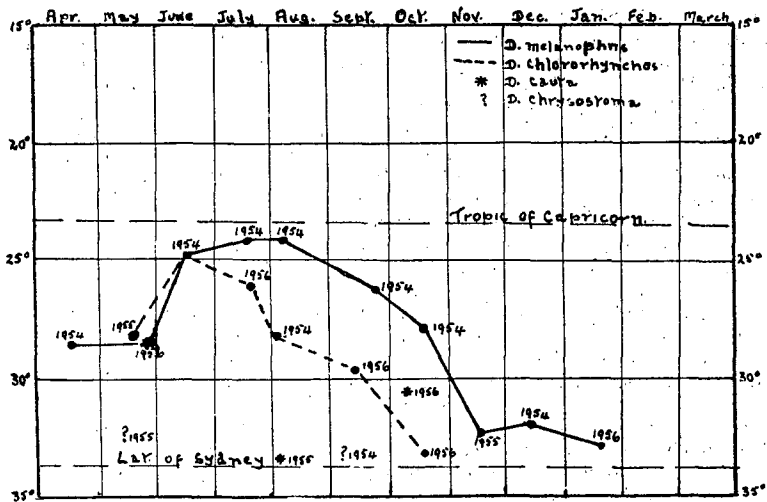
*Position approximate but correct to 30'

1. Authorities quoted by Marshall Laird (1956: 226)

2. Authorities quoted by J. D. MacDonald & P. A. Lawford (1954: 14)

YELLOW-NOSED MOLLYMAWK (*Diomedea chlororhynchos*)

A glance at the graph reveals that this species had a more limited distribution within the surveyed area than either of the two species already considered. It was not seen prior to May and never later than October, though it was observed in all intervening months. It was most prevalent in 1956, but in



Northerly Distribution Mollymawks April 1954/October 1956

1954 ranged furthest north, reaching Breaksea Spit light vessel. A number of immature birds of this species was seen during 1956. Their bills were darker than those of the immature Black-browed Mollymawk and with the sharply defined and more extensive area of white on the under wing were diagnostic. L. C. Richdale (1952; 98), on the authority of Broekhuysen and Macnae, gives mid-April as the time of departure of fledglings from breeding stations. Those in immature plumage seen by me in late winter and early spring could possibly have been first-year birds. Again referring to Richdale (1951), his authority being again Broekhuysen and Macnae, he advises that breeding birds depart from breeding stations in mid-April and probably return by the end of August. There was a sharp decline in the number of adult birds each year of the survey during August, though this species was never numerous. The greatest number ever observed following the ship at one time was seven on July 24, 1956, when off Byron Bay (Lat. 28° 37' S). Such adults as was seen by me in October were possibly birds that had not reached sexual maturity, as this species appears to breed yearly, and by that date intending breeders should have been at the nesting localities far to the south.

Most information of the northern range of this species to hand is of a general nature, but D. L. Serventy and H. M. Whittell (1951; 112) refer to birds attending fishing boats in the northern part of Sharks Bay, Western Australia (approximately 24° 44' S); this is almost as far north as my most northerly observation. These above authors also, on the authority of Dr C. A. Gibson-Hill, relate the finding of a dying bird at the Cocos-Keeling Islands (approximately 12° S, 97° E) in July, 1941. Surely a remarkable record for any of the mollymawks. K. A. Hindwood (1940) makes mention of sightings and of specimens taken from the vicinity of Sydney during autumn and winter months. Where dates were included, the approximate position of these birds has been included in the table below.

DISTRIBUTIONAL DATA OF NORTHERN RANGE OF
YELLOW-NOSED MOLLYMAWK

Month & Year	Position	Authority
*March 1933	34° 00' S 151° 15' E	K. A. Hindwood (1940)
May 1955	26° 16' S 153° 38' E	Own Observation
May 1956	28° 37' S 153° 42' E	Ditto
June 1954	24° 24' S 153° 14' E	Ditto
June 1956	30° 56' S 153° 16' E	Ditto

June 1955	32° 45' S 152° 17' E	Ditto
*June 1940	33° 35' S 151° 23' E	K. A. Hindwood (1940)
*July 1941	12° 00' S 97° 00' E	D. L. Serventy & H. M. Whittell (1951)
July 1956	25° 56' S 153° 15' E	Own Observation
July 1955	27° 55' S 153° 43' E	Ditto
August 1954	28° 16' S 153° 38' E	Ditto
August 1955	29° 25' S 153° 27' E	Ditto
*August 1927	33° 50' S 151° 15' E	Kinghorn (1928) ¹
September 1956	29° 22' S 153° 27' E	Own Observation
October 1956	33° 16' S 151° 39' E	Ditto

*Position approximate but correct to 30'
1. Authority quoted by K. A. Hindwood

WHITE-CAPPED MOLLYMAWK (*Diomedea cauta*)

This would appear to have the most localised distribution of any of the species of albatross frequenting eastern Australian waters. Although it breeds on Albatross Island (Lat. 40° 22' S) in Bass Strait, it was seen north of Sydney on only two occasions: once some miles south of Newcastle on August 8, 1955, and again on October 10, 1956, when 15 miles north of Tacking Point in Lat. 31° 10' S. As this species does not follow ships in these waters, more may have been in the area under review, but if it had been common it would have come within the range of binoculars more often.

W. R. B. Oliver (1930) describes its general distribution as Southern Indian and Pacific Ocean from the Cape of Good Hope to South America. L. E. Richdale (1952; 101), quoting Oliver and also Armstrong, states that birds are at the breeding stations from about the end of August to mid-April. The only useful data to hand regarding northerly distribution is tabulated below, together with the two lone individuals seen by myself and are not sufficient to give any indication of the breeding season on the northern limit of the species' range.

DISTRIBUTIONAL DATA: RANGE OF WHITE-CAPPED MOLLYMAWK

Month & Year	Position	Authority
*January 1925	25° 32' S 138° 40' E	H. T. Condon (1946)
*April 1924	25° 31' S 138° 47' E	H. T. Condon (1946)
August 1955	33° 00' S 151° 53' E	Own Observation
October 1956	31° 10' S 152° 57' E	Ditto
*October 1926	38° 39' S 144° 53' E	W. MacGillivray (1927)
*November 1895	34° 00' S 151° 10' E	K. A. Hindwood (1940)

*Position approximate but correct to 30'

GREY-HEADED ALBATROSS (*Diomedea chrysostoma*)

If one is to use the description of Serventy and Whittell (1951; 112) as a guide, two birds of this species were seen: the first off Newcastle on September 20, 1954, and the other off Sugarloaf Point (Lat. 32° 26' S) on May 29, 1955. The head and neck of the birds in each case were of a slaty grey colour and the under-wing was white, fringed with a narrow margin of black. It was also noted that there was a yellow stripe along the ridge of the black upper mandible. W. B. Alexander (1955; 11) states: 'This species can only be distinguished with certainty from the Yellow-nosed Albatross by the form of the culminicorn (superior plate of the bill), which is rounded posteriorly. Its head is usually grey, and the bill dark grey with a yellow line along the lower mandible. Its range is more southerly than that of the Yellow-nosed Albatross so that it is rarely seen on the routes of passenger steamers.' This latter description leaves some doubt as to the correct identification of these two birds.

Like the other mollymawks, this is said to be a yearly breeder. L. E. Richdale (1952; 101), on the authority of Sorensen, states that the time spent at the breeding stations is from early October to early June. My observations just fell within the period adult birds would be ranging over the ocean.

Little seems to have been written of the northerly range of the species. W. R. B. Oliver (1930) does mention that specimens have been taken off Great Barrier Island (Lat. 36° 10' S), and at other points south, in New

Zealand waters, and that observations have been made in sub-Antarctic seas to the south of New Zealand; no dates were furnished. K. A. Hindwood (1940) states that the only definite record for New South Wales was of a bird collected in Port Jackson in 1931.

DISTRIBUTIONAL DATA: RANGE OF GREY-HEADED MOLLYMAWK

Month & Year	Position	Authority
April 1931	33° 51' S 151° 15' E	K. A. Hindwood (1940)
May 1955	32° 26' S 152° 35' E	Own Observation
September 1954	32° 53' S 151° 52' E	Ditto
*_____	36° 10' S 175° 18' E	W. R. B. Oliver (1930)

*Position approximate but correct to 30'

SUMMARY

This paper constitutes a survey of *Diomedea* along the eastern coast of Australia, north of Sydney. The northern limits of the five species during the different months of the year have been emphasised by means of graphs and tables; the possible effect of the reputed breeding seasons on their northerly dispersal has been discussed, and comments have been made on some unusual occurrences within the area of review.

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THE WESTLAND PETREL

By R. JACKSON

During the three seasons 1954-56 I had the opportunity to study the Westland Petrel (*Procellaria westlandica*) in the colony at Barrytown, 22 miles north of Greymouth. This petrel (¹), closely related to *P. parkinsoni* and *P. aequinoctialis*, is peculiar in that it begins nesting in the autumn.

BREEDING CYCLE: In late March and early April the petrels return to the colony, occupy and clean out the burrows. The extent of this preliminary cleaning work may be gauged by the example of a burrow which was opened to gain access to the nest in 1955 and which was extended four feet in 1956. Another burrow was extended two feet in May, 1956. On 8/4/56 half the burrows could be recognised as occupied by the fresh soil at the mouth; and in many of them a single petrel or a pair could be found resting during the day.

Every evening during April many petrels noisily return. Throughout the night birds may be heard on the wing, and many, single or paired, wander about the colony. This activity reaches its peak in early May. At 8 p.m. on 5/6/56, two hours after dark, I saw copulation take place, and I now think I can interpret events which I noted on 30/4/55 as those of a similar night. Calls and cackling from across the valley and the cries of petrels in

the air were answered after a lapse of half a minute by the petrels about me. Occasionally calls were initiated by a pair in their excitement. On a small bench I found a pair sitting three yards apart and with the male slightly uphill. Their posture with heads down and neck outstretched caught my attention. The male cackled and the female joined in, squawking. When the noise had lasted for about a minute the pair relapsed into silence. Within another two minutes they had been stirred to further calling by the calls of neighbouring petrels. During 20 minutes the male moved gradually towards the female until he was one yard downhill. Then she ran forward, thrusting her body across his and her neck under his beak. For some minutes he searched among her neck feathers, as if looking for lice. My torch, which I switched on whenever they called or moved, disturbed them and they separated. Soon they had been stirred to call again, and now his call changed. It now began with a squawk, became a shrill shriek for two or three syllables and continued as an ecstatic cackle. He moved alongside her and began searching again among her neck feathers. He mounted, once or twice biting her neck feathers to gain a firm grip, and remained mounted for three minutes. After dismounting he went five yards away down a steep bank, sat down and remained quietly for half an hour. She remained quietly on the bench. Now they took no notice of the calls of the other petrels. She was not disturbed by my moving forward to within six inches of her. Ten minutes later she went and sat down two yards beyond her mate. He moved back, taking frequent spells, on to the bench near me and continued to wander uphill so that in 20 minutes he had passed from view, while she remained seven yards below me. Then she wandered away in the opposite direction and was lost too.

I looked for other pairs in the open and found one pair which retreated into a burrow, and many single birds sitting quietly or wandering about. In the burrows were many excited pairs, and overhead many petrels, single or paired, calling loudly. The ecstatic cackle came from all sides, and a similar call is common at all periods of excitement, particularly at the time of departure. On this basis I tentatively sex these petrels.

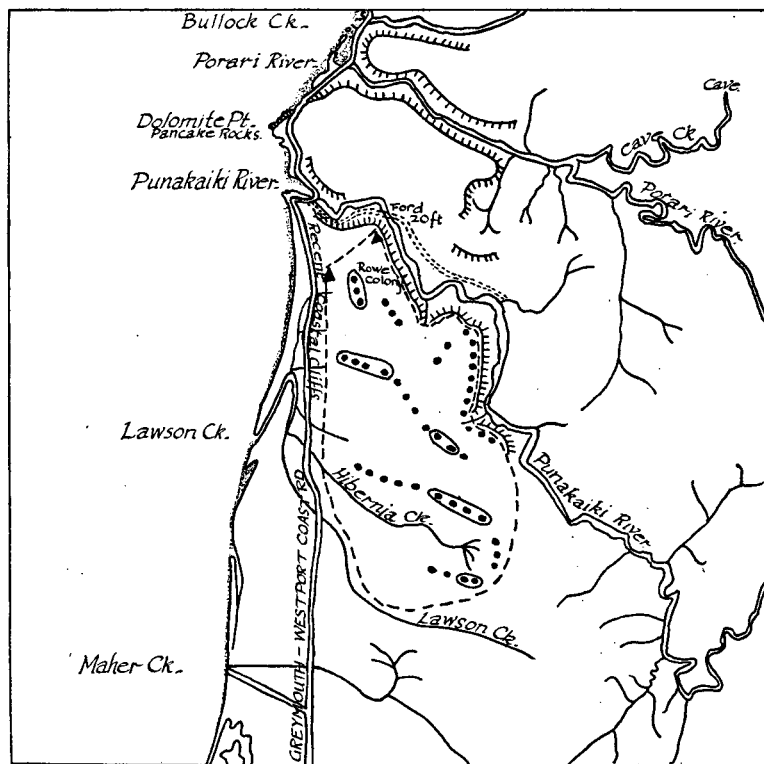
The single large egg is laid between late May and the end of June. After more than two months' incubation, the egg hatches between early August and mid-September. The chick is brooded for a fortnight; then for about three months it remains in the burrow alone by day before flying, usually in early December, though a few remain till the end of that month. By August and September the parents have worn tails and are less vigorous than in April.

HEALTH AND MORTALITY: Westland Petrels seem to be a healthy species. Skeletons and bones do not litter the breeding ground, as seems to be usual in most Westland colonies of Sooty Shearwaters (*P. griseus*). All the petrels are infested with *Halipeurus* lice and have occasional *Saemundsonia* lice, but these parasites seem to cause them no harm. In the nests are many beetles and some chernetine pseudo-scorpions.

Mortality among the early chicks may be heavy. The earliest egg found, 25/5/56, was broken and out in the open, where it may have been pushed during further excavation of the burrow. The shell was still damp with egg-white, and there was no sign of the development of the allantois. An early-hatched chick found on 22/7/56 was left by its parents after being brooded a week instead of the usual fortnight, perhaps because the burrow had been disturbed by a human visitor. A week after it was abandoned I found the chick's legs, the remnant left by a rat or stoat. Penniket⁽²⁾ has found a high stoat density in the colony; rats also are common, but this is the only instance of predation I have met. A late chick found on the main road at 11 p.m. on 26/12/56 died two weeks later. It was put in the paddock over the fence. Next morning after a stormy night it had moved only a yard or two, so it was picked up and released in the muttonbird colony on the top of the cliffs at Twelve Mile in the hope that there it might get airborne.

After a week it had moved three yards and in another nine days had moved 25 yards diagonally downhill and across several muttonbird runways. It was dead. The whole fortnight had been stormy and the chick never strong. Five other deaths in my knowledge have been accidents; an adult trapped with its wing between three roots; an egg lost when the floor of its burrow collapsed into the burrow below; another egg lost from a flooded burrow, and two dead adults by the road. As discussed below, the population may have decreased slightly in recent years.

WESTLAND PETREL COLONY



Definite Colonies ●●
 Two empty Burrows ▲
 Private Road - - - - -

REFERENCE
 Colonies with many Burrows ○○
 Boundary Line of Colony ·····
 Cliffs [hatched pattern]

Scale : 1 mile 2 miles

HABITAT: The colony consists of sub-colonies of between 20 and 200 burrows, distributed over six square miles between the tops of the 300-foot limestone bluffs along the south bank of the Punakaiki River and a geologically Recent coastal cliff, separated from the sea by a coastal plain a quarter of a mile wide. Close to the sea the rock is a soft mudstone. Both mudstone and limestone support a luxuriant forest cover. The lowest levels are covered with a very dense growth of kie-kie, the middle levels with a

typical more open Westland forest of podocarps, kamahi and rata, and the highest levels with an open beech forest. Most of the petrels favour the Westland forest, where they are found on top of most slips and bluffs and under some. Some big sub-colonies are on the sides of wide, comparatively dry spurs. Those birds near no bluff have no difficulty in becoming airborne as they use the many creepers to climb sloping trees and so to launch themselves from near the treetops. The Barrytown colony of Westland Petrels is the only one known, and I am confident that no other exists between Westport and Paringa.

POPULATION: By counting returning birds in April, 1955, and later by estimating the number of sub-colonies in order to obtain an estimate of burrows and pairs, I judge the population to be between 3,000 adults and 3,000 pairs. During the last 80 years the colony may have decreased, for there are numerous unoccupied burrows. The burrows which are furthest downstream near the Punakaiki Road are now disused. On the next bluff there are no burrows. Further inland, one on each bluff, are most of the Punakaiki sub-colonies. In the Rowe colony, which is just inside the bush on top of a terrace north of Hibernia Creek, are 200 burrows with about 30 unused. During the three years I watched this colony it has declined rapidly, possibly as the petrels moved to other sub-colonies. On the spur up to the terrace and between the creek and the Recent coastal cliffs are more derelict burrows in cleared ground. It is likely that before clearing the petrels had burrows all along the tops of these coastal cliffs.

HISTORY: I was struck by the fact that the burrows on top of the limestone bluffs along the Punakaiki would have been in a more typical petrel site, almost overhanging the sea, if the sea were covering the wide flat valley floor below. Eighty years ago the western boundary of the colony may have been along the top of the Recent coastal cliffs; and 5,000 years ago, when there was a sea-level maximum, 20 feet above the present sea-level on the West Coast, as is known by carbon dating⁽³⁾, the foot of these cliffs would have been 10 feet below sea-level. The sea would have extended up the Punakaiki nearly to the first ford and the foot of the bluffs where the lowest deserted burrows are. Furthermore, since the seaward boundary of the colony may now be retreating inland, the petrels at that time may have nested closer to the sea than they do now on the bluffs along the lower Punakaiki.

On this evidence it seems that the site of this colony may have been selected about the period of the sea-level maximum some 5,000 years ago; and the petrels have remained there since and expanded over the whole block between the Punakaiki River and the Recent coastal cliffs. Perhaps this is the period for *Procellaria westlandica* to have become specifically distinct.

LITERATURE

- (1) Falla, R. A., 1946 – An undescribed form of the Black Petrel, *Rec. Cant. Mus.* V, 2.
- (2) Penniket, J. G., 1955 – Notes on some birds of the Western Paparous, Westland, *Notornis* VI, 6.
- (3) Geological Survey, Greymouth, on open file.

Thanks: Messrs L. Angus and J. G. Penniket have freely given me their observations and have helped in the field. The officers of the Geological Survey have helped in discussion and criticism.

A DISTRIBUTION STUDY OF THE SOUTH-POLAR SKUA

By CARL R. EKLUND

In conjunction with activities to be carried out in the Antarctic during the International Geophysical Year of 1957-58, a banding study is being undertaken to determine more about the Skua (*Catharacta skua*). Ornithologists disagree on the systematic treatment of the bipolar forms of the genus *Catharacta*. The South-polar Skua (*C. s. maccormicki*) appears to be the common breeding bird on the Antarctic Continent. A banding study of this sub-species should help solve some of the questions on its distribution and relationship with other recognised forms.

Six nations, including Argentina, the United Kingdom, Japan, Norway, the U.S.S.R. and the United States, will band at 16 stations, and Chile and France have agreed to carry out observations at certain of their stations. Australia, which is already using a coloured band at the Mawson Station, will also band at its Vestfold Hills Station if materials can be forwarded there. New Zealand will carry out joint banding studies with the United States at two stations.

Multi-coloured, unnumbered, one-and-one-half inch wide thermoplastic leg bands are being used. The material is manufactured of rubber-styrene under the trade name of Boltaron, and is similar but heavier to that being used successfully in neckband markers for geese by the United States Fish and Wildlife Service. The bands were given limited testing at the U.S. National Zoological Park in Washington, D.C., on skuas which were taken in the Antarctic in 1955.

Seven basic colours which are readily distinguished from each other in the field are being used. To provide a sufficient number of different colours for each of the 16 and possibly 17 stations, a dual colour was obtained with some by applying a vinyl-based paint suitable for thermoplastics to one-half of the band.

Colours and the position and station at which each band are being used are shown in Table 1. Some positions are approximate pending location and establishment of sites.

Vinyl plastic, pressure-sensitive adhesive tape of the same colour as the thermoplastic material will be applied over the band to further ensure retention.

In addition to the coloured band, a numbered aluminium band or ring will be placed on the other leg. Some participating countries have national banding programmes and will use their own marked bands. Others have been supplied metal bands now being used by the U.S. Fish and Wildlife Service in migratory bird studies. That Service has agreed to act as a clearing house for returns.

Some dyeing of adult skuas will be carried out at the Wilkes Station (Knox Coast) using a scarlet colour. Experiments will also be made at this station with green wing or neck streamers made of a plasticised polyvinyl chloride material. If time permits, birds will also be dyed at the Cape Adare Station, using a yellow colour. This method of marking has been quite successful with geese and mourning doves in the United States.

Kits, including coloured and metal bands, vinyl plastic adhesive tape, material for trapping birds, and record and instruction sheets, were forwarded all co-operating countries in October, 1956.

TABLE 1: BANDING STATIONS

Country & Station	Location	Colour of Band
UNITED STATES		
Williams Air Facility	Lat. 77° 50' S, Long. 166° 36' E	Grey-Red
Little America	Lat. 78° 14' S, Long. 161° 55' W	Blue
Marie Byrd	Lat. 80° 00' S, Long. 120° 00' W	Black

South Pole	Lat. 90° 00' S	White
Wilkes (Knox)	Lat. 66° 00' S, Long. 110° to 115° E	Green
Adare (jointly with N.Z.)	Lat. 72° 00' S, Long. 171° 00' E	Red
Weddell	Lat. 78° 00' S, Long. 50° 00' W	Yellow
ARGENTINA		
General Belgrano	Lat. 77° 58' S, Long. 38° 48' W	Yellow-Blue
San Martin	Lat. 68° 08' S, Long. 67° 06' W	Blue-Green
Almirante Brown	Lat. 64° 53' S, Long. 62° 52' W	Yellow-Green
AUSTRALIA		
Mawson	Lat. 67° 36' S, Long. 62° 53' E	Already using orange
Vestfold Hills	Lat. 68° 30' S, Long. 78° 00' E	Grey-Yellow (if bands can be forwarded)
JAPAN		
Prince Harold Coast	Lat. 70° 00' S, Long. 35° 00' E	Red-Blue
NEW ZEALAND		
Scott	Lat. 77° 52' S, Long. 163° 00' E	To use N.Z. metal numbered band & some coloured bands of nearby Wms. Air Fac. Jointly with U.S.
Adare	See U.S. above	Jointly with U.S.
NORWAY		
Queen Maud Land	Lat. 70° 30' S, Long. 01° 00' W	Yellow-Black
U.S.S.R.		
Mirny	Lat. 66° 33' S, Long. 93° 00' E	Yellow-Red
UNITED KINGDOM		
B' Deception Island	Lat. 62° 59' S, Long. 60° 34' W	Grey-Green
F' Argentine Island	Lat. 65° 15' S, Long. 64° 16' W	White-Yellow
H' Signy Island	Lat. 60° 43' S, Long. 45° 36' W	White-Blue

Banding-location maps with record and instruction sheets were also sent to the French for use at their Point Geologie Station on the Antarctic Continent, as well as at Kerguelen and Amsterdam Islands; to United Kingdom observers for use at the Union of South Africa's Tristan de Cunha and Gough Islands; to Australia for use at Macquarie Island; to New Zealand for use at Campbell Island; and to Chile for use at four of its stations in the Palmer Peninsula (Grahamland). It is hoped that similar material can be sent to South Africa's Marion Island Station.

The success of the study is dependent upon two things: (1) the number of birds banded, and (2) the observations made of banded birds in the Antarctic as well as outside of the polar region.

Within the Antarctic it is hoped that each station will record observations of birds wearing coloured bands other than is used by that particular station, as well as observations of skuas which occur there in successive years with the station's own coloured band. One full and parts of two breeding seasons will be available for this. In addition, it is hoped personnel at the outlying islands off Antarctica will record occurrences of banded birds. It is further hoped that ornithologists and others throughout the Southern Hemisphere will report any observations or records of skuas with coloured bands as well as numbered metal bands if the birds are captured.

This most southerly recording of all birds may show some extremely interesting flight patterns. Captain Scott on his trek to the South Pole saw it in January, 1912, at latitude 87° 20' S, longitude 160° 40' E, 160 miles from the Pole. A sledging party on the second Byrd Expedition saw the species at latitude 86° 05' S. It is entirely possible, therefore, that the South-polar Skua is the first bird to 'attain the pole'. And provision has been made to band it!

It would be appreciated if information is forwarded the author, USNCGY, Regional Programmes Office, Room 716, 1145 19th Street, N.W., Washington 25, D.C., who until February, 1958, will be station scientific leader at the Wilkes Station on the Knox Coast. Contact via amateur radio might be made there since a 'ham' station will be in operation.

SHORT NOTES

WHITE-WINGED BLACK TERN AT WAIKANAĒ

On 30/3/57 a winter-plumaged White-winged Black Tern was seen at the Waikanae estuary. It resembled those seen in 1954 (*Notornis*, vol. 6, p. 69) except that its club-shaped nape patch was much paler and less conspicuous, and the black ear patches thus more striking; outer primaries blackish with light shafts; lesser coverts of leading edge and a 'yoke' across the front of the mantle darker than rest of upper surface. The bird was seen again on 6, 14 and 28 April, and for the last time on 6 May. Like the 1954 birds it was aggressive to White-fronted and Black-fronted Terns with which it associated. On 6 April it spent much time on a shallow pool washing, and then preened vigorously on the nearby sand. On the last two dates there seemed more dark feathers than at first, giving a broader dark band across the mantle and on both sides of the carpal flexure.

C. A. FLEMING

ARCTIC SKUA LANDING ON BEACH

Every autumn, when a flock of up to 1500 White-fronted Terns gathers at Waikanae estuary (*Notornis*, vol. 6, p. 69), numbers of Arctic Skuas (*Stercorarius parasiticus*) can be observed harrying terns offshore as they return to roost with the flock. Thus at least five different skuas were counted on 10/4/55, and several on 23/4/57, occasionally chasing their victims across the breakers and over the beach, giving good opportunities for close observation. Some skuas at this time have the projecting pointed tail-feathers of adults, though not, in my experience, such long ones as illustrated in the *Handbook of British Birds*, vol. V, p. 138. One bird seen several times (23/4/57) seemed most like the 'second winter pale phase' illustrated in the *Handbook*, pl. 139, but whiter mid-ventrally; it must have been particularly hungry, as it repeatedly chased terns in wide circles over the sand-flats. Incidentally these Arctic Skuas were sometimes chased by Caspian Terns, whereas the Pomatorhine Skua reported in 1953 chased Caspian Terns (*Notornis*, vol. 7, p. 62).

On 28/4/57, skuas were still conspicuous, and after many sorties over the beach, one eventually landed without fuss quietly among a small group of gulls on the edge of the roosting mob of 200 White-fronted Terns, with which incidentally were eight Black-fronted, a Fairy, and a White-winged Black Tern. I was at the time prone on the sand observing with telescope at a range of little more than a chain. The skua stood almost motionless facing the terns and me, occasionally taking a waddling step forward, then after about two minutes flew out to sea. Though the gulls moved aside for it, neither they nor the terns showed any sign of panic. I do not know of another record of a healthy Arctic Skua's landing in New Zealand.

C. A. FLEMING

GREENFINCH TAKING BEES

At 5.30 a.m. on 29/12/56, just as a hive of bees woke up, a cock Greenfinch (*Chloris chloris*) settled on the roof. During the next twenty minutes he swooped down and snapped up about two dozen bees as they walked out on to the alighting-board into the sunshine. He caught them by the thorax and crushed them before eating. Between whiles he cleaned his beak.

R. JACKSON

GREAT SPOTTED KIWI EATING SNAILS

Many dead snails (*Paryphanta gagei*) with their inner spires broken were found in January, September and December 1956 on the moss just inside the bush at Seven-mile Creek, near Greymouth. The living snails are found under the alpine shrubs in the open a few yards away. Judging by the footprints, it is the Great Spotted Kiwi (*A. haasti*) which feeds on these snails, taking them into the cover of the bush to eat them.

R. JACKSON

[Dr A. W. B. Powell comments that the Weka (*Gallirallus australis*) also eats these snails. — Ed.]

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BACK NUMBERS OF 'NOTORNIS'

Members are reminded that back numbers of *Notornis* and the earlier *N.Z. Bird Notes* are obtainable from the Society. Enquiries about costs and the parts still held in stock should be made to J. C. Davenport, 5 Belfast Street, Hillsborough, Auckland S.E.5.

Other publications available are: *Checklist of New Zealand Birds*, 1953 (10/6); Reports and Bulletins prior to 1943 (5/-); *The Takahe* (5/-); *Gannet Census* (5/-); *Measurements of Birds* (6d); *Identification of Albatrosses* (1/-).

DONATIONS TO 31/1/58

GENERAL: Department of Scientific and Industrial Research, £50; Estate of G. W. Gummer, £10; J. Prickett, £10; Southland Girls' High School, £3 3/-; B. Sladden, £2 2/-; M. C. Downes, £2; V. M. Rutherford, £1; C. F. Parsonson, 10/6; A. R. Annabell, J. A. Fagan, C. Tattersall and R. H. Traill, 10/-; P. G. Gunson, 5/-; Sundries, 14/3.

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