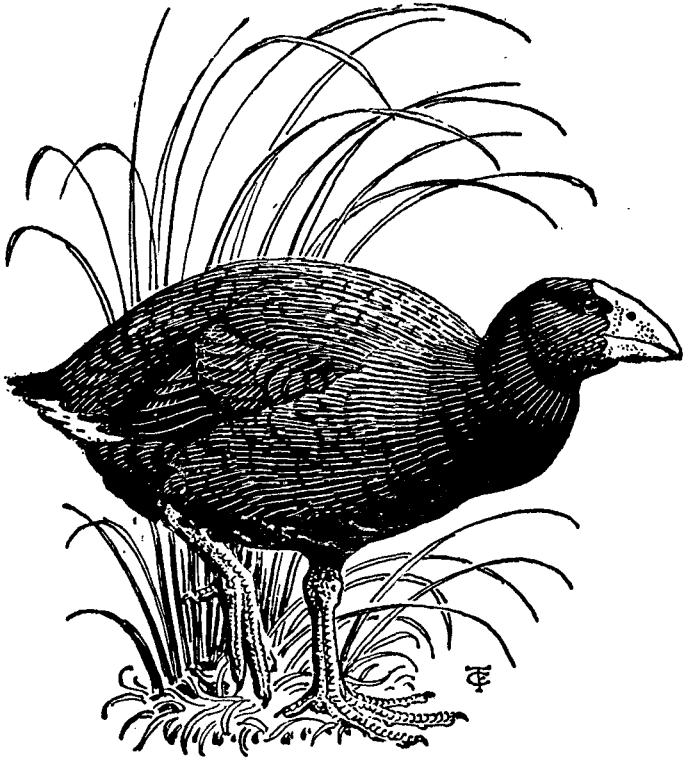
NOTORNIS



QUARTERLY JOURNAL

of the

Ornithological Society of New Zealand

(Incorporated)

Volume Fifteen, Number Four, December, 1968

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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.

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NOTORNIS

In continuation of New Zealand Bird Notes

Volume XV, No. 4 - - - DECEMBER, 1968

JOURNAL OF THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND
(Incorporated)

Registered with the G.P.O., Wellington, as a Magazine

Edited by R. B. SIBSON, 26 Entrican Avenue, Remuera, S.E. 2

Annual Subscription: Ordinary Member, $2; Endowment Member, $3

Life Membership, $40 (for members over thirty years of age)

Subscriptions are a minimum of $2 a year, payable at the time of application and the first of each year thereafter.

Contents of Vol. 15, No. 4: December, 1968

NOTES ON THE SNARES ISLAND SNIPE

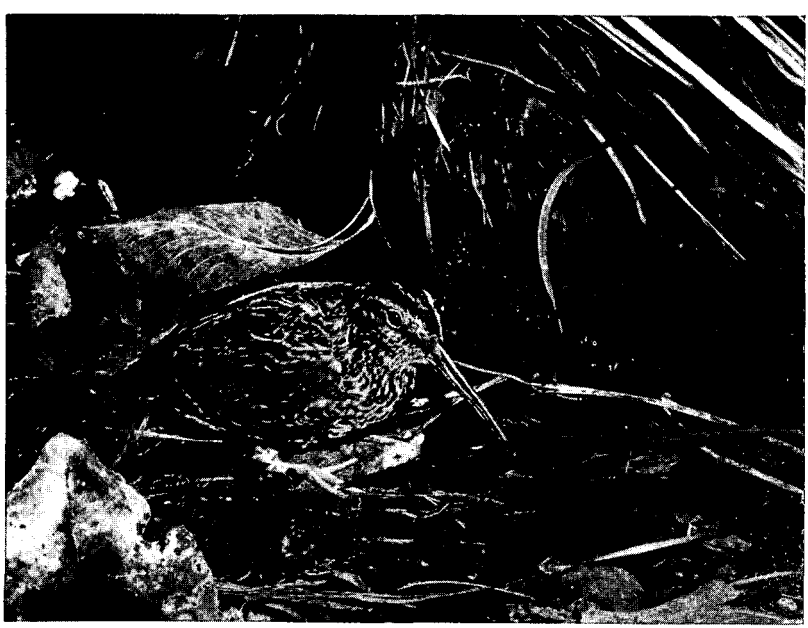
By R. A. ANDERSON
Wildlife Service, Department of Internal Affairs, Wellington

During the period 2 January - 9 February 1967, I took part in a Canterbury University Expedition to the Snares. The purpose of the expedition was to undertake a preliminary ecological study of the main island in the group, North-east Island. Time permitted me to make some brief observations on the habits of the Snares Island Snipe *(Coenocorypha aucklandica huegeli)*. The paucity of information on this species warrants these observations being recorded.

HABITAT

The dominant vegetation over the island is *Olearia lyalli* interrupted by areas of *Senecio stewartiae* and *Stilbocarpa robusta.* In places the *Olearia* canopy reaches a height of 20 - 30 feet but in general averages 6 - 10 feet. The centre of the island is covered by a pakihi-type swamp and the main slopes by tussock, *Poa foliosa* and *P. astonii.* My observations were confined to an area adjacent to the hut, near the boat harbour. Here, the *Olearia* was clumped and indispersed with *Senecio* to give open patches and dense low cover.

Snipe were observed over most of the island, but seemed to prefer areas similar to the study area. Although the latter was subjected to considerable human interference, it held four established territories, and numerous sightings of other birds were made.



[B. Stonehouse

Plate XXXVII — Snares Island Snipe.

FEEDING

Stead (1948) states, " Their food apparently consists chiefly of worms — this is the only food I saw them take — but they doubtless also eat the white maggots from the ground . . . ."

The droppings of four birds (3 adult, 1 juvenile) were collected and analysed. The results were (according to frequency of occurrence):—

Food Type	*Adult*	*Adult*	*Adult*	*Juvenile*
Spider	1			
Carabid beetle	1			
Earwig	1		6	1
Scarabid beetle	2			
Amphipod remains	75% by vol.	90% by vol.	75% by vol.	50% by vol.
Lepidoptera larvae		2	1	
Mite			11	
Weevil imago			2	

Unfortunately, the material was not searched for earthworm setae so that Stead's observation cannot be confirmed from this small sample.

Feeding occurs throughout the day but was more intense at morning and evening. The search for food was confined to forest fringes and areas of tussock and scattered scrub. Very few were found under the *Olearia* canopy except near isolated patches of grass and *Hebe elliptica.* Stead reported Snipe always to be found on the outskirts of penguin colonies. However, the number and distribution of these colonies are such that Snipe feeding along forest margins inevitably come into contact with them.

Snipe typically probe for food by pushing the bill deep into the soil or tussock bases, pausing as if to feel for insect movement. Probing of an area can be very intensive — 54 probes being counted in an area 12" x 12" in peat of medium hardness. Despite the fact that probing was the only method of feeding seen, it is interesting that the species identified in the faeces were all surface-dwelling insects.

NESTING AND BREEDING BEHAVIOUR

My observations began too late in the year to find incubating birds or nests. Stead found several nests; all were deep cups lined with grass and sited in the centre, or at the base, of tussock clumps. Richdale (1948) found them " on the ground under some solid vegetation or hollow end of a solid tree trunk."

Nesting probably starts in early November and laying extends into December, for well-grown young were seen as early as 10 January 1967. There may be considerable variation in the date at which egg-laying begins from year to year, for Stead considered egg-laying to begin in December. The size of young encountered during my stay indicates that breeding must have begun considerably earlier than this.

The species is strongly territorial — at least during the breeding season. All birds in the observation area had very well-defined territories which they defended fiercely. Fighting involved vigorous feather pulling — usually of back and breast, and this was associated

with wing flapping. Following such clashes, the territory holder was heard to utter a low vibrant " chup chup."

The fledgling usually accompanies the parent on feeding excursions. However, never more than one chick was seen with a parent — suggesting, if the recorded clutch size of two is substantiated, that each parent accompanies one of the chicks. Parents continue to feed the chick until it is reasonably well feathered. The chick also forages for itself.

SEX DIFFERENCES

Buller (1905) when referring to *C. aucklandica* states, " In the four examples of this rare bird (two males and two females) now in my collection, the sexes are exactly alike in plumage but the general coloration is much darker in one pair than in the other. The lighter-plumaged birds were obtained at the Auckland Islands and of these the female has a bill fully 0.25 inches longer than in the male. [Elsewhere in the same work, Buller states that this is usual in Snipes.] The dark-coloured birds, which again are precisely alike in plumage, came from the Snares . . . ."

To follow up this point, several live birds, and Dominion Museum study skins were measured. Details are given in Table 1. From this small sample, no clear pattern emerges — the ranges of measurements of each sex overlap.

JUVENILES

Six juveniles were caught and colour-banded to allow individual recognition. Measurements of some of these birds on recapture gave some indications of growth rates and these are detailed in Table 2.

[B. Stonehouse

Plate XXXVIII — Chick of Snares Island Snipe.

TABLE 1
MEASUREMENTS OF SEXED SNIPE (ADULTS)

Sex	Specimen	Weight (gm.)	Culmen (mm.)	Wing (mm.)	Tarsus and Midtoe and Claw (mm.)
M	Live	110	54.0	–	
M	Live	125	54.0	109	
M	Live	120	53.0	112	
M	DM 711	–	54.0	102	23.0 (T) + 32.5 (MTC)
M	DM 5617	–	50.5	102	24.0 (T) + 30.5 (MTC)
M	DM 1523	–	50.0	104	23.5 (T) + 31.5 (MTC)
F	Live	120	52.0	109	
F	Live	–	52.0	108	
F	Live	100	53.0	110	
F	Live	90	54.0	110	
F	DM 712	–	56.5	106	24.5 (T) + 32.5 (MTC)

Females were taken to be those with large brood patches, expanded cloacas or both.

Wing measurements were of the flattened wing from the carpal joint.

TABLE 2
MEASUREMENTS OF JUVENILES

Specimen	Date	Weight (gm.)	Culmen (mm.)	Wing (mm.)	Tarsus (mm.)	Mid Toe and Claw (mm.)
1	10/1/67	37	23.0	52.0	–	–
„	3/2/67	73	44.4	100.0	28.3	32.5
2	10/1/67	72	39.0	91.0	–	–
„	4/2/67	96	47.8	103.0	28.7	33.2
3	12/1/67	90	45.0	104.0	–	–
„	24/1/67	92	48.4	106.0	29.2	32.2
4	15/1/67	37	25.0	43.0	–	–
5	15/1/67	80	37.0	79.0	–	–
6	24/1/67	51	31.5	65.0	25.5	30.5
„	7/2/67	63	33.4	92.0	28.6	32.1

GENERAL HABITS

Stead reported the species to be reluctant to fly during daytime and then only over distances of a few yards. My observations do not support this generalisation. When disturbed during the day,

birds would often take to wing and some flew distances of several hundred yards. These birds generally returned to their territories quickly.

Those scared in the company of chicks seldom flew — instead the typical " broken-wing " distraction display was performed.

The species is very active at night, and it is during this period that the bulk of feeding is done.

ACKNOWLEDGEMENTS

I wish to thank members of the 1966/67 Canterbury University Snares Island Expedition for the opportunity to accompany them and for their help in collecting this information. I also wish to express my appreciation to Mr. M. J. Williams, Wildlife Service, Department of Internal Affairs, for his help in preparing the manuscript; Mr. R. M. Bull for identifying the food material; and Dr. B. Stonehouse, Canterbury University, for allowing me to publish his two photographs.

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———— ★ ————

SHORT NOTE

DO KIWIS LIVE NEAR STREAMS ?

Recently browsing in the library, I noticed a comment by Hartman and Shorland. They report that much of the skin fat of a Kiwi, *Apteryx australis mantelli,* was of C20 unsaturated fatty acids. This fat would have been derived from aquatic fauna and showed that this Kiwi frequently fed from streams.

My experience with the Great Spotted Kiwi, *A. haasti,* adds weight to this result. In October 1958 I stumbled on a Great Spotted Kiwi nest. This nest was under an avalanche boulder about three yards from the Edwards River and five yards inside the forest from the bushline. Often I have heard these Kiwis when at the Edwards Hut. An especially close bird may be heard calling by the stream at the top of the fan behind the hut, which is at the bushline. Probably its nest is under the moraine on the ridge above this fan. For several years I sought to find this nest without success.

This Kiwi is common near the rivers and by the bushline in the Bealey and Mingha Valleys, Arthurs Pass National Park. Deeper within the forest it is found near pakihis, on roche-moutonnes across the valley floor or on the peat bogs between lateral moraines left during the Ice Age. In the Grey District some pakihis are on the very barren soils formed from weathered Brunner formation rock. Great Spotted Kiwis are found in such places.

By Kelly's Hut at the junction of Kelly's stream and the Otira River, I have heard a different Kiwi. The forest here is of rimu. By negative inference I judge this Kiwi to be the South Island Kiwi, *A. australis australis.*

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— J. R. JACKSON

DISTRIBUTION AND BREEDING RECORDS OF THE WELCOME SWALLOW FOR THE SOUTH ISLAND, NEW ZEALAND, 1955 - 1968

By G. A. TUNNICLIFFE
Zoology Department, University of Canterbury

INTRODUCTION

The purpose of this paper is to assemble new nest and sight records in the South Island of the Welcome Swallow *(Hirundo neoxena)* as an extension of the earlier records compiled by Edgar 1966 (2).

I wish to thank the many people who have made their observations available to me either through the O.S.N.Z. Recording Scheme or by personal communication. Each record in the text bears the initials of the observer(s) given in the following list.

J. Adams (J.A.), A. J. Baker (A.J.B.), F. M. Climo (F.M.C.), B. D. Bell (B.D.B.), Mrs. M. M. Buchanan (M.M.B.), J. A. Cowie (J.A.C.), P. S. Crosier (P.S.C.), M. P. Daniel (M.P.D.), Dr. M. P. Buchler (M.P.B.), R. Dunipace (R.D.), D. K. S. Graham (D.K.S.G.), Mrs. J. B. Hamel (J.B.H.), G. Harrow (G.H.), M. Keillor (M.K.), F. C. Kinsky (F.C.K.), J. Mackel (J.M.), W. Mawson (W.M.), R. Melhopt (R.M.), J. A. Mills (J.A.M.), B. N. Norris (B.N.N.), P. J. Reece (P.J.R.), P. Sagar (P.S.), R. B. Sibson (R.B.S.), M. H. Sinclair (M.H.S.), Miss C. H. Turner (C.H.T.), M. Small (M.S.), Dr. R. Smith (R.S.), D. Smith (D.S.), R. R. Sutton (R.R.S.), Dr. K. E. Westerskov (K.E.W.), Dr. E. C. Young (E.C.Y.).

Edgar's 1966 (2) records showed that in the South Island the Welcome Swallow occurred on Cook Strait Islands, in Nelson, Marlborough, Westland, Canterbury and possibly Southland, but bred only at Lake Ellesmere in Canterbury.

They now appear to be well established in all provinces except Westland.

The distribution and breeding records are summarised below for each province except for the Cook Strait Islands which are treated separately. Edgar's 1955-65 records are included for comparison.

The order followed is locality, number of Swallows (in brackets), date, and observers' initials (in brackets). Fig. 1 shows the South Island Provinces and localities referred to in the text and Fig. 2 mid-Canterbury localities.

COOK STRAIT ISLANDS

1955 - 1965

Sightings: Stephens Island, (2), December 1961. Brothers Islands, (1), September 1964.

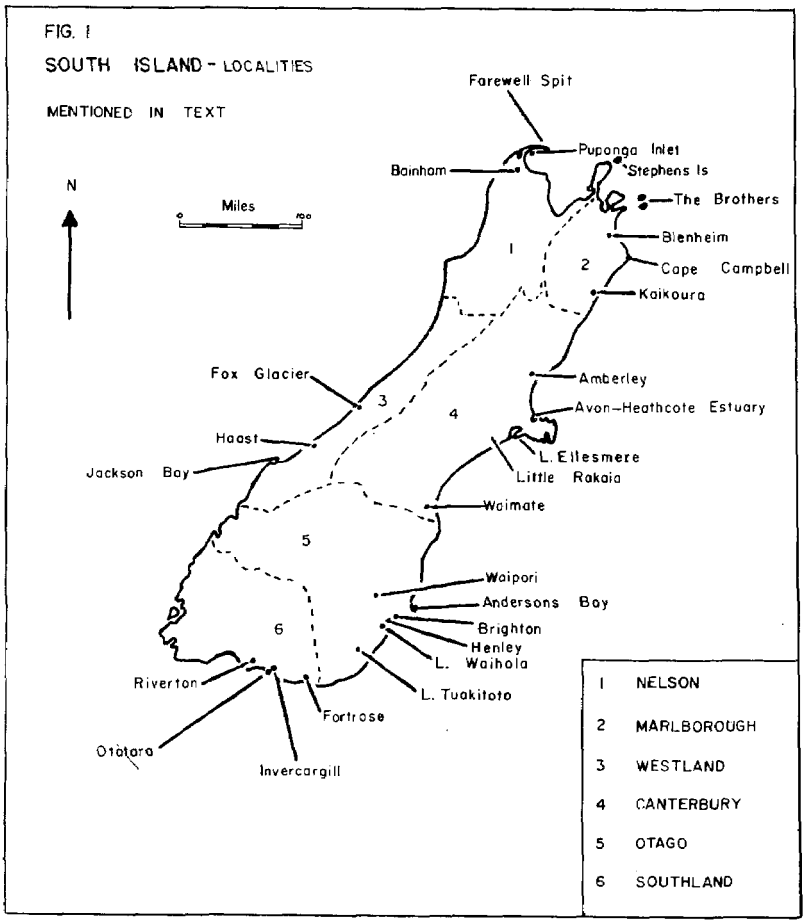
Swallows have not yet bred on these islands and there are no recent sightings.

MARLBOROUGH

1955 - 1965

Sightings: Smiths Bridge (five miles east of Blenheim), (2), 24 July 1957.

Breeding: No records.



1965 - 1968

Sightings: Spring Creek (three miles north of Blenheim), (1), 12 December 1966, (J.M.); (2), April 1967, (J.A.C.); (10) July 1967 (J.A.C.). Lake Elterwater (22 miles south-east of Blenheim), (2), May 1967, (B.D.B.), (R.B.S.). Near Cape Campbell, (30-40), late September 1967. Kaikoura, (1), 9 May 1968, (J.A.M.).

Breeding: South end of Wairau Lagoons (four miles north-east of Blenheim); nest found in mid-December 1967 inside an iron tank that was used as a duck shooting stand; two adults and three young flew from this nest (J.A.).

NELSON

1955 - 1965

Sightings: At the base of Farewell Spit (1), 25 November 1955; over a lake at the base of the spit, (8), April 1965; Twelve miles along the spit, (7), April 1965.

Breeding: No records.

1965 - 1968

Sightings: At twelve miles on Farewell Spit, (7, numbers estimated) early April 1965 and (12) in June 1966 Bell 1966 (1). Flying above ponds along the Spit, Freeman's Pond, Puponga Inlet, (number of swallows not given for these localities), January 1967 (B.D.B.). Flocks were recorded at all the above localities in January 1968 (F.M.C.). At Bainham in Aorere Valley (6), January 1968 (A.J.B.). At Freeman's farm, Farewell Spit (90-100, the largest flock yet recorded in the South Island), February 1968 (W.M.).

Breeding: Cape Farewell Light; one nest was located in January 1967 under the overhang of a small dam (B.D.B.).

WEST COAST

1955 - 1965

Sightings: Jackson Bay (1), 31 August 1962.

Breeding: No records.

1965 - 1968

Sightings: Between Haast and Fox Glacier, (1) November 1965 (M.P.D.).

Breeding: No records.

CANTERBURY*

1955 - 1965

Sightings (see Fig. 2): Between late 1961 and February 1964 Swallows were recorded at Lakeside, Kaituna, Ataahua, Kaituna Valley and at the LII River Mouth. All sightings for Canterbury were at Lake Ellesmere.

Nesting: The first record of a Swallow nest for the South Island was at Lakeside during the 1961/62 season. Swallows nested again there in 1962/63, possibly in 1963/64 and again in the 1964/65 season. Juvenile Swallows were seen in the 1963/64 season at Ataahua. All South Island records of nests came from Lake Ellesmere.

1965 - 1968

Sightings: South Canterbury. Ki Wainono Lagoon (east of Waimate) (2), May 1967 (M.K.); (3) in June 1967 and (10) in August 1967 (P.S.).

Mid Canterbury (Lake Ellesmere and Environs). Kaitorete Spit, on the Lake margin half a mile east of the Acclimatisation Society watchtower, (2) 28 July 1966; (2) 2 November 1966; (2) late in December 1966 (G.A.T.). Half a mile east of previous locality, (2), 2 November 1966 and during December 1966 (G.A.T.). Coopers Lagoon (located three miles south of Taumutu), (5), 21 July 1966 (G.A.T.). (19), 7 March 1968 and (3) a fortnight later (P.J.R.). Little Rakaia (2), 24 September 1966 and (1) near Rakaia bridge (main south road) on 30 September 1966 (M.M.B.). Lakeside, (2) were recorded on five occasions from mid-September 1966 to the end of October 1966 and (8) on 21 July 1966 (G.A.T.). At the Irwell River Mouth (2), 15 October 1966 (P.S.C.). LII River Mouth, a flock (25, the largest flock so far recorded at Lake Ellesmere) June 1967 (G.A.T.). Coes Ford on the Selwyn River, (11) June 1967 (G.H.). A mile south

* Turbott 1965 (3), has given a detailed account of the distribution and nesting of Swallows in Canterbury from late 1961 to February 1964.

east of the Motukarara Racecourse (5), December 1966 (G.H.). At Kaituna, from June 1966 to November 1967 Swallows were seen on eighteen occasions along the Lake shore opposite the old Kaituna railway station site; on each occasion (2) were sighted together although a flock of (6) was seen in June 1966 (D.K.S.G., G.A.T.). Avon Heathcote Estuary. At the south-west corner of the Estuary (5), 5 February 1967 (G.H.).
North Canterbury. In the lower Waipara River area at Teviotdale near Amberley (4), August 1966 (E.C.Y.).

Breeding: All recent breeding records are from mid-Canterbury.

Kaituna: The following observations summarise breeding records I made under a culvert on the Akaroa highway, a quarter-mile north of the old Kaituna railway station on the eastern side of Lake Ellesmere.
10 Nov. 1966. Three nests were found. One nest contained five eggs, another was completed except for the lining and the third consisted of an incomplete mud cup.
6 Dec. 1966. The nests were at the same stage as above but contained no eggs. Five chicks and two adults flew from under the culvert.
4 Jan. 1967. A second clutch of five eggs was found in the same nest which previously contained eggs.
30 Jan. 1967. Three eggs were found in the same nest that contained eggs on the previous visit.
5 Dec. 1967. The same nests were present. Nest one contained five eggs, nest two contained two eggs and nest three was now complete but lacked a lining and contained no eggs.
5 Jan. 1968. Nest one contained four fledged chicks and one addled egg. Nest two contained five new eggs.
18 Jan. 1968. Five chicks were found in nest one (C.H.T.).
27 Mar. 1968. Nest one had fallen to the ground, nest two contained one egg and nest three contained two eggs.
(Regular searches on the eastern periphery proper of Lake Ellesmere over the last three years have revealed no nesting areas other than at Kaituna.)

Kaitorete Spit: Two miles south-west of Kaituna an empty Swallow nest was found under a tank stand on 2 November 1966 half a mile east of the Acclimatisation Society watchtower on Kaitorere Spit. Swallows had previously attempted to nest inside this tank as the remains of a nest and dead Swallow were found at the bottom of the tank. In mid-November 1966, and three weeks later, the nest was still empty.
A second nest containing five eggs was found on 2 November 1966 a mile east of the previous site on the inside wall of a concrete water tank. The clay outlines of two other nests (which had fallen into the water) on the tank walls, and three eggs in the water, indicated that there had been at least two previous unsuccessful nesting attempts. On 5 December 1966 a new nest containing four new eggs had been constructed on the tank wall, and the previous nest with five eggs, was found submerged at the bottom of the tank. Late in December this new nest also became dislodged.
Both tanks had fluctuating water levels and they were unsuitable as nest sites. Throughout the 1967/68 nesting season no Swallow nests were found at the first tank site and the second tank was not available for a nesting site as it had been removed.

Coopers Lagoon: This area, located just beyond the south-west corner of Lake Ellesmere, was regularly searched for nests from November 1967 to March 1968 but none were found (P.J.R.).

Lakeside: The one breeding record for this area is of two nests found on 30 October 1965. Both nests were built in a boat anchored offshore and each contained five eggs (P.S.C.).

Irwell River Mouth: Two nests were found on 9 November 1965 under the gunwale of a launch anchored at the mouth of the Irwell River. One contained four eggs, but the contents of the second nest could not be determined as it was inaccessible (M.P.B.).

Avon Heathcote Estuary: On 1 February 1967 a Swallow nest was found under a culvert on Humphrey's Drive on the south-west side of the Avon Heathcote Estuary (R.M.). Three days later three chicks were found in the nest (B.N.), and on 5 February three chicks and two adults were seen flying near the culvert (G.H.). On 16 February the same nest contained three eggs and a week later three chicks (G.A.T.).

OTAGO

1955 - 1965

Sightings: No records.
Breeding: No records.

1965 - 1968

Sightings: Near the main highway at Henley (2), in winter 1966 (R.S.). Andersons Bay (1) early August 1966 (R.D.). At Brighton (2) during autumn 1967 (I.B.H., K.E.W.). On the swampland between Lake Waihola and Lake Waipori (9) for eight weeks up to 7 June 1967; some of these birds were possibly juveniles (H.S.). At Lake Tuakitoto (9), May 1967 (D.S.).
Breeding: No records.

SOUTHLAND

1955 - 1965

Sightings: An unconfirmed sighting at Otatara from November 1963 to March 1964.
Breeding: No records.

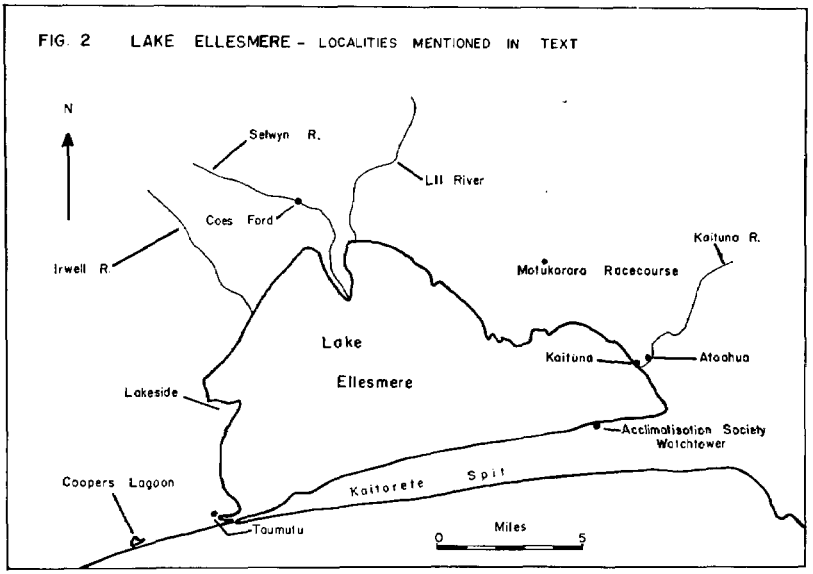
1965 - 1968

Sightings: All sightings of Swallows from Southland have been made by R.R.S. These records have been either in autumn or winter on the coastal strip from Fortrose to Riverton. Waimatuku Wildlife Refuge (seventeen miles north-west of Invercargill) (1) mid-July 1966. Lake Murihiku (four miles west of Invercargill) (3), late February 1967. Mataura River at Gorge Road (eight miles north-west of Fortrose) (11), 12 May 1967; (3) 15 May 1967. Eastern end of Waituna Lagoon (twelve miles south-west of Invercargill, (1) late in November 1967; (5) 17 March 1968.
Breeding: No records.

SUMMARY

Sightings:

Apart from Westland, Swallows now appear to be established in all provinces of the South Island. The largest numbers of birds were recorded from the Farewell Spit area in Nelson Province, Cape Campbell in Marlborough and Lake Ellesmere in Canterbury. Recent first sightings of Swallow flocks near Waimate, Otago, and Southland indicate the species is spreading through the South Island.



Breeding:

For the first time Swallows have been recorded breeding in the Nelson and Marlborough provinces. The largest number of nests was at Lake Ellesmere.

Since Turbott's 1965 (3) account, Swallows have nested at four new localities at Lake Ellesmere and, for the first time, at the Avon Heathcote Estuary.

One factor that has limited nesting success of Swallows at Lake Ellesmere is the type of nest site chosen. On Kaitorete Spit nest mortality was high because of fluctuating water levels inside tanks used for nesting. Further, the lack of nesting records at Lakeside and the general agreement amongst Lakeside residents that Swallows are not occurring there in their usual numbers during recent nesting seasons may be attributed to the absence of the traditional Swallow nesting site (the launch " Loretta "; see Turbott). Casual observations would suggest that, although there is an abundance of insects available at Lake Ellesmere for Swallows, the success of this species will be dependent upon the availability of suitable nest sites. One potential source for nest sites at Lake Ellesmere is the more permanent shooting stands found scattered along the Lake margins but there are no records of these being used.

ACKNOWLEDGEMENTS

I am grateful to Dr. B. Wisely, Dr. E. C. Young and Mr. K. A. Liggett for the assistance they provided during the preparation of this paper. I would also like to thank Mr. A. T. Edgar for allowing me to examine O.S.N.Z. Recording Scheme data.

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THE AUSTRALIAN COOT ESTABLISHED ON VIRGINIA LAKE, WANGANUI

By ROSS MACDONALD

The Australian Coot *(Fulica atra)* was first observed on Virginia Lake, Wanganui, in 1962 and breeding first recorded during 1964/65 (Notornis 13, 165).

The numbers have steadily increased to approximately 60 birds, with 12 breeding pairs raising 37 young during the 1967/68 breeding season. Observations suggest this could be near the maximum number for this lake.

During the 5½ years the species has been on this lake, observations have shown an increase in the vigour of territorial fighting, with greater demands on available nesting space, a wide variation in number of eggs laid and young raised, nest sites and construction and possibly of most importance, changes in behaviour, particularly in aggression towards other waterfowl.

TERRITORIES

During the last two seasons (1966/68), the establishment of breeding territories started in August and nest construction by early September. By the end of September, nest construction was well advanced and sitting had begun.

Territorial fighting was very much in evidence at the start of the last breeding season, probably because of the number of birds on the lake and thus a greater demand for nesting areas.

If, in defending its territory, a Coot runs along the surface, with wings and feet moving furiously, the intruder invariably makes a rapid retreat.

At other times, the male birds swim towards each other, wings held up, giving a " large front view." If neither gives ground, a vigorous battle may ensue. One such combat was so vigorous and long, that the two birds lay, almost exhausted, on their backs, with feet gripping the chest of their opponent. They continued to peck at each other in spasms. Finally one "escaped" by swimming underwater some distance away from its opponent. During this particular battle, two other birds (possibly females) joined in briefly.

NESTING

Nest sites have been (1) amongst raupo and reeds
(2) attached to weeping willow branches at water level
(3) on lily leaves.

The first two localities have proved to be by far the most successful. In the raupo and reeds, the tops of the reeds are often " folded over " the nest.

Those constructed on lilies have not proved very successful and in fact these sites have been used mainly " in emergency," when a nest in use has been destroyed, or because of the lack of other suitable sites in the territory.

The most common material used in nest construction has been lily stems and leaves and frequently a bird has been observed dragging

a lily stem, four feet or more in length, to its nest site. Other materials such as reeds and willow roots and twigs have been used. Both male and female birds appear to take part in construction.

After the chicks have been hatched, the parents continue to build on to the present nest, or, as in most cases, construct further nests in their territory. These appear to be " roosting nests " and when disturbed from one nest, the brood will frequently make its way, as unobtrusively as possible, to the other nest. One pair, which has as its breeding tree, a huge weeping willow, has only constructed one other such nest and this was only used for a brief period. With another pair, it has not been possible to determine if " roosting nests " have been constructed, because of the dense vegetation in the nesting site.

INCUBATION AND RAISING YOUNG

Incubation is shared by male and female. One pair, when changing over, touched beaks before actually changing places.

Although length of incubation has not been definitely recorded for every nest, observations suggest it may be between 14 to 22 days (which is slightly less than the " Field Guide " note of c. 22 days).

The number of eggs laid and chicks hatched has varied from 1 to 6 and though during previous seasons the first broods were the larger, this has not been so definite during the last breeding period.

Both adults feed the chicks, continually diving for waterweed (mainly Elodea). Older chicks of a family group, when diving for weed, share the weed they bring up with younger or smaller chicks. A brood may feed together, or in two groups, each with one of the parents.

Family groups did not all remain so closely-knit during the 1967/68 season as during previous years. In earlier seasons, the parents and chicks of all broods remained largely in the breeding territory until well towards the end of the season (c. April). However, young of the first brood did not always remain so close to the nesting territory during this last season (1967/68). This may possibly be because the species appears to be now firmly established on the lake. Flocking together usually starts in April and most birds join the flock/s by May. Since the species has become more firmly established on the lake, no cases of treble broods have been recorded.

Mortality *percentage* has increased as the number of nesting pairs and chicks hatched has increased, but reasons for this have not been determined. The mortality rate was approximately 40% over the 1967/68 season, but nearer 30%, during the 1966/67 season.

ESTABLISHMENT ON OTHER LAKES

Australian Coots have been noted on nearby lakes Kaitoke and Westmere, but no evidence has been collected to show that they are breeding on these waters.

The following chart shows breeding pairs and the young raised during the last two breeding seasons.

1966-67 BREEDING SEASON

Breeding Pairs	FIRST BROOD		SECOND BROOD		Total hatched or (eggs laid)	Mortality	TOTAL RAISED
	Chicks hatched or eggs laid	Young raised	Chicks hatched or eggs laid	Young raised			
A	4	1	5	4	9	4	5
B	5	0	4 eggs	2	9	7	2
C	6	5	5	5	11	1	10
D	5	3			5	2	3
E	2	2			2	0	2
F	5	4	2	2	7	1	6
G	1	1	2	2	3	0	3
H	3	3			3	0	3
I	1 egg		2	2	3	1	2
Totals 9	32	19	20	17	52	16	36

1967-68 BREEDING SEASON

Breeding Pairs	FIRST BROOD		SECOND BROOD		Total hatched or (eggs laid)	Mortality	TOTAL RAISED
	Chicks hatched or eggs laid	Young raised	Chicks hatched or eggs laid	Young raised			
A	6	3	3	1	9	5	4
B	5 eggs nest destroyed and abandoned				5 eggs	5	
C	2 survived 4-5 days — disappeared 2nd attempt at nest abandoned				2	2	
D	5	3	5	5	10	2	8
E	5	2			5	3	2
F	3	2			3	1	2
G	2	1	4	4	6	1	5
H	2	2	3	2	5	1	4
I	3	1			3	2	1
J	2	2			2	0	2
K	1	1	3	1	4	2	2
L	1	1	6	6	7	0	7
Totals 12	32	18	24	19	61	24	37

FEEDING

Food has consisted almost completely of waterweed *(Elodea)*, though occasional birds have been seen eating young willow leaves. It is possible that small animal life is obtained from amongst the weed, but this has not been determined definitely.

During the last year, some birds have taken bread, which visitors to the lake have thrown to the ducks. One adult Coot also fed this to a chick. However, they do not appear to take very much of this food.

An interesting change in feeding behaviour was noted during the last year, when ducks were seen feeding with Coots. After the Coots dived for waterweed and brought it to the surface, Grey and Mallard Ducks frequently milled around and shared in the food. This has occurred when the adult Coots have been feeding young, but no real attempt was made by the Coots to chase the ducks away. It could not be determined definitely whether the ducks were always taking weed, or instead, small animal life brought up with the weed.

This is a contrast to the coot behaviour, when they first became established on this lake — they vigorously chased all waterfowl, except a male Paradise Duck. Aggression towards other waterfowl has gradually reduced during the last two or three seasons. In fact, during the last breeding season, aggressive action appeared to be directed more towards individuals of their own kind, than other waterfowl.

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SHORT NOTE

REACTIONS OF BIRDS TO FALCONS

On 1/4/66 at 1525 hrs. R. E. R. Porter and P. R. Wilson saw a Falcon *(Falco novaeseelandiae)* flying 15-20 ft. above the D.S.I.R. Research Orchard, half a mile from the centre of Havelock North. Fantails, Sparrows, Whiteyes, Chaffinches, Thrushes, Blackbirds, Mynas, Hedgesparrows and Greenfinches took to trees and gave alarm calls. A flock of 30-40 Mynas gave alarm calls for about 15 minutes after the Falcon had left and two Fantails sat quietly huddled side by side on a piece of wire in a large shed for the same time. In contrast to these reactions, Harriers *(Circus approximans)* elicit much less response from the orchard birds.

Early in March 1967 at 1300 hrs. K. J. Dawson and J. Jones (pers. comm.) saw two Falcons attack three or four Keas on the open rock and snowgrass tops at about 5500 ft. between the East Matukituki and Corner Burn (Lake Wanaka). The first thing they saw was a Kea reeling back, flapping and squawking wildly after a Falcon had attacked it in mid-air. Then both Falcons attacked, flying about 50 ft. above the Keas and swooping on to them. The Keas could not evade the Falcons and, though no feathers were knocked off, they were hard pressed and hid amongst a jumble of rocks. The Falcons moved off 10-15 minutes later when their swoops failed to dislodge the Keas.

— R. E. R. PORTER
— D. G. DAWSON

CENSUS RECORDS OF TURNSTONE
For Firth of Thames and Manukau Harbour

By H. R. McKENZIE

The Turnstone *(Arenaria interpres)* is the third most numerous of the Arctic waders migrating to New Zealand. It is a holarctic species, breeding in high altitudes and its migration southwards is similarly world embracing. It is not definitely known from what part of the Arctic and Sub-Arctic it comes here to winter in our summer, but recently (1968) two birds, one in Australia and one in New Zealand, have been reported seen with brightly painted feathers. This kind of marking, plus leg bands, has been lately used by biologists of South-Western College, Winfield, Kansas, U.S.A., working in the Pribilof Islands, west of Alaska and north of the Kurile Chain and may prove that some of our birds come, perhaps via Hawaii, from the Alaskan side of the Bering Sea. George C. Munro, " Birds of Hawaii," 2nd ed., revised, p. 37, 1960, states that Turnstones winter in Hawaii in large flocks and that Coultas estimated there were 50,000 on Laysan Island (of the Hawaiian Chain) in Dec. 1963 (Northern winter).

The summer population in New Zealand could be well over 2000. Its winter (New Zealand winter) population here is higher in proportion to its summer numbers than those of the Godwit, Knot and Golden Plover. This could indicate that as a species the Turnstone takes longer to mature.

A close study of all notes taken shows that it is not safe to include early May and late August in winter figures. Munro, 1960, states that the winter migrants to Hawaii arrive from the north in August and September and leave about May. This agrees well with observations made here. The first Turnstones arrive in New Zealand in the latter half of August and the last depart as late as May. The Godwit and Knot begin to arrive in mid-September and depart up to mid-April, so that they spend up to two months less time here than does the Turnstone. Exceptions must of course be expected.

The post-Christmas build-up of Knots at Karaka, Manukau Harbour, is discussed in Notornis 14, 156. It was thought likely that the Knot movement, or the greater part of it, came from Farewell Spit. The Turnstone chart indicates that this species has a build-up which is similar, though less emphasised. As Farewell Spit has one of the largest populations of Turnstones, the Karaka increase could well stem from there. The Firth of Thames shows a post-Christmas build-up in a lesser degree.

In large and small flocks Turnstones occur from Parengarenga Harbour in the north to the coast of Southland. Parengarenga Harbour and Farewell Spit have the largest flocks. The Firth of Thames, so far as records indicate, has been occupied only in recent years, but the Turnstone was known in the Manukau Harbour in numbers from earlier than 1880.

The Turnstone is a good subject for census work because it flocks densely and does not move inland to any great distance. This

contrasts with its habit in Hawaii where Munro mentions that it is common in large flocks in upland pastures as well as along shorelines and lagoons.

FIRTH OF THAMES SUMMER COUNTS

Records were kept by R. B. Sibson and the writer from the spring of 1941 and many industrious members and friends took part in censuses for most years from 1950-51 to the summer of 1966-67.

A single bird was seen on 27/10/41, but of course the species could have occurred for some years before that. Three were found on 2/1/44 and one, two or three each summer up to 1949. No further sightings were made up to the summer of 1951-52. The census counts began in 1951 and are shown on the chart. Information gained on visits other than censuses is recorded on the chart in brackets. Such visits do not cover the whole census area so are styled "stab counts."

The pre-chart records were compiled in years when almost monthly visits were made. They and the chart show that this was a rare bird for the first twelve years of our observations. The further figures, from 1951 to 1967, are sometimes irregular, but show a firm trend towards higher numbers.

FIRTH OF THAMES WINTER COUNTS

From 1941 to 1952 patrols were made as often as in summer, but no wintering birds were found. The chart shows relatively high numbers for winter on from 1953, indicating a real increase for this important bird haunt.

MANUKAU HARBOUR SUMMER COUNTS

Records kept from 1941 to 1949, plus the first six years as charted, i.e., 1950-51 to 1955-56, agree with Buller's (1888) statement reading "Flocks of as many as a hundred are regularly observed in a few favoured localities." It should be quite safe to infer that Manukau was one of these localities. Oliver, 2nd ed., 254, says "Buller quotes Cheeseman as stating that in March 1880, in the Manukau Harbour, he met a flock of 1000 Turnstones." According to our experience this would be abnormal for the summer flock, or for a pre-migration movement from further south. It could be an error made in passing the figure from one to the other. Birds do unpredictable things so it will have to be left as an unusual happening. For the years 1940 to 1945 inclusive autumn counts were 60 to 85 (Sibson, N.Z. B.N. II, 5). These were all or mostly near Puketutu. Karaka was not then being observed, but 47 in a field on Urquhart's farm on 3/3/46 could indicate that either the population had moved from Puketutu or that Karaka could have been regularly patronised in the earlier years. From 1953 onward there are few records from Puketutu, perhaps owing to the inundation of their habitat, caused by the establishment of oxidation ponds by the A.M.D.B.

From the evidence available one could be led to believe that migration to and from New Zealand has been in progress for a very long time, perhaps in cycles of greater and lesser numbers. For the eleven years 1956-57 to 1966-67 the annual numbers have steadily increased from approximately 100 to almost 400. Why has the relatively sudden acceleration taken place? It seems to be in line with the apparent recent increases of some other migrants, particularly some that have quickly risen from very small to quite moderate

TURNSTONE CENSUS TOTALS FOR FIRTH OF THAMES AND MANUKAU HARBOUR from Feb. 1951 to January 1967

Firth of Thames Summer Counts Date			Manukau Harbour Summer Counts Date		
29- 4-51	Nil		25- 2-51	9	(75 on 8- 4-51)
2-12-51	Nil		1951-52	NC	
1952-53	NC	(5 on 23-11-52)	1952-53	NC	(55 on 14- 2-53)
13-12-53	13		22-11-53	105	(200 on 11-10-53) (120 on 21- 3-54)
1954-55	NC	(10 on 17-10-54) (2 on 11- 4-55)	1954-55	NC	(50 on 16-10-54) (30 on 10- 4-55)
4-12-55	5	(16 on 8- 1-56)	1955-56	NC	(132 on 3-12-55) (120 on 4- 3-56)
25-11-56	22	(25 on 9-12-56)	4-11-56	93	(130 on 18-12-56) (180 on 3- 2-57)
1957-58	NC	(196+on 3- 2-58)	1957-58	NC	(130 on 28- 9-57) (300 on 6- 4-58)
1958-59	NC	(32 on 15- 2-59)	1958-59	NC	(200 on 18-10-58) (200 on 27- 2-59)
6-12-59	28	(41 on 5- 1-60)	8-11-59	190	(250 on 17- 2-60)
27-11-60	48	(76 on 22-12-60)	4-12-60	200	(255 on 1- 1-61)
26-11-61	59	(65 on 31-12-61)	10-12-61	180	(250 on 10- 3-62)
2-12-62	20	(61 on 3- 1-63)	16-12-62	220	(330 on 30-10-62)
8-12-63	41	(78 on 4- 2-64)	3-11-63	150	(350 on 31- 1-64)
8-11-64	47	(64 on 23-12-64)	22-11-64	Nil	(170 on 25-11-64) (365 on 21- 2-65)
14-11-65	91		12-12-65	300	
4-12-66	23	(114on 3- 3-67)	11-12-66	320	(400 on 27- 3-67)

Firth of Thames Winter Counts			Manukau Harbour Winter Counts		
24- 6- 51	Nil		6- 5-51	3	(4 on 8- 7-51)
13- 7-52	Nil	(	14- 6-52	2	(6 On 26- 7-52)
2- 8-53	7		14- 6-53	36	(56 on 31- 5-53)
1954	NC	(4 on 23- 5-54)	1954	NC	(31 on 7- 6-54)
26- 6-65	22		24- 7-55	Nil	(24 on 7- 5-55)
17- 6-56	5		8- 7-56	50+	(
1957	NC	(18 on 9- 6-57)	1957	NC	
1958	NC		1958	NC	(40 on 6- 7-58)
1959	NC	(4 on 16- 6-59)	1959	NC	
1960	NC		10- 7-60	20	
2- 7-61	42		30- 7-61	89	
24- 6-62	3		22- 7-62	2	
14- 7-63	4		23- 6-63	1	
17- 5-64	25		14- 6-64	49	
4- 7-65	11	(22 on 2- 6-65)	1- 8-65	8	(30 on 3- 7-65)
24- 7-66	8		5- 6-66	31	

Note____ "Nil" = Census held but none seen.
"NC" = No census held, or records lost.

Errata. In Vol. 14, 19 and 14, 155 read 24- 6-62 for 24- 4-62.

numbers; while others are appearing now that we have not known before. If there is anything in the cycle theory a decline may be expected sonner or later. If the increase continues the Turnstone will have to extend its habitat and resort to inland living places as in Hawaii. We like to think that we have been very clever in "shrinking the world" with our sudden improvement in communications, but the birds may be keeping up with us.

MANUKAU HARBOUR WINTER COUNTS

Prior to the census period fewer and less comprehensive visits were made to Manukau, which could explain there being few records, 10 on 13/7/47, 13 on 2/7/50 and 16 on 16/7/50. The chart shows an increase which is roughly in line with the summer figures. It is good to know that this engaging little bird is more than holding its own.

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RED-NECKED STINTS IN NORTHERN NEW ZEALAND

By R. B. SIBSON

The history of the Red-necked Stint *(Calidris ruficollis)* as a New Zealand bird begins in the South Island in 1902, when Edgar Stead obtained two specimens of what he called the Red-necked Sandpiper, at Lake Ellesmere, one in January and the other in July. Apparently in the same year another stint was collected in Otago at Taieri Flat and was thought to be an example of the Little Stint *(C. minuta)*. About 1910 when Stead (1) secured several more stints in winter plumage at L. Ellesmere, all were identified as *minuta*. According to Falla (3) more stints were collected at L. Ellesmere between 1928 and 1930, by which time it was generally agreed that the migratory stints which normally reach New Zealand are referable to *ruficollis*.

It is relevant to mention that not only first year birds of *ruficollis* and *minuta* but also adults in winter plumage are virtually inseparable in the field; and are distinguishable in the hand only under the most critical examination. Some authors have been inclined to treat *minuta* and *ruficollis* as conspecific; *minuta* being the form which breeds in the western palaearctic, and being supplanted in the extreme east by *ruficollis*. But Russian ornithologists (5) treat them as full species as there is a broad zone where their feeding ranges overlap; and Vaurie (10) states that they are sympatric on the eastern Taimyr Peninsula and around the delta of the Lena. Males of the two species in breeding plumage are markedly dissimilar.

The first mention of the occurrence of the Red-necked Stint in the North Island is by Falla (3). It was taken at Waikanae on the Wellington coast on 30 March 1930. Thus when four were found together in the Firth of Thames (4) on 27/10/41 and again on 9/11/41, this was the first record of anything resembling a flock in the North Island. During the ensuing years the study of shore-birds in the Firth of Thames became much more thorough; yet

very few stints were noted — none at all in some years — and it was not till the summer of 1951-52 that another palpable flocklet was discovered.

Similarly the Red-necked Stint was very scarce in Manukau Harbour during the 1940's. The Wrybills *(A. frontalis)* and Banded Dotterels *(C. bicinctus)* of the Puketutu flats were under close observation between 1940 and 1950; yet in only two summers was a Red-necked Stint found among them. Along the Karaka coast (8) scrutiny of the Wrybill flocks began in 1946, but some years were to elapse before a stint was found among them. It is reasonable to assume, therefore, that during the 1940's the Red-necked Stint was a very rare migrant in the northern harbours; and probably elsewhere in New Zealand.

COUNTS OF RED-NECKED STINTS

Summer	*Firth of Thames*	*Manukau*	*Kaipara*
1941-42	4 (2)	–	
1942-43	–	–	N
1943-44	–	1	O
1944-45	2	–	
1945-46	–	–	O
1946-47	–	–	B
1947-48	1	1	S
1948-49	2 (2)	–	E
1949-50	2	–	R
1950-51	1	–	V
1951-52	5 (3)	–	A
1952-53	9 (4)	2 (2)	T
1953-54	7 (1)	2	I
1954-55	6 (1)	1 (2)	O
1955-56	5	2 (1)	N
1956-57	5 (2)	4 (1)	S
1957-58	19 (20)	11 (4)	3
1958-59	26 (1)	14 (1)	4
1959-60	5	11	4
1960-61	5	14 (4)	4
1961-62	3 (1)	12 (1)	1
1962-63	4 (1)	7 (1)	3
1963-64	15 (11)	7	1
1964-65	18 (2)	13 (1)	6
1965-66	13 (2)	14 (2)	–
1966-67	14	20	7
1967-68	15 (3)	21 (1)	–

The figures for overwinterers are in brackets

During the 1950's, as a glance at the chart will show, there was a marked increase, particularly towards the end of the decade. Now in the later 1960's we would be surprised if we could not find small flocks of stints spending the summer, often but not invariably attached to Wrybills, in certain favoured localities, namely Miranda between White Bridge and Kairito Creek in the Firth of Thames; Kidd's Bay in Manukau and Tapora in Kaipara.

In Australia the Red-necked Stint is the commonest of the migratory arctic waders to remain over the southern winter. In

New Zealand the number of immature non-breeders which stay behind after April is very small; and the quickest way to find them, at any rate in the north, is by examining the flocks of wintering Wrybills at their high-tide roosts. The twenty Stints which overwintered in 1958 at Miranda were, by our standards, quite exceptional.

The few which overwinter may form the nucleus of the flocks which slowly build up during the spring; but some may travel south with the Wrybills or Banded Dotterels with which they have been associating for several months. Sometimes the first migrants are back before the end of September; e.g. at Karaka in 1958 after four had over-wintered, ten were present on September 28th, one of which was still in quite bright breeding dress; but most drift in during October and November. Adults may arrive still wearing traces of red nuptial feathering. By December the local flocks have become fairly stable and they remain so till the end of March. Thus at Kidd's Bay, Karaka, a flock of 18 had assembled by 9/12/67; there were 20 on 21/2/68 and 21 on 31/3/68. Likewise in the Firth of Thames a summering flock of 15 was undiminished on 24/3/68. So far there is no evidence of any substantial influx as Stints from the more southerly flocks travel north. Once they set out, they probably travel fast with few or short halts. Nor do the local flocks suddenly disappear. Rather they dwindle as pairs or groups complete the moult into breeding dress.

Elsewhere in the north there are few localities from which Red-necked Stints have been reported and the paucity of sightings is probably a true reflection of their former status. The records are:—

Parengarenga:
- 2 on 24/3/51 (D.A.U., H.R.McK.)
- 11 (15?) on 5/4/53 (H.R.McK.)
- 1 on 1/2/55
- 22 on 6/3/68 (A.T.E.)
- 20 on 25/10/68 (A.T.E.)

Ruakaka:
- 1 on 19/12/57 (B.D.B.)
- 1 on 14/9/58

Kaimaumau:
- 11 on 25/1/62 (A.T.E.)

Kaituna, B.o.P.:
- 1 overwintered 1967 (R.J.)

From the evidence available it seems indisputable that the improved figures so noticeable in the Firth of Thames and Manukau Harbour since the 1940's and especially in the 1960's represent a genuine increase in the number of Red-necked Stints which are reaching New Zealand annually; and that they are not merely the result of greater efficiency on the part of local observers. Even so the size of the northern flocks which have been under review is modest compared with those found in the South Island in 1968, viz. 57 in Southland and 38 on Farewell Spit.

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AN ANALYSIS OF PELLETS CAST BY HARRIER HAWKS

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For the research mentioned here two Harrier Hawks *(Circus approximans gouldi)* were kept in captivity (using normal falconry procedure) one for 8 months and the other for 3 months. The main food for tracing the length between food ingestion and pellet casting was mice. Mice of four different colours, black, white, champagne and grey were used, thus making it relatively easy to trace the intake and release by means of the hair colour.

For example, two mice of one of these colours would be fed to the hawk on a given day. The hawk would not be fed any other mice until a pellet was cast containing fur of this mouse's colour of fur or a period of three weeks had elapsed. Then two mice of another colour would be fed to the hawk, thus enabling any pellets containing hair of the previous mice to be traced if regurgitation is late. This made the minimum time, between feeding the hawk two lots of mice of the same colour, four weeks.

Between the time of feeding with these marked mice and the casting of a pellet the hawk would be fed on road-killed Brush-tailed Opossums *(Trichosurus vulpecula)*, European Rabbit *(Oryctolagus cuniculus)* or occasionally a European Hedgehog *(Erinaceus europaeus)* or European Hare *(Lepus europaeus)*.

An analysis was also undertaken of 20 pellets collected in the Drummond area of the Southland Acclimatisation District. Measurements were made of the length and width of the pellet, and its weight noted. After the weighing and measuring had been completed their volumes were taken by measuring their displacement of fine sand in a graduated cylinder.

The pellet is a collection of the undigested portions of a bird's food which, rather than being passed out with the faeces, is regurgitated from the stomach through the crop to the mouth.

The pellet of the Harrier Hawk is usually composed of hard materials such as: bones, claws, chitinous insect skeletons, egg shells, beaks, feathers and hair. Often, other indigestible material that is either taken in accidentally or on purpose, such as plant matter, is evacuated in the same manner. In short, any indigestible items that cannot pass through the pyloric sphincter into the duodenal portion of the small intestine may be ejected this way.

A characteristic hawk pellet consists of an outer layer of feathers or wool, often bound together by grass, surrounding an inner core of hard materials. At times, sufficient protective substances or binding cannot be obtained with their normal diet and then it is not uncommon for a bird to pick up materials not usually taken with the normal food. Some pellets have been found containing paper and cellophane forming a protective binding around the solid inner core.

The hawks that were kept in captivity have been noticed picking at straw and grass but only a very small amount was ingested during these periods of observation. Whether this was sufficient to form a protective outer cover for the core one cannot say.

One of the 129 hawks dissected contained a rather large quantity of grass or plant material. Some of this material may have been ingested accidentally with their normal food. Although, in one bird, specimen 54, almost the whole crop contents were of a plant nature. I would think that in the rest, judging by the small amounts of plant matter found, the quantities would be too small to be of much aid in covering the hard central contents of the pellets.

The pellets perform another function besides the ejection of indigestible material and that is they remove a layer of sediment that builds up in the stomach. This is necessary if the bird is to remain healthy. If a bird is unable to obtain enough detritus to form at least one pellet a week to remove this lining it becomes lethargic and inattentive. In other words, the general health of the bird declines.

Pellets of the Harrier Hawk are usually broader at the front end than the back end. The taper between the two ends is very seldom a regular one, in some pellets it is a sharp taper and in others it is slow if at all. Other pellets are oval in shape with their widest section near the centre. Occasionally they are very peculiarly shaped as far as pellets are concerned in that they are in the form of a triangle or a circle.

The pellets of hawks are unreliable as a quantitative indication of food habits and even a rough quantitative estimate of items found is suspect. It was found that some food items fed to hawks in captivity did not show up in any of the pellets examined after the feeding. For example, of two distinctively coloured mice fed to a captive hawk, no traces came through in the pellets.

During a crop, stomach and pellet analysis certain unavoidable difficulties are bound to be encountered which may lead to vagueness or in some cases error. Some of these difficulties apply to both gut content and pellet analysis while others apply only to gut analysis. The main areas where these problems are likely to arise in this gut content analysis are: determining the number of individual items in gut or pellet; the failure to examine each hair or feather in the gut or pellet; and the lack of knowledge of differentiating characteristics.

The difficulty in enumerating individual items in the gut or pellet contents occurs particularly when the hawk has been eating large prey and all that may remain in the stomach or pellet is hair or feathers. Under these circumstances, it is very difficult, if not impossible, to tell the number of prey or carrion items of that particular species that the hawk has been feeding on, since there is nothing that can be used as a basis for counting the items. When the hawk has been eating smaller food items such as small birds, mice or lizards the task of enumeration is not so difficult. Since, with these smaller items the whole individual is usually consumed there is no difficulty in counting birds' feet, beaks, mouse skulls or even incisors.

The failure to examine every hair or feather of the gut or pellet under the microscope can be well understood. This method of individual examination would take a tremendous amount of time, so hairs and feathers were grouped macroscopically at first and then representative sections of these groups were mounted on slides and identified. In some cases similar hairs of two separate species may have been placed in the same group and identified as one individual.

The lack of knowledge of differentiating characteristics is aggravated by the fact that there is no key available for differentiating the feathers of young passerines. The problem was made even more difficult by the destruction of some of the identifying features by the physical and chemical action of the stomach. In pellets, feathers tend to be well ground and even powdery and the hair broken with the characteristic medullary patterns lacking, thus making very few complete hairs or feathers available for study.

Many of the contents of a gut like seeds and small grit (labelled detritus) may have been the result of the prey having eaten another animal and then having its crop, gizzard or stomach release these contents inside the hawk's stomach. These secondary foods may cause one to assume, for example, that the hawk has been eating insects, where in fact these are secondary foods. One of his prey may have eaten the insects and they were released from the prey's stomach or crop.

Another possibility of error is the fact that the hawk may have ingested some of its own feathers usually after having preened itself. In such cases the author's judgment was used to determine which feathers were from preening and which were actually from prey or carrion.

The main factor that may cause error, besides the ones mentioned above, in a pellet analysis is the holding over of food items for several days.

If, for example, a particular hawk revisited the same roost for several days or even weeks in succession then two, three or even four pellets may be collected containing parts of the same food item. It was found that in one case where pellets were cast more than two weeks apart traces of one particular food item showed up in both cases. This of course is not common but casting of different parts of the same food item in separate pellets happens quite regularly. This could lead to counting the same food item more than once.

The tabulation of pellet contents in the following tables is not a true indication of the food habits of the hawk since they change seasonally. The contents of these pellets should be used only as an indication of some of the food eaten during the late spring and early summer.

The pellets analysed in the following tables were collected by Mr. Roger Sutton in the Drummond area of the Southland Acclimatisation Society.

PERCENTAGE OCCURRENCE OF FOOD ITEMS FOUND IN PELLETS

	Number of Items	*Percent*
Sheep *(Ovis sp.)* remains	6	15.8%
Rabbit *(Oryctolagus cuniculus)*	2	5.3
Hare *(Lepus europaeus)*	2	5.3
Opossum *(Trichosurus vulpecula)*	3	7.0
Yellowhammer *(Emberiza citrinella)*	1	2.6
Song Thrush *(Turdus ericetorum)*	2	5.3
Ducks (*Anas* sp.)	5	13.2
Passerines (unidentified)	10	26.4
Lizards	2	5.2
Skylark eggs *(Alauda arvensis)*	1	2.6
Blackbird eggs *(Turdus merula)*	2	5.2
Unidentified egg shell	2	5.2
	38	99.1%

PELLET STATISTICS

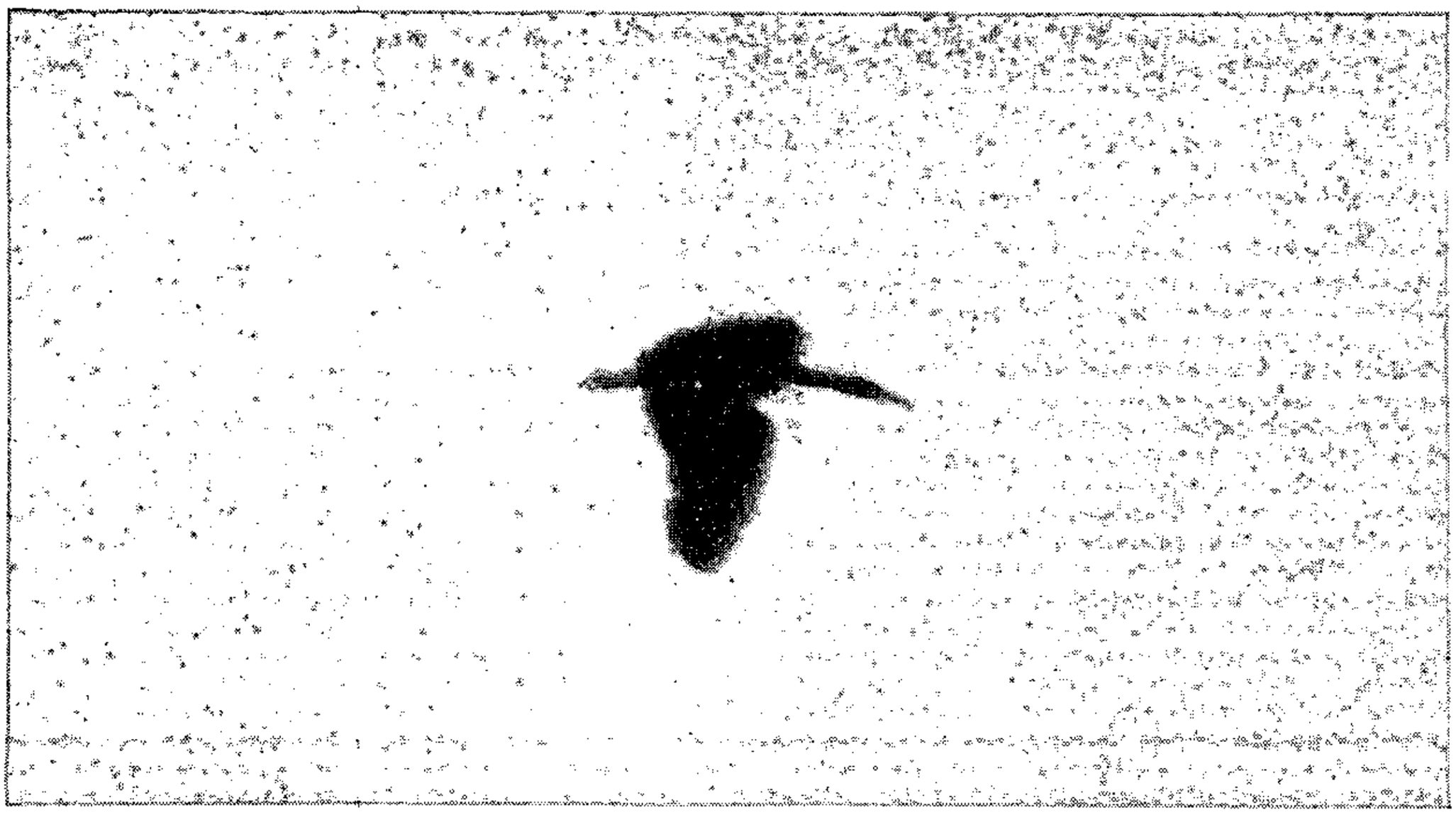
Pellet Number	*Length*	*Width*	*Dry Weight*	*Volume*
1	27.0 mm.	18.0 mm.	1.3 gm.	5.0 cc.
2	23.5	18.0	1.3	4.0
3	37.0	19.0	2.0	5.5
4	20.5	18.0	1.2	5.0
5	28.0	14.0	1.9	4.0
6	35.0	21.0	1.8	9.0
7	31.0	17.0	1.0	6.0
8	27.0	15.5	0.9	4.0
9	30.0	21.0	1.5	7.0
10	26.0	20.0	1.1	4.0
11	31.0	18.5	1.1	4.5
12	33.0	20.0	1.2	6.0
13	32.0	15.0	1.3	4.0
14	48.0	25.0	4.2	9.0
15	32.0	21.0	2.9	6.0
16	27.0	16.0	0.9	3.0
17	21.0	19.0	0.8	6.0
18	33.0	19.0	2.1	7.0
19	29.0	22.0	2.6	7.0
20	47.0	28.0	3.3	9.0
Total	618.0	385.0	34.4	112.0
Average	30.9 mm.	19.3 mm.	1.2 gm.	5.6 cc.

AUSTRALIAN BROLGA (GRUS RUBICUNDA) RECORDED IN NEW ZEALAND

By K. E. WESTERSKOV
Department of Zoology, University of Otago, Dunedin

Mid-afternoon in warm and sunny weather on 8 January 1968 I had stopped at Punakaiki, Westland, to see the famed pancake rock formations. On my way back to the car I relaxed on the open plateau above the cliff formation, in order to remove an exposed film from my camera and insert a new one.

Having done so and before moving on, I incidentally or habitually scanned the sky and experienced immediately the bone-tingling thrill of seeing a large and unusual bird in steady and easy flight coming towards me from the sea to the north. The next few minutes were some of my most hectic ever experienced: I first of all was puzzled and surprised, and eliminated in no time all the species it could not be (not a heron as the long neck was stretched, not a Royal Spoonbill which is white) and very quickly arrived at the conclusion that this bird undoubtedly was a Brolga, till recently the only species of crane known in Australia (Lavery and Blackman, 1968, have now found the Eastern Sarus Crane, *Grus antigone sharpii,* breeding beside the Gulf of Carpentaria and near Atherton in northern Queensland since 1967). I was caught between two desires: to rush a few steps down a track to my wife who carried my 10 x 50 binoculars: and to photograph the bird. In seconds I picked up my binoculars, had a good long look at the bird, got my camera ready (Exacta with 135 mm. telephoto lens) and took a photograph of the bird which was by then a fair way off (cf. Fig. 1), and studied the bird again carefully in my binoculars till it disappeared from sight to the south.



[K. E. Westerskov

Plate XXXIX — Brolga in flight, Punekaiki, Westland.

All of this happened so quickly and thinking back I should probably have concentrated on photographing the bird when it flew almost straight over me, I would estimate at a distance of about 150 feet. As mentioned the bird came in from the sea to the north and later examination indicated that it was following the coast-line; it did not increase altitude when flying over the rocky peninsula where I was standing but continued in a straight unbroken line. As the plateau where I was standing was about 100 feet above sea-level (for which information I am grateful to Mr. B. L. Wood of the N.Z. Geological Survey, Dunedin), the overall altitude of flight above the sea and later the swamp to the south of Punakaiki was in the order of 250 feet.

The bird continued towards the south without gaining or losing altitude and finally disappeared from sight. Returned to the car I wrote this brief description in my notebook without any reference to descriptions (I did not have the opportunity to check the literature on this species till several days later after return to Dunedin):

" Large, dark grey, the size of White Stork, thick head with reddish face, long and stretched neck, long and pointed dark bill, long dark legs trailing behind. Flight not laboured like White-faced Heron, easier, more stretched wings. Brolga Crane ? "

There were two reasons why I decided this bird was a Brolga: (1) During my work over the last couple of years with the manuscript to my ' Know Your New Zealand Birds,' I had checked most Australian ornithological literature on stragglers and potential avian immigrants and was well familiar with likely possibilities: (2) Last year I saw on two occasions H. J. Pollock's fine colour film ' Brolga ' with many flight shots.

After the observation and making notes I proceeded by car southwards in the direction taken by the bird, photographing the swampy marsh habitat stretching for miles behind the coast-line. I spent the next couple of hours watching in my binoculars the sky, lagoons and lakes, open patches; and took the only road leading to the beach and walked to a nearby lake where I flushed four White-faced Herons. I also talked to three farmers in the area, one of them burning tree stumps in the middle of the swamp, but none of them had noticed any ' herons ' lately.

As the bird was not to be seen and easily could have settled anywhere in the miles of flax and marsh country, I proceeded to Greymouth. Arrived here I phoned the Internal Affairs local field officer, Mr. T. Hartley-Smith and the Regional Representative of the Ornithological Society, Mr. P. Grant, to tell them about the bird and encourage them to look for it, but unfortunately found neither at home.

I then ' broke off action ' and proceeded to Lake Brunner in order to continue my momentarily but so happily interrupted Crested Grebe work.

Looking back and having compared my notes on the spot and subsequent notes with information in Australian ornithological literature, I am convinced that this bird was a Brolga *(Grus rubicunda)*.

I should like to discuss the main features in more detail:

(1) Size: The bird was of very large size, much bigger than White-faced Heron, clearly bigger than White Heron, and I immediately

thought of the European White Stork with which I was thoroughly familiar during my boyhood and youth in Denmark. It was also approximately of the size and general outline of the Sandhill Crane with which I became well familiar during my 1961-62 stay in Alberta, Canada, where I observed large flocks during migration.

(2) Plumage coloration: The bird was uniformly grey and appeared dark grey; this was probably because it was seen from underneath (lower surfaces in shadow) and flying, or possibly because it was an immature bird (which " differs from the adult in being darker," Mathews, 1921: 189).

(3) Neck: The most unusual and unexpected feature which immediately attracted my attention was the long, extended, straight and slightly drooped (" sagging ") neck which at once ruled out the species of herons which *all,* in sustained flight, fly with head and neck tucked back in S-form on shoulder. The straight neck is easily noticeable in Fig. 1.

(4) Bill: The bill was stork-heron-like, long and pointed, and of dark colour.

(5) Head: I noticed two points about the head: It was " thick," i.e. it appeared heavier, not so slender as in herons, and it was reddish on the face.

(6) Legs: The legs were long, dark and extended, trailing beyond the tail. When the legs do not appear particularly long in Fig. 1, the reason is that this photograph was taken at an oblique angle, with the bird moving away from me, already an appreciable distance away. Also, the legs are not stretched straight out behind the bird but trail below the horizontal.

(7) Wings: The wings were dark, long, broad rounded at the tips, and more stretched as in White Stork and Sandhill Crane, not arched as in herons; compare for a visual impression the two photographs of flying Sandhill Cranes on pp. 87 and 116 in Aymar, 1936, particularly the latter showing the stretched wing-planes, with for example my photograph (Westerskov, 1967: 47) of a flying White Heron, showing the arched or curved wings.

(8) Flight: The flight was unlaboured and rhythmic, easy and graceful, not the characteristic somewhat laboured deep wing-beat of the herons. The wings were moved in a narrow arch.

(9) Habitat: The bird was seen following the coast-line or coming in from the sea to the north of Punakaiki and proceeding at unchanged altitude to and over the extensive miles of swamp and marsh county (with scattered lakes and lagoons) to the south. This habitat appears ideally suited and conforms fully with habitats given in Australia: " Frequenting plains and swampy areas " (Cayley, 1951: 5), " The brolga is a bird of the plains but not restricted to them: it frequents also swampy country and well-grassed flats, the margins of lakes and streams, away from the open plain, and may be met with around lily-lagoons in lightly timbered country up north " (Barrett, 1947: 22).

(10) Identification by elimination. Of all the Australian large-sized heron/stork/ibis types of birds that this bird could have been, identification by elimination was accomplished thus:

It was *not a heron* as all herons fly with neck in S-form resting on shoulders; also this bird was bigger than any herons in this region.

It was *not an ibis* as the three Australian species of ibis (of which two species have been seen in increasing numbers in New Zealand, cf. Andrew, 1963: 315) are much smaller, more of the size of White-faced Heron; ibises fly with stretched neck but have *decurved bill* like a curlew, and their flight is quite different, alternatively flapping and gliding; I had the opportunity to observe and photograph the Sacred Ibis in Kenya in 1965.

It was *not a stork* of which family only the giant Jabiru (Black-necked Stork) occurs in Australia; the Jabiru is black and white in plumage, has heavy black bill and red legs.

It was *not a Royal Spoonbill* which I have observed at Nelson and which is snow-white and has conspicuous, black spatulate bill.

And it was *not a bittern* of which all three Australian species are smaller, brown and mottled, with neck retracted as herons during flight.

DISTRIBUTION OF BROLGA

The Brolga is an endemic to Australia and New Guinea. It occurs according to Peters (1934: 153) in two subspecies, the type from *Grus rubicunda rubicunda* (Perry) in southern and eastern Australia and in the swampy lowlands of southern New Guinea, and *Grus rubicunda argentea* (Mathews) found in north-western Australia and the Northern Territory. The Brolga has not been recorded from Tasmania, but Mathews (1921: 189) mentioned that a Brolga has once been recorded from Central Asia; this record is doubted by Lavery (in litt.) because of the similarity between some individuals of Eastern Sarus Crane and Brolga.

In the 'Checklist of New Zealand Birds' (Fleming, 1953: 38), under the Order Gruiformes this footnote is included: "A large bird seen at Clevedon from March to May, 1947, has been identified as a Brolga (*Grus rubicunda* (Perry), Australia) from a feather found. Further evidence is required before this species can be added to the New Zealand list. See *Auckland Weekly News,* July 18, 1951: 38, and *Notornis,* 1952, 4 (7): 198." McKenzie and Cunningham (1952: 198) stated that "From March to May, 1947, a large bird was seen and heard in the vicinity of Clevedon by more than 80 people. From a study of all reports, and comparison with museum specimens of a feather found, it is concluded that the bird was a Brolga."

VERIFICATION

I had the opportunity to discuss my observation and photograph with several Australian ornithologists attending the A.N.Z.A.A.S. Science Congress held in Christchurch in January 1968. Among them was Mr. I. C. R. Rowley of the Division of Wildlife Research, C.S.I.R.O., Canberra; he advised me to show my material to Mr. H. J. Lavery, Research Entomologist of the Animal Health Station, Townsville, Queensland. Mr. Lavery has studied this species for a number of years and is a recognised Brolga specialist.

Mr. Lavery has very kindly studied and discussed my paper and photograph with his colleague, Mr. J. G. Blackman, with whom he has carried out Brolga studies since 1959. In a letter dated 3 August 1968, Mr. Lavery confirmed: "The description which you give is almost certainly that of a brolga; at 150 feet one is unlikely to mistake the species." And later: "We conclude by accepting the record as presented by you (see enclosed MS of extension paper)."

This last reference is to the paper by Lavery and Blackman (1968) included in my References. In this paper the authors state under Distribution (including my record): "Brolgas occur throughout northern and eastern Australia from Shark Bay, Western Australia, to south-western South Australia, and in New Guinea from Frederick Henry Island to the Fly River basin. Occasional birds have been recorded from other parts of the Australian mainland (e.g. Beacon in Western Australia) and adjacent islands (e.g. Sepik River basin in New Guinea, Willis Island and the South Island of New Zealand)."

My photograph of the flying Brolga is I readily admit photographically very poor and diagnostically of only limited help. The photo presented (Fig. 1) is an appreciable enlargement of a 35 mm. negative. It does show the following criteria: (1) long straight neck; (2) long pointed straight beak, both diagnostic features of the Brolga; (3) the long legs, and (4) the long wings are also diagnostic features and need more explanation. As the bird was at an appreciable distance when photographed, at an oblique angle and photographed partly side-ways, partly from behind (and of course from below), several distortions photographically can take place: the legs appear shorter because parts of their upper parts are hidden by or seen against an arching wing. I have studied big enlargements of my photograph (also as seen on the screen through a projector), but because of the long distance involved when the picture was taken and the fact that only a silhouette was obtained, it has not been possible to differentiate and see whether the right wing is the upper one, arched and with wing-tips bent down forwards and towards neck, or whether the right wing is the extended lower wing seen in photograph. The bird I saw was flying at ease, at unchanged altitude and undoubtedly aided by coastal up-currents of air; its outer primaries appear not separated, but this I have seen to be the case in photographs of other cranes (e.g. in K. Sogaard's fine photograph of a flock of the similar-sized Eurasian Crane, *Megalornis grus,* published in the Norwegian journal 'Jakt-Fiske-Friluftsliv,' *97:* 28, 1968). The wings and their interpretation (as to shape and relative position) also caused speculation by Lavery who, however, concluded: "but we are prepared to accept that this may be artefact."

As the Brolga may be seen again in Westland (or elsewhere in New Zealand), appreciable detail has been given in this paper to enable ornithologists to distinguish it if met in the field and point out how it differs from related species. For reading my manuscript and helpful comments and for the loan of the photographs I am grateful to Mr. H. J. Lavery and his colleague, Mr. J. G. Blackman.

CONCLUSION AND SUMMARY

A Brolga *(Grus rubicunda)* was observed on 8 January 1968 at Punakaiki, Westland, under good conditions. The bird was watched in 10 x 50 binoculars while flying over and a photograph taken; however poor this photograph, taken at appreciable distance of the disappearing bird, it does show the long stretched neck, long bill and legs, and long broad wings characteristic of this species.

Others may see the Brolga, I hope, and more Brolgas and possibly other large wading birds may come to this country from across the Tasman. Considering the frequent appearance of Australian herons, ibises and spoonbills in New Zealand and the nomadic and widely

roaming habits of the Brolga, the occurrence of this species in New Zealand cannot be considered an unexpected phenomenon; rather, it was on the ' waiting list ' as it were.

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A NEW ZEALAND RECORD OF THE NORTHERN SHOVELLER

By P. J. HOWARD

A drake Shoveler in fine plumage was shot on the 6th May 1968 by Mr. Tony Cathcart of Onewhero in the Maungatawhiri Swamp, near Pokeno, Lower Waikato. I noted at once that it differed from the New Zealand Shoveler *(Anas rhynchotis)*. Reference to literature led to its tentative identification as a specimen of the Northern Shoveler *(A. clypeata)*. H. R. McKenzie came to see it, bringing further literature and we were sure enough of the identity of the bird to refer it to Mr. E. G. Turbott and Mr. R. B. Sibson, by whom its identity was finally confirmed.

A study skin, A.V. 1224. 1 was made and is in the Auckland War Memorial Museum. Measurements are:— Length 487, Wing 241, Tail 94.5, Tarsus 32. Bill 63, Gonads 8 x 3.5 mm.

The head and neck are solidly a glossy dark green. There is no sign of the white crescent on the side of the face as in *rhynchotis*. The breast is white, clearly and sharply defined from the green of the neck and the smooth russet brown or plum colour of the lower breast and belly. In both the white and the brown is a scattered pattern of very small patches of vermiculations. This is described by Witherby. The back is patterned as in *rhynchotis*, but the colours are brighter. The under-tail has a broad white band across, whereas the New Zealand bird has only large side patches of white. No significant difference in the bill can be discerned. The legs are bright orange.

It is worth mentioning that when this bird was shot it was flying with a female of unknown species.

[*Anas clypeata* tends to travel further south on its migrations than other northern ducks and is not deterred by the ' heat barrier ' of the tropics. As a stray it has reached South Africa and Australia. Its occurrence in New Zealand is therefore not as surprising as at first it may appear. — Ed.]

AN OWLET-NIGHTJAR FROM NEW ZEALAND

By R. J. SCARLETT, Canterbury Museum

ABSTRACT

A sub-fossil Owlet-Nightjar, related to, but with larger limbs than, the genus **Aegotheles,** from a number of New Zealand localities, is described, and placed in a new genus.

DISCUSSION

For many years material has accumulated in the Canterbury Museum, of a bird new to the New Zealand afunal list. The bones come from caves and a swamp, and show a wide distribution in both North and South Islands. The material consists of three part skeletons, and a number of odd bones. A few bones were collected last century, but most have been found in the last twenty years, largely owing to the greatly accelerated exploration of caves by the various speleological groups, most of which kindly make their finds available for identification.

Lack of comparative material in New Zealand Museums prevented identification until 1967, when, while visiting Australia, I was able, through the courtesy of Messrs. Herbert Condon, of the South Australian Museum, and Alan McEvey, of the National Museum of Victoria, to examine and measure skeletons of the *Caprimulgiformes, Podargus, Eurostopodus* and *Aegotheles.* Subsequently I obtained by exchange, from the National Museum of Victoria, skeletons of *Podargus* and *Aegotheles.* Dr. Warren Hitchcock of C.S.I.R.O. Wildlife Division, Canberra, supplied lists of tarsal measurements of New Guinea species of *Aegotheles,* and Mr. Graham Turbott, now Director of the Auckland Museum, made the Pukemiro Cave specimen available for study. To all these helpers I am grateful.

When I examined the Australian material, I realised that the New Zealand bones belonged to an Owlet-nightjar, with cranium and sternum hardly distinguishable from the Australian and New Guinea forms, but with much larger wings and legs. Because of the latter feature, I propose a new genus *Megaegotheles,* and species, *novaezealandiae* for the New Zealand bird.

The New Zealand material consists of 3 part-skeletons all of which are sub-adult, and a number of odd bones.

SOUTH ISLAND

AV 5090: Earnscleugh Cave, Otago: 1874. F. W. Hutton. Pelvis (in 3 pieces) labelled " Sceloglaux " by Hutton.

AV 5124: Earnscleugh Cave, Otago. 1874. F. W. Hutton. Distal end of R. tibio-tarsus. R. Tarso-metatarsus: Both labelled " Creadion " by Hutton.

AV 19,890: 50 x 60 c.m. test pit floor of Rockshelter B at head of Frenchman's Gully, Timaru district 1/9/1964. R. J. Scarlett. Proximal end and part shaft of L. tarso-metatarsus.

AV 7241: Pyramid Valley Swamp, North Canterbury. 1/4/1942. J. R. Eyles and R. J. Scarlett. R. humerus.

AV 7242: Pyramid Valley Swamp. 4/3/1949. J. R. Eyles and R. J. Scarlett. L. humerus.

AV 15,118: Pyramid Valley Swamp. 18/2/1957. R. J. Scarlett. L. tibio-tarsus.

AV 13, 772: Pyramid Valley Swamp. 13/2/1955. Canterbury Museum party. L. humerus.

AV 14, 467: Pyramid Valley Swamp. 17/2/1956. R. J. Scarlett. R. humerus.

AV 17,333: Limestone Rockshelter No. 1, farm of Euan Murchison, Weka Pass, North Canterbury, 15/3/1959. G. R. Kennington, R. and L. proximal end L. femora, distal end and shaft of R. tibio-tarsus, distal end and part shaft of L. tarso-metatarsus, R. humerus (mixed bones).

AV 17,774: Locality as AV 17,333. 23/9/1961. G. R. Kennington and R. J. Scarlett. R. tibio-tarsus, proximal ends and part shaft of I.R. 2L.; distal ends and part shaft of R. tarso-metatarsi, L. humerus (mixed bones).

AV 16,996: Harwood Hole Limestone cave, Canaan, Takaka, Nelson. Resting on flowstone surface, c. 100 feet above cave-floor (the cave is the deepest in New Zealand). Jan. 1960. O. R. Wilkes. Sub adult: Pelvis, sternum, 3 vertebrae, 8 ribs, sternal rib, R. & L. femora, R. shaft of L. tibio-tarsi, R. fibula, shaft of R. tarso-metatarsus, L. shaft of R. humeri, R. coracoid, R. scapula: phalanx (individual skeleton).

AV 21,343: Pothole, Canaan Road, Takaka: 1961. E. Sixtus: distal end of L. tibio-tarsus: R. tarso-metatarsus.

AV 16, 745: Moa Hole, (pot hole) Canaan, Takaka. Jan. 1960. O. R. Wilkes: R. & L. tarso-metatarsi.

AV 16,728: Moa Hole, Canaan, Takaka. Jan. 1960: O. R. Wilkes. Sternum (possibly belonging to AV 16,745).

AV 16,744: Kiwi Hole, Canaan, Takaka, upper level. Jan. 1960. O. R. Wilkes. Sub-adult R. tarso-metatarsus.

AV 16,856: Fissure 3, Limestone Bluff, Heaphy River, N.W. Nelson. 3/12/1952. O. R. Wilkes: Sub-adult proximal end and shaft of R. tarso-metatarsus.

AV 16,640: Fissure 3, Limestone Bluff, Heaphy River. 30/11/59 - 2/12/59. R. J. Scarlett and O. R. Wilkes: R. Carpo-metacarpus.

AV 16,638: Fissure 3, Limestone Bluff, Heaphy River, data as for AV 16,640. R. & L. humeri: R. distal end and part shaft L. tibio-tarsi, R. & L. tarso-metatarsi.

AV 16,773: Fissure 4, above Limestone Bluff, Heaphy River: 2/12/1959. O. R. Wilkes. R. & L. humeri, R. tibio-tarsus (minus head), proximal L. tarso-metatarsus.

AV 18,012: Location 1a, Gouland Downs Limestone cave complex, N.W. Nelson. 21/11/1961. O. R. Wilkes. L. tarso-metatarsus: R. humerus (minus head).

AV 17,647: Cascade Cave, Paturau, N.W. Nelson. 5/8/1961. P. R. Kettle. Distal end and shaft of R., part shaft of L. tibio-tarsi: broken L. tarso-metatarsus: R. humerus (in two pieces) vertebra.

NORTH ISLAND

AV 18,563: Te Waka No. 1 cave in Waitotaran limestone, c. 4,500 feet, about 30 miles from Napier, Hawkes Bay: before the Hatope lapilli shower of 1900 B.P. ±50 (50 A.D.). April 1959. W. H. Hartree: sub-adult R. tarso-metatarsus.

AV 18,564: Same data as AV 18,563: Part cranium: part sacrum: proximal end and shaft of R. tarso-metatarsus.

AV 18,505: Te Waka No. 1: data as above: Shaft of L. humerus.

AV 18,641: Te Waka No. 1: data as above: 1958. R. tibio-tarsus.

AV 18,242: Te Waka No. 1: data as above, except that the bone is before the Waimihia pumice-shower of 3,430 ±50 B.P. (1480 B.C.). W. H. Hartree: —/7/1949. L. humerus.

AV 18,241: Te Waka No. 1: data as for AV 18,242. R. humerus. L. tarso-metatarsus (individual).

AV 18,240: Te Waka No. 1: data as for AV 18,242: L. tarso-metatarsus, L. tibio-tarsus, R. humerus (individual).

AV 17,503: Hukanui 7a, Limestone cave, c. 2,500 feet, about 30 miles from Napier, Hawkes Bay. Upper level, above Hatepe lapilli. 11 & 12/6/61. R. J. Scarlett and W. H. Hartree. L. tarso-metatarsus.

AV 17,512: Hukanui 7a, Lower level in soil above Hatepe lapilli. 7 - 12/6/1961. W. H. Hartree and R. J. Scarlett. R. humerus.

AV 17,513: Hukanui 7a; Lower level, data as for AV 17,512: L. tarso-metatarsus, slightly sub-adult.

AV 16,804: Limestone cave near Puketitiri, Hawkes Bay. —/1/1960. R. A. Whittle. R. tibio-tarsus: distal end and shaft of L. femur.

AV 20,651: Skyline Cave, Mahoenui, Taranaki: 20/2/1966. Taranaki Caving Club, per D. Medway: Sub-adult: pelvis (broken), R. and L. humeri, R. and L. ulnae, R. and part L. radii, R. (broken) and L. carpo-metacarpi, R. and L. scapulae, L. coracoid, 8 vertebrae, L. proximal end distal ends of R. femora, R. distal and part shaft L. tibio tarsi, R. and L. tarso-metatarsi (broken in shaft), R. quadrate, L. posterior ramus of mandible.

Auckland Museum specimen: Gaskell's Caves, Matira, Pukemiro, Auckland. Date ? (before 1958). L. Vause: Sub-adult. Cranium (badly fragmented): part mandible: L. quadrate: Broken pelvis: Distal end and shaft of R. and L. humeri, Proximal ends of R. and L. ulnae, R. and L. radii, R. and L. carpo-metacarpi; Proximal and distal ends of R., distal end of L. coracoids; fragments of R. femur, fragments of R. and L. tibio-tarsi, 11 vertebrae, 3 ribs, 2 sternal ribs (a very fragile specimen).

MATERIAL USED FOR COMPARISON
Aegotheles cristatus (Shaw)

South Australian Museum:

No.	Skeleton	Locality	Sex	Date	Collector
B15062 B10989	Complete Sternum, R. &. L. coracoids, clavicle, R. & L. scapulae, Some sternal ribs (from skin)	Port Augusta	?	–/10/1931	Mrs. L. Bryant
B11472	Sternum, most of leg and wing bones	?	?	?	Dr. A. M. Morgan
B10996	Sternum, clavicle, R. coracoid, R. scapula	Milong	?	6/3/1909	?
B10341	Pelvis, sternum, R. & L. femora, clavicle, R. & L. coracoids, R. & L. scapulae, 17 vertebrae, ribs, sternal ribs, L. ends (from skin), R. & L. humeri.	?	?	?	Dr. A. M. Morgan
B11629	Complete	?	F	5/11/1928	Dr. A. M. Morgan

National Museum of Victoria:					
W6769	Complete	?	?	?	?
W6466	Complete	?	?	?	?
W2340	Complete	?	?	?	?
W6585	Lacks mandible. Pelvis broken.	?	?	?	?
W6680	Complete	?	?	?	?
B8778 (C.M. A.V.21,756)	Complete except for a few ribs.	Willaroo, Casterton, Victoria	M	10/6/1966	C. Austin

NOTE ON AUTHOR'S NAME: The name **cristatus,** for an Owlet-Nightjar, was first published in J. White's **Journal of a Voyage to New South Wales,** 1790, p. 241, and plate 29. Peters (**Checklist of Birds of the World,** Vol. IV, p. 182) and Rand and Gilliard (**Handbook of New Guinea Birds,** p. 262)) give the author as White. On the other hand Hartert in the ***Catalogue of Birds in the British Museum*** *quotes it as* " Shaw," in White's "Voyages," and Australian writers also quote it as " Shaw." As I have not access to the original publication, I am unable to decide which authors are right.

The choice of a specimen for the Holotype of *Megaegotheles* has been a problem. Of the completely mature bones, very few are associated. After much consideration, I have chosen AV 16,996, as the Holotype, and the other specimens listed are Paratypes. The Holotype skeleton is closer to maturity than AV 20,651 and the skeleton belonging to Auckland Museum, although it contains fewer bones. Unfortunately, the Holotype has no cranium, and the following cranial description is of AV 18,564:

CRANIUM

This cranium is somewhat defective, being broken in the post-orbital to para-occipital region on the rightside, with two indentations on the top, and lacking pre-maxilla, mandible, quadrates, quadrato-jugals, palatines, vomer, pterygoids and other cranial bones. It terminates at the narrowest part of the inter-orbital region, lacking the forked part of the " flexure " to which the pre-maxilla hinges in *Aegotheles.* It is even more constricted in this region than in most *Aegotheles,* as the table of cranial measurements indicates. It has the broad, rounded posterior region of *Aegotheles.* The Nightjars *(Eurostopodus)* are almost square in this region, and while the Frogmouths *(Podargus)* are rounded posteriorly, both Nightjars and Frogmouths are very much broader in comparison with size, than in Owlet-Nightjars. Crania of the only other three genera among the many in the *Caprimulgiformes* available to me, *Caprimulgus europaeus* Linne from Europe, *Steatornis caripensis* Humboldt from Trinidad, and *Phalaenoptilus nuttallii hueyii* Dickey, from California, are all much less rounded posteriorly than *Aegotheles* or *Megaegotheles,* and very much broader inter-orbitally. The orbital walls of *Megaegotheles* cover the whole of the orbital space, with the exception of 11 foramina, one very small approximately 0.8 c.m. from the top of the cranium, and 1.1 c.m. anterior to the post-orbital process, another approximately in line with this, and 1.4 c.m. anterior to the post-orbital process, 0.075 c.m. behind, and slightly above the most anterior foramen is another very minute one, and 0.2 c.m. behind the one first mentioned, and slightly above it, is another minute one.

The largest foramen is a circular, thick-walled hole, opening " sideways " and entering in an anterior direction *forward* of a depression, from the base of which 3 closely grouped tiny foramina

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Plate XL — **Megaegotheles novaezealandiae:** Cranium AV 18,564, left dorsal and posterior views.

also open, and above which there are a further two minute foramina. Inside, on the lower part of the "wall" of the largest foramen, is another minute foramen. The largest foramen is 1.1 c.m. from the top of the cranium, and 0.55 c.m. anterior to the post-orbital process. It measures 0.125 c.m. The *Aegotheles* cranium used for comparison, B 8778, is cracked through the orbital walls, and only the large foramen, which enters more directly than in *Megaegatheles, above* a depression containing two small foramina, can be seen.

The space between the frontal and squamosal is 0.415 c.m., and the distance between post-orbital and para-occipital processes is 0.165 c.m.

There is a very small foramen on the ridge of the squamosal 0.475 c.m. from the edge, and 0.875 c.m. from the centre of the supra-occipital " bulge." On the *Aegotheles* cranium similar foramina cannot be seen. The occipital foramen is broken on the right, but measures approximately 0.5 c.m. across it. The fragments of mandible (R. + L. posterior rami, and part of the anterior left ramus) in the Auckland Museum specimen, agree well with the mandible of *Aegotheles* in conformation, although in a fully adult bird they would have been a little larger.

PELVIS

This is described from the Holotype, AV 16,996, where it is better preserved than in the other specimens. The measurements are given in the table below. It is very similar to *Aegotheles* in form, with a pronounced central ridge arising from the anterior 2 sacral vertebrae, forming a " crest " between the two anterior portions of the ilia. This " crest " rises above the ilia, as in *Aegotheles* but is somewhat more pronounced than in the latter. The ischia and pubes diverge or " splay " widely at the posterior, as in *Aegotheles.* The ischio-iliac (post-acetubular) foramen is slightly more ovoid, less rounded, in *Megaegotheles* than in *Aegotheles,* as the length and breadth measurements (0.35 x 0.25 for AV 16,996, 0.375 x 0.2 for AV 5090, 0.35 x 0.2 for the Auckland Museum specimen, and 0.315 x 0.215 for B 8778) indicate.

STERNUM

The only mature specimen, AV 16,728, has an abnormality on the right side, as will be seen in the photograph, but otherwise, except for larger size, *Megaegotheles* is very similar to *Aegotheles*. The central process is broader in *Megaegotheles* (AV 16,728: 0.45; AV 16,996: 0.35; Auckland Museum individual: 0.425; and *Aegotheles* B 8778: 0.15 c.m.). These measurements were taken at the narrowest posterior portion, adjacent to the narrow band of bone which unites all the posterior processes. In *Megaegotheles* the anterior processes thrust forward in a more pronounced fashion, and the central anterior projection for the attachment of the clavicle, which is divided in *Aegotheles*, is a blunt, ribbed point in *Megaegotheles*.

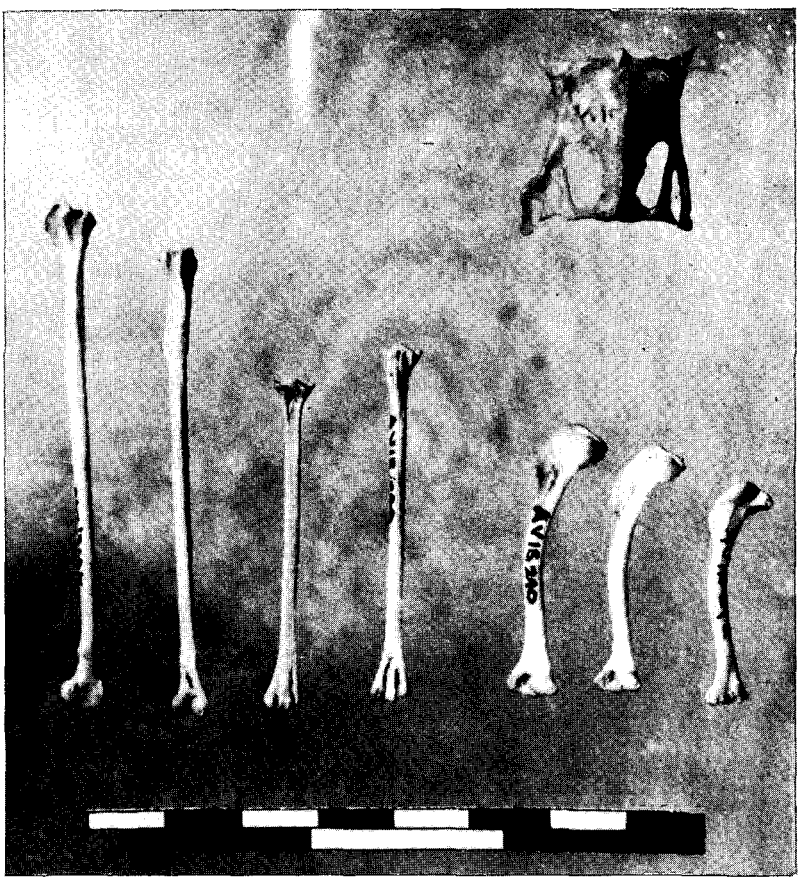

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Plate XLI — **Megaegotheles novaezealandiae:** Sternum: AV 16,728 (note abnormality), tibio-tarsi. AV 18,240: left side. AV 18,641: front: tarso-metatarsi. AV 18,241 front: AV 18,240: back: humeri; AV 18,240; AV 18,241. front AV 18,242: back views.

FEMUR

Shaft oval, much expanded proximally and distally. Both ends have a relatively flattened appearance: Except for the much greater size *Megaegotheles* is similar in this bone to *Aegotheles.* The shaft is relatively straight. There is a tubercle on the ventral surface, near the outer edge, distally. A similar tubercle is barely visible in *Aegotheles.*

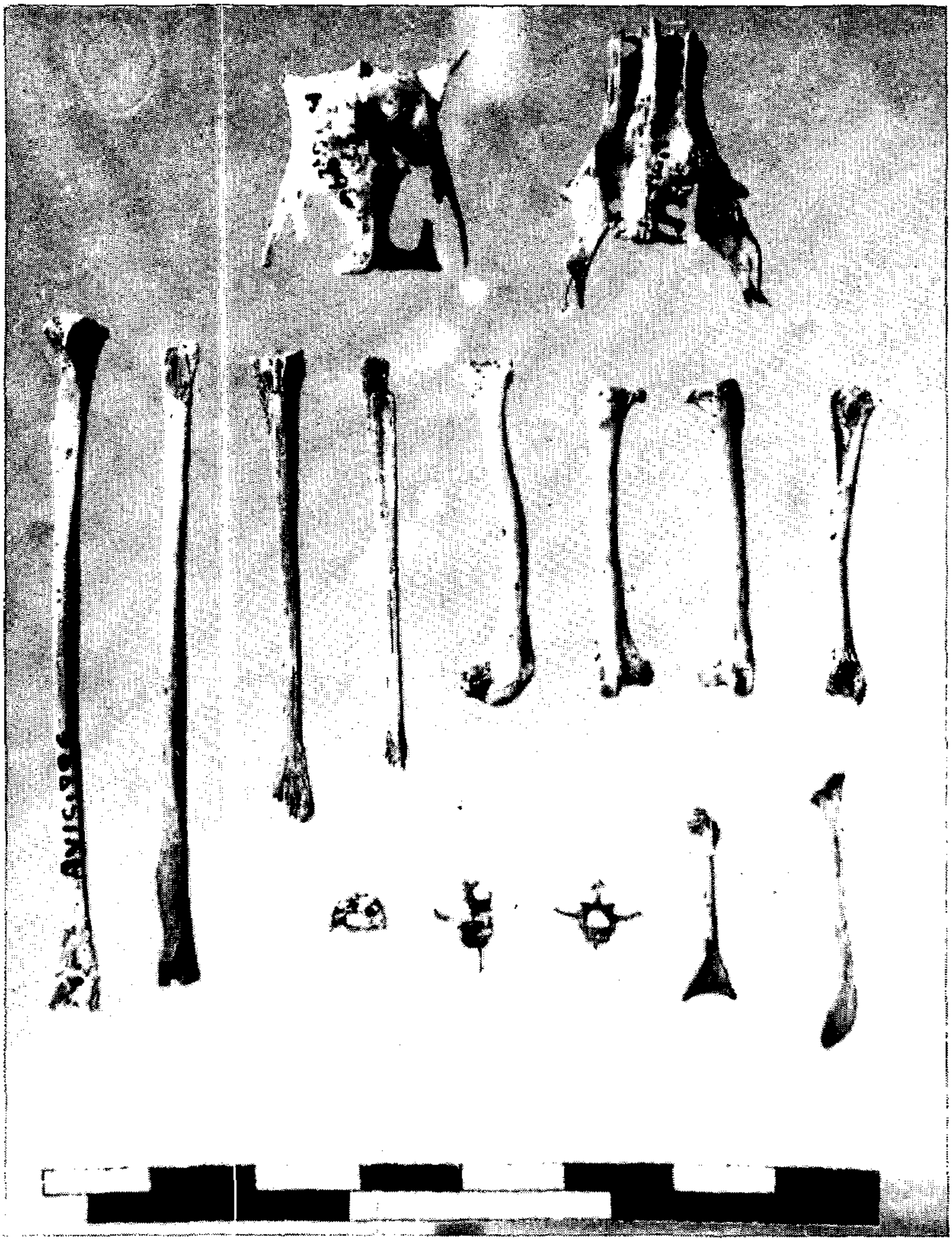

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Plate XLII — Holotype of **Megaegotheles novaezealandiae:** AV 16,996 (L. tibio-tarsus. R. and L. humeri inverted).

TIBIO-TARSUS

This again is much larger than in *Aegotheles.* Shaft almost round in section. Viewed from above, the head is almost square, with the exception of the cnemial crest. The latter is short, slopes fairly sharply upwards from the shaft, and is moderately produced above. The measurements of the crest on four adult bones, anterior to posterior, ranged from 0.65 to 0.725 cm. In *Aegotheles* the cnemial crest is less pronounced relatively, than in *Megaegotheles.* Distally, the two genera are very similar except for size.

TARSO METATARSUS

In *Megaegotheles* this bone appears as a greatly enlarged version of *Aegotheles.* The condyles expand in an even slope, the inner, as is usual in birds, being shorter than the central one. In *Megaegotheles,* in most cases, the outer condyle is very little shorter than the central one, and this is also the case in *Aegotheles.*

In general, leg bones of *Megaegotheles* resemble closely those of *Aegotheles,* except in the much larger size, the tibio-tarsi and tarso-metatarsi being about twice as large in the new genus as in *Aegotheles.*

HUMERUS

Except for greatly increased size, there is little to separate the humeri of *Megaegotheles* and *Aegotheles,* except that the former appear even more bowed in the shaft. The difference will be apparent in the photograph.

ULNA, RADIUS, CARPO-METACARPUS

These bones are also greatly enlarged version of *Aegotheles,* and call for no special comment.

The measurements for all the various bones of *Megaegotheles,* with comparative measurements of *Aegotheles,* follow. All are in centimetres.

Measurements for *Aegotheles cristatus* and *Megaegotheles* (AV 18,564)

CRANIUM, PREMAXILLA, MANDIBLE

	Length Cranium & Premaxilla	Premaxilla chord of culmen	Width at post Orbitals	Height	Occipital to flexure	Width between orbits	Width of Orbit	Mandible Width	Mandible length
South Australian Museum									
B11629F	3.7	1.85	2.2	1.7	2.05	0.25	1.5	2.4	2.5
B11472	3.65 ±	1.75	2.35	1.75	2.3	0.2	1.6	No mandible	
B15062	3.35	–	2.2+	1.8	2.15	0.225	1.5	No mandible	
Nat. Museum Victoria									
B8778	3.9	1.5	2.4	1.575	2.35	0.275	1.875	2.1	2.6
W6769	3.7	–	2.4	1.8	2.4	0.3	1.8	2.3	2.75
W2340	3.7	–	2.35	1.8	2.2	0.25	1.65	2.2	2.55
W6680	3.7	–	2.3	1.8	2.3	0.25	1.75	No mandible	
W6585	3.5	–	2.3	1.8	2.2	0.25	1.7	No mandible	
W6466	3.5	–	2.3	1.6	2.3	0.3	1.8	No mandible	
Megaegotheles									
AV18,564	–	–	2.8 (estimated)	1.7+	2.45+	0.2	1.9+	No mandible	

PELVIS

Aegotheles cristatus	Length	Sacral length	Anterior width	Posterior width	Width across supra-trochanteric processes
S. Aus. Museum					
B10341	2.4	–	0.8	1.7	1.6
B11629	2.1	1.6	0.9	2.0	1.6
B15062	2.1	1.6	0.7	–	1.5
Nat. Museum Victoria					
W6769	2.5	1.6	0.9	1.7	1.7
B8778	2.3	1.8	0.8	2.3	1.615
W2340	2.3	1.7	0.8	2.3	1.6
W6680	–	1.7	0.85	Broken	1.625
W6466	2.25	1.8	0.8	Broken	1.6
Megaegotheles					
Canterbury Museum					
AV16,996*	2.75	2.1	1.0	2.0	1.8
AV5090*	2.6+	1.9	–	–	–
AV20,651*	–	1.525	–	–	–
Auckland Museum*	2.5+	1.7	–	–	–

* Sub-adult.

STERNUM

Aegotheles cristatus

	Length	Lenth along keel	Anterior width	Posterior width	Height Ant. Process to keel	Width of "waist"
S. Aust. Museum						
B10996	2.2	2.1	1.6	2.1	1.4	1.4
B11629	2.1	2.0	1.4	4.8	1.2	1.15
B10989	2.0	2.1	1.4	2.1	1.4	1.3
B15062	2.0	2.0	1.35	1.8	1.4	1.25
B11472	2.0	1.95	1.5	–	1.3	1.25
B10341	–	2.0	1.5	1.9	1.3	1.4
Nat. Museum Victoria						
W6769	2.2	2.2	1.625	2.0	1.35	1.4
W6680	2.2	2.15	1.5	1.9	1.4	1.3
W2136	2.2	–	1.45	1.8	1.4	1.3
W2340	2.15	2.1	1.45	2.0	1.4	1.4
W6585	2.1	2.1	1.45	2.15	1.5	1.3
B8778	2.05	2.0	1.5	2.1	1.3	1.45
B6806	2.0	2.2	1.5	1.9	1.5	1.35
W6466	2.0	1.95	–	1.85 (abnormal)	1.35	–
Megaegotheles						
AV16,728	2.4	1.975	2.1	2.2	1.25	1.6
AV16,996*	2.15	1.7	1.9±	2.1+	–	1.45
Auck. Museum*	2.1	1.7	1.7±†	1.8±†	–	1.6±†

† These measurements were obtained by measuring the complete half and doubling.

* Sub-adult.

FEMUR

Aegotheles cristatus (10 measured)	L.	P.	M.	D.
Maximum W6466	2.2	0.425	0.2	0.5
Minimum B1169	2.05	0.4	0.175	0.4

The smallest proximal width was from B15062, which measured 0.375. B11472 and B8778 each had a mean measurement of 0.15.

Megaegotheles Adult (mixed bones)	L.	P.	M.	D.
Maximum: AV17,333 Rt.	3.2	0.65	0.275	0.625
Minimum: AV17,333 Lt.	2.95	0.6+	0.275	0.625

AV16804, a distal end, had a mean measurement of 0.25 and a distal one of 0.6.

Sub-adult	L.	P.	M.	D.
Maximum AV16,996	3.025	0.6	0.25	0.6
Minimum AV20,651	2.325	0.475	0.2	0.475

TIBIOTARSUS

Aegotheles cristatus (9 measured)	L.	P.	M.	D.
Maximum W6680	3.8	0.35	0.2	0.4
Minimum B15062	3.5	0.35	0.15	0.3

(Five had a proximal width of 0.4)

Megaegotheles (6 measured)	L.	P.	M.	D.
Adult —				
Maximum AV16,638	6.6+	–	0.3	0.6
Maximum AV17,774	6.6	0.6	0.3	0.575
Minimum AV15,118	5.8	0.5	0.225	0.45

(Two had a mean width of 0.215)

Sub-adult —				
Maximum AV16,696	6.7	0.55	0.25	0.515
AV20,651	5.35	0.35	0.2	0.425

TARSO-METATARSUS

Aegotheles cristatus (9 measured)	L.	P.	M.	D.
Maximum W2340	2.4	0.4	0.15	0.4
Minimum W6568	2.1	0.4	0.15	0.4

(Four had a proximal width of 0.36, and one a mean of 0.2)

Dr. Warren Hitchcock kindly supplied me with length measurements of tarso-metatarsi of New Guinea form of *Aegotheles* made on skins in the collection of C.S.I.R.O., Canberra, and with similar data from the literature. These would of course be a little larger than those made on bones. These measurements combined with those given by Rand and Gilliard, give the following results (for species only). I have no data for the subspecies in the various groups.

LENGTH

A. cristatus	2.0 - 2.4
A. archboldi	Rand, Male 1.9 - 2.0; Female 2.0
A. bennetti	Salvadori and D'Albertisi, Male 2.0; Female 2.2
A. albertisi	Sclater, Male 1.6 - 2.2; Female 1.9 - 2.1
A. insignis	Salvadori, Male 1.8 - 2.2; Female 2.1 - 2.4
A. wallaci	Gray 1.5

Megaegotheles (10 measured)	L.	P.	M.	D.
Adult —				
Maximum AV18,012	4.925	0.6	0.25	0.625
Minimum AV18,241	4.35	0.525	0.215	0.55
Sub-adult —				
Maximum AV18,563	4.475	0.525	0.2	0.515
Minimum AV20,651	3.7	0.375	0.175	0.4

Of the adult bones, the greatest proximal width is 0.65 and the smallest distal width (on 4 bones) is 0.515.

HUMERUS

Aegotheles cristatus

Three individuals in the South Australian Museum, B11629, B11472, and B15062, aul had a length of 2.6, proximal width of 0.8, distal width of 0.6, but the mean was 0.25, 0.215 and 0.2 respectively. Six specimens in the National Museum of Victoria ranged from:

	L.	P.	M.	D.
Maximum W2340	2.75	0.75	0.2	0.65
Minimum B8778	2.675	0.8	0.225	0.55

Four of these had a proximal width of 0.8, two of 0.75 and the distal width ranged from 0.65 to 0.4.

For *Megaegotheles* the range of eleven adult humeri was:

	L.	P.	M.	D.
Maximum AV21,638	3.5	0.95	0.3	0.7
Minimum AV18,242	2.9	0.825	0.25	0.6

AV7242 had a proximal width of only 0.675.

OTHER WING BONES

The length of the other wing components of *Aegotheles cristatus* follows, with number measured in brackets: ULNA (7) 3.5 - 3.2; RADIUS (8) 3.25 - 3.1; CARPO-METACARPUS (9) 1.9 - 1.7.

Corresponding measurements for *Megaegotheles* are: (Sub-adult) ULNA (1) 3.285; RADIUS (2) 3.4 - 3.0; CARPO-METACARPUS Adult (AV16,640) 1.9; Sub-adult (2) 1.8 - 1.65.

SHOULDER GIRDLE

Aegotheles cristatus: Coracoid (10) 1.8 - 1.5; Scapula (10) 2.225 - 2.1.

Megaegotheles (Sub-adult): Coracoid (2) 1.875 - 1.6; Scapula (2) 2.575 - 2.35.

DETAILS OF THE HOLOTYPE FOLLOW: As stated above, it is sub-adult.

AV16,996		L.	P.	M.	D.	
Humerus:	R.	–	–	0.275	–	Defective at both ends
	L.	3.3	0.725	0.275	0.5	
Femur:	R.	3.025	0.6	0.25	0.6	
	L.	3.025	0.6	0.25	0.55	
Tibio-	R.	6.7	0.55	0.25	0.515	
tarsus:	L.	–	–	0.25	–	Defective at both ends
Tarso-	R.	–	–	0.2	–	Defective at both ends
metatarsus:	L.	4.5	0.52	0.2	–	Inner condyle absent

Right coracoid: Length 1.875. *Right scapula:* Length 2.575.

	Length	Sacral length	Anterior width	Posterior width	Width across Supra-trochanteric processes
Pelvis:	2.75	2.1	1.0	2.0	1.8

	Length	Length along keel	Anterior width	Posterior width	Height (Ant. process to Keel)	Width of "waist"
Sternum:	2.15	1.7	1.9±	2.1+	–	1.45

The other bones present are 3 vertebrae, 8 ribs, 1 sternal rib, 1 phalanx.

CONCLUSION

Megaegotheles has a much greater range in the size of the leg and wing components than has *Aegotheles,* but this is not unusual in New Zealand birds. Among living birds, for instance, Tui and Kakapo exhibit a similar variation, not all of which is due to difference in sex, while among extinct forms the N.Z. and Chatham Is. Coot, *Nesophalaris* (= *Palaeolimnas*) and the various species of Moa may be cited. Otherwise, the new genus is very much closer to *Aegotheles* than to any other of the *Caprimulgiformes* I have been able to examine.

On present evidence it would appear to have been extinct before the arrival of man, not having been found in human association. This is, admittedly, negative evidence, and further finds may modify this conclusion, but as it is nearly 100 years since the first bones of *Megaegotheles* were discovered, I do not consider that there is a great possibility that man saw this bird. The only dates that can be given are from Te Waka No. 1 Cave, Hawkes Bay, where it was present before 1480 B.C. and ranged to before 50 A.D. and from Pyramid Valley, where the contents of three Moa gizzards and a skeleton from an early level ranged from 1790 to 1500 B.C., although this of course does not date the *Megaegotheles* bones from this swamp, which built up for many centuries.

FOOTNOTE:

Since writing this paper, another locality has been added. AV 22,247, a left humerus and R. posterior ramus of mandible, were collected, among thousands of bird bones, in Harrison's Hole, Ruakokopatuna, Martinborough, in 1968, by John Marston.

LITERATURE CONSULTED

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SHORT NOTES

SOME HAZARDS FOR EARLY NESTING PIED STILTS

In spite of the inclement weather of the 1968 winter, Pied Stilts *(H. leucocephalus)* began to nest early in Ardmore.

The first nest, of four eggs, was found at 11 a.m. on June 19. It seemed that incubation was in progress so that the eggs were probably laid during the first week of June. The nest was carefully watched up to June 29, when heavy rain brought a flood which washed away the eggs. A search failed to reveal any of the washed out eggs. The parents were no longer present. No other Stilts were seen during the time the nest was watched.

A pair, presumed to be the same, returned to the area three days after the loss of the nest, and remained. No others came. On July 16 the second nest of this pair was found, there being three eggs at 5.15 p.m. Next evening there were four eggs. The nest was empty at 5 p.m. on July 22. During the morning of the 21st, the owners of the farm saw a party of about eight Stilts attacking four Pukeko at the site of the nest. Pukeko footprints were left in the mud beside the nest. No egg-shells were found. The further six Stilts, not previously seen, must have come from some distance to aid the nesting pair. The nesting pair stayed closely by the nest and remained in the general area for several days.

During the first week in August three other birds were about but were not present when the third nest of two eggs was found on August 11. Two further eggs were laid on the 12th and 13th. On August 15 the nest had been robbed, obviously by Pukeko, which had left footmarks at this nest also. There were small pieces of egg-shell in and by the nest and a small amount of albumen in it.

It is almost certain that the same pair nested the three times. One of the pair had a distinct black collar. No other Stilt seen had this distinguishing feature. About two weeks later they returned but did not nest again.

— SUSAN FOGARTY

AN INTRASPECIFIC ATTACK IN HOUSE SPARROWS

The following instance of a male House Sparrow *(Passer domesticus)* attacking an injured male of its own species is unusual. An injured male Sparrow (band B-4666 — first banded as a adult on 18 June 1960) was found lying on the ground in a Christchurch back yard on 25 June 1966 at 1200 hrs. There were no feathers on the top or sides of the head where raw flesh was showing; one eye was closed. At 1210 hrs., after examination, it was released where it had been found. A short time later squawks were heard and several sparrows flew up as I approached the injured bird.

The bird was watched from a window, and at 1225 hrs., several male and female Sparrows went up and hopped round it. Then a colour-banded male arrived and attacked it repeatedly between 1230 and 1330 hrs. Each attack lasted about five minutes and the banded male fed or rested nearby for about the same time between attacks. When attacking, the aggressor stood beside or on the injured bird and pecked at its head (particularly the eyes and the edge of the injured area), wing tips and cloaca, extending the previous injuries to the eyes and enlarging the bare area down the nape.

The injured bird frequently squawked and limped or fluttered away, but seemed incapable of retaliation and was even at times rolled on to its back. A number of sparrows of both sexes showed transient interest in these encounters.

At 1330 I killed the now badly injured bird and left it lying on its back in the same place. The colour-banded male returned and, without touching the body, examined it for five minutes before flying away. The dead bird was put the right way up. The colour-banded male again returned and attacked the body till it rolled on to its back, when it again lost interest. The cause of the initial injuries is unknown.

— DAVID G. DAWSON

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PREDATORY BEHAVIOUR OF WHITE-BACKED MAGPIE

In June, while visiting the dairy farm of Mr. S. G. R. Middlemas of Matakana, I saw a White-backed Magpie *(G. hypoleuca)* in a grass paddock pecking vigorously at something on the ground.

As Mr. Middlemas and I approached the spot, the Magpie flew off leaving a hen Blackbird *(T. merula)* unconscious on the ground with feathers scattered around her. One eye had been pecked out and part of the neck and upper breast denuded of feathers.

While I was examining the Blackbird in my hand, she regained consciousness and flew off rather laboriously.

It is unlikely that the Blackbird was previously stunned by flying into wire, as there were no power or telephone lines nearby and the nearest fence was 40 yards away.

— G. J. H. MOON

SPINE-TAILED SWIFT IN SOUTHLAND

On 27/4/68 I was at West Peak in the Hokonui Hills with a group of boys who were training for the Duke of Edinburgh Award. We were on the tussock tops at an altitude of 1750 feet, when our attention was drawn to a dark streamlined bird with long pointed narrow wings swept back and with a quick darting action, not tumbling but twisting and appearing "off balance" at times. It was roughly tui-sized, but altogether different in shape and flight. After flying over the hilltop it went away, then returned and circled as if interested in us. It then flew below us so that both upper and under surfaces were seen. The upper surface was very dark, almost black; the under surface was grey-brown with a pale band about two inches wide on the underside of the rump. The under-chin was also light-coloured. On consulting reference books I was able to rule out Fork-tailed Swift, and confirmed my impression that the bird we had watched was a Spine-tailed Swift *(Chaetura caudacuta)*.

— PHIL DORIZAC

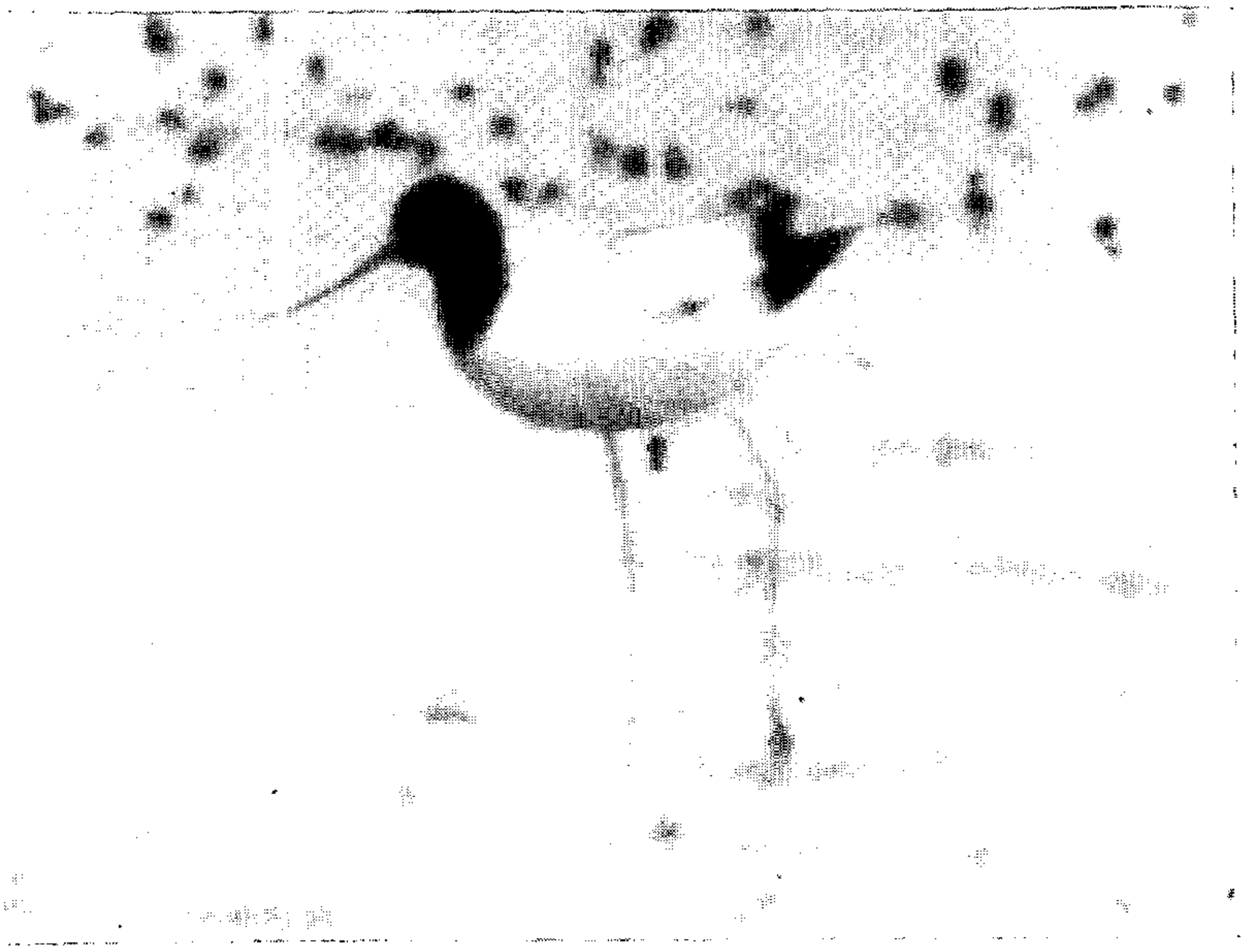

Plate XLIII (a) — Red-headed Avocet at Westport.

As mentioned on p. 123, the first Red-necked Avocet to be recorded in New Zealand for more than half a century, was found near Westport in February, 1968. It remained for some months and was photographed by Peter Grant on April 7th.

Plate XLIII (b) — Red-headed Avocet at Westport.

[P. Grant

Plate XLIII (c) — Red-headed Avocet at Westport.

REVIEWS

A Field Guide to the Birds of New Zealand, by R. A. Falla, R. B. Sibson and E. G. Turbott. Collins, 1966. $4.50.

The remarkable growth of organised ornithology in New Zealand in the few decades since O.S.N.Z. was founded has been very largely through the example, guidance and stimulus of these three authors. It is fitting therefore that it should be their voluntary labours with the *Field Guide* that will found a new generation of richly fortunate ornithologists for whom the understanding of the relationships, distribution, status and field identity of New Zealand birds can be the starting point rather than the culminating point of their interest in birds.

The desperate need for a field guide has long been evident, particularly since the appearance of such books in Europe and the U.S.A. has shown the way. However, much greater knowledge has been needed of the species present, their distribution, habitat and breeding before a worth-while attempt could be made. It is therefore a tribute not only to the authority of the authors but also to the swift progress of N.Z. ornithology that the book is so comprehensive.

Undertaken at the request of the O.S.N.Z. Council, the preparation must have been enormous. The result has been worth waiting for. The accumulated experience of N.Z. ornithologists has been painstakingly brought together and condensed into a text as reliable, clear and readable as the best of overseas field guides. There are minor faults, some unevenness inevitably remains from a three-author system, and some features might be improved. These, however, can mostly be done quite readily, now that the main work has been so carefully completed.

Doubtless many users of the book will find points they would wish improved or corrected in light of their own local knowledge. A second edition is already in early incubation so that now is the time to send the Editor constructive, practicable suggestions.

The text takes as its starting point the well-tried Peterson layout for each species, under headings of description, voice, habitat and range, and (for local breeders) breeding. An exception is the Game Birds which receive a remarkably cursory treatment that will have to be completed in the next edition. The descriptions are clear and succinct, as befits a field guide. Specially valuable field characters are emphasised by italics but this very helpful technique is used with varying liberality in different sections. Some species, e.g. some petrels and gulls, in which italics are desirable, are given none.

Sensibly, the birds are arranged closely in the order of the 1953 *Checklist*, not in order of size or habitat as some books have attempted. This is simpler for both writer and reader, particularly when similar species are to be compared or taxonomic relationships are to be discussed.

In some ways this is as much a fireside book as a field book, for we have often in the sections on habitat and range a condensed but absorbing discussion of a species' history, relationships, behaviour and movements. Also we are treated to an introduction to many bird Orders which explains some features of interest and the place

in the world pattern of the species representing the Order in N.Z. Such introductory material, although strictly beyond the scope of a field guide, is very valuable to the inexpert reader. Here the text is most apparently uneven. While some introductions, e.g. to kiwis, diving petrels, gannets, rails, gulls, are good, some distinctive N.Z. groups e.g. wattle-birds, wrens, N.Z. Thrushes, parrots, receive either no introduction or one that is of little help to most readers.

We have the opposite extreme in a five page flight into the joys and techniques of wader study. Waders are prominent in our avifauna and it is I suppose relevant to give them special attention, even to an emphasis on the rarity, for waders have inspired a high proportion of amateur ornithology in N.Z.

However, I should like to see similar emphasis given to our seabirds, their role in our fauna and in the world pattern, the pleasures, techniques and difficulties in studying them. This would include comments on banding and on beach patrolling, N.Z. activities almost as widespread as wader study.

In fact I should like to see the seabird text extended to include a small sub-section for each species to help the patroller. This would include culmen measurements. For example, neither the text nor the illustrations distinguish the two albatrosses by their nostril shape and, whereas Plates 5, 6 and 7 are splendid for patrollers, the text does not support their use in this way.

The illustrations are for many people the main part of a field guide. Individually they have been beautifully prepared by Miss Talbot Kelly. Very few (notably Takahe) are unconvincing and, if the reproduction of some plates can be improved, the public and the visitor, who are entitled to identify their birds from pictures first, will be quite well served.

Plates 1, 2, 16 and 18 are a delight, although I am not clear whether the pigeon, cuckoo and myna are inserted as afterthoughts or as a size comparison. Incidentally, I presume the birds of each plate are to the same scale? Something very odd has happened to shag beaks in Pl. 8 and what a ghastly mess of blurring and false colouring has occurred in the printing of Pl. 15 and, to a lesser extent, of Pl. 17.

If there had to be a limited allocation of species to plates, the first need of inexperienced readers, I should have expected a less uneven choice of candidates for several plates. Would not the tits, robins and Fantail take precedence over Saddleback, Thrushes and Stitchbird in Pl. 16. for instance, or general views of Banded and Red-breasted Dotterels, Spurwing and Golden Plovers over Terek Sandpiper and Tattler in Pl. 12? In any case, I hope that over future editions the number of plates can gradually be increased until at least all common species can be covered in plates of the same high standard as these.

Well, we have our book now, to which we have all indirectly contributed in some small way. I hope we can all be as pleased to have it as I am, as proud of standards of accuracy and presentation. At last, too, we shall now be spared embarrassment when acquaintances ask what bird book they should have in the house.

— B.D.H.

"Common Birds of Garden and Farmland," by Dr. P. C. Bull, 1968. Govt. Printer, Wellington, Serial G.P. 44, 25c.

In the past, Post-primary School Bulletins have presented information on various topics which in some instances such as seaweeds was not available elsewhere. The present booklet is fully up to the high standard and is a useful summary of why and how we study birds, how birds live and their relationship with man. Written in a down-to-earth manner by an eminent ecologist it is in discussing this relationship that Dr. Bull is at his best. For example he looks into the *reasons* for birds' habits (" Generally, the laying time of birds is such that the young leave the nest when their food supply is most abundant. Seeds are usually more abundant in summer than in spring, and this may explain why most of the seed-eating birds tend to lay later than the insect eaters.").

Ornithologists should read this well-illustrated booklet. They will be in a better position to answer the many queries which they are frequently asked, such as, " Why are you interested in birds ? "

— J.M.C.

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LETTER

The following information may be useful for solving several identification problems faced by R. B. Clapp in his article " Birds of Swain's Island," which appeared in Notornis Vol. XV, No. 3.

In the final paragraph on p. 199, Clapp mentions that two Hawaiian-Americans frequently referred in their diaries to a bird known as the ' gogo,' and he suggests that from their habits and other evidence, these are apparently either Brown Noddies *(Anous stolidus)* or Black Noddies *(Anous tenuirostris)*. From personal experience, the word ' gogo ' is used throughout the Tokelau Islands (100 miles further north) for the Brown Noddy — the Black Noddy being called ' lakia.' In Western Polynesia, the 'ng' sound is typically represented by ' g,' and the word ' gogo ' is pronounced as a Maori would pronounce ' ngo ngo.' Thus the striking similarity to ' ngongo,' the name that the Ellice Islanders use for the Brown Noddy is not surprising. ' Gogo ' or ' logo ' will certainly be the Brown Noddy and I would be surprised if the locals did not have a separate name for the Black Noddy. It is interesting to note that in the Hawaiian dialect 'n' replaces the original Polynesian ' ng,' and yet the two Hawaiian observers on Swain's Island used ' g ' in their diaries.

In the first paragraph on p. 201 the author is again confused as to whether the ' akaiakai ' of the Hawaiian observers refers to the Fairy Tern *(Gygis alba)* or the Sooty Tern *(Sterna fuscata)*. The Tokelau name for the Fairy Tern is ' akiaki,' while the Sooty Tern is known as ' talagogo.' Since the observer also referred to the bird as a ' love bird,' it is fairly certain that the Fairy Tern is being referred to.

The final problem which arises is that the author is " unable to identify a bird referred to as a ' vasavosa '." The Tokelauans use the name ' vahavaha ' for the American Wandering Tattler, which Clapp records as *Tringa incana*. The letters 's' and 'h' are not constant

throughout the Polynesian dialects and in Samoan the 'h' has been fully replaced by 's' or 'f.' The Tokelauans also aspirate the 'h' and thus 'vahavaha' would sound like 'vasavasa.' Almost certainly then, the unidentified bird would be the American Wandering Tattler, which I observed as a common migrant on Atafu atoll, Tokelau Islands.

— DAVID J. GRAVATT,
Zoology Dept., University of Auckland

The Editor,
Sir,

In the last two issues of this Journal there have been published two interesting and informative papers on the birdlife of some of the Pacific Islands, in which we in New Zealand should be taking a more vital interest. The keenness of the observers is to be commended; but one can only view with dismay the amount of collecting which has taken place, particularly of such rather rare species in the Pacific as the Bristle-thighed Curlew and the Sanderling, and of some of the pigeons, etc. One cannot but question the necessity for all this collecting, and the value of the information to be gathered from it, which would seem to be limited to the state of development of the gonads and of the moult. Surely such collecting smacks of the nineteenth century, and not of the conservation minded 1960's.

— A. BLACKBURN

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LABOUR DAY WEEK-END, 1967
At Glenavy, South Canterbury

The South Island Labour Day Week-end, October 21 - 23, 1967, was based at the Glentaki Motor Camp at the Waitaki River Bridge. The site was well chosen for study of the local birds. The party settled into cabins and camps on the Friday evening. Ian and Joy McVinnie were the hosts and their programme was excellent. The days, regardless of weather, were spent in the field and interesting meetings held in the camp in the evenings.

A trip to the north side of the river mouth on the Saturday morning produced 1 White-faced Heron, 5 Little Shags, a resting flock of c. 1300 Spotted Shags, 2 Pied Stilts, Black-backed Gulls, 150 Black-billed and 3 Red-billed Gulls and 1 Caspian Tern. On a shingle bank at the outlet and on the other side was a colony of c. 5000 White-fronted Terns busy at nest building.

On the way to the south side in the afternoon a halt was made at the middle of the Waitaki Bridge to look down on a colony of c. 2000 Black-billed Gulls, with, as yet, only a few eggs. Six Red-billed Gulls were settled in the edge of the colony, one on a nest. On the other side of the bridge were 9 Black-fronted Terns. Nests of 2, 2, 1 and 1 were found.

At the south side of the mouth some of the party went to the tern colony, where no eggs were found. Many of the birds had a pink flush on their plumage. Others, led by Ian McVinnie, who had been studying the Banded Dotterel there and banding chicks, were shown late nests and chicks on the steep inner side of the high shingle bank, a new thing for most. Fewer nests were found

on the very inviting flat. Other birds were Canada Goose, South Island Pied Oystercatcher, Wrybill and Turnstone, in very small numbers.

The Sunday brought a fierce gale with lashing rain, but the party set out for Edwin Sheat's, near Palmerston, to see ledge-nesting Spotted Shags, all along a single cliff-face ledge of rock. On the way stops were made to look at the birds of small lagoons and c. 580 Spotted Shag with c. 150 Black-backed Gull feeding on a shoal of fish close to the shore. A Giant Petrel sailed close by. The journey on foot to the shags was successful, at the cost of being soaked. All were invited into the house and Edwin Sheat and his wife and family dried the bedraggled party and fed them royally. Some went out in the rain to look at nests of Blue Penguin and Sooty Shearwater at the cliffs on the farm.

Lake Ki-Wainono was the goal for the Monday, a fine day. The 'bag' was pleasantly varied, including many Little Shag, Black Swan, Mallard and Shoveler, 12 Banded Dotterels, a few Pied Stilts, a Black-backed Gull colony of 23 nests, 5 Caspian and 12 White-fronted Terns, 2 Canada Geese, 4 Wrybills, 4 Godwits and one each of White-faced Heron, Knot, Sharp-tailed Sandpiper, Stint, Southern Skua and Little Tern.

The very keen and happy party dispersed on the Monday afternoon, very thankful to the McVinnies for all they had done to achieve such success and to the Sheats for their liberal hospitality.

— H.R.McK.

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NOTICES

HORUHORU GANNETS — Disaster or Very Late Season ?

Landing on Horuhoru, 9/11/68, the Steins expected to find fifteen to sixteen hundred occupied nests — instead they found three hundred. The occupied nests were wide apart, spaced irregularly. Between them were traces of a thousand or more nesting sites of which many seemed to have had recent use of considerable duration. No sign of egg or chick remained however, but several hundred adults were floating on the waves, half-a-mile to the north-west.

We had expected to see chicks up to seven weeks of age. Instead we found very few much over a fortnight. This means that every chick that had hatched before 1st October had subsequently perished. There were a few eggs that had been laid in the last day or so, and these were in old nests. Some years ago we established that if a pair had lost their first chick, they were sometimes able to lay again, after the lapse of four to five weeks.

Whatever the cause, and however the Gannets now act, it seems likely that this season will hold the record for chick mortality. The bad weather we have experienced over the last few weeks must have made family life very difficult for the Gannets. We would like to know how widespread the effects have been and would be very pleased if those who visit other gannetries would write to the editor.

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

Would members of the Ornithological Society who sight these colour marked gulls please send the combination, date and place sited to James A. Mills, Zoology Department, University of Canterbury.

SCIENTIFIC STUDIES IN NATIONAL PARKS

Each year a report is presented to the National Parks Authority showing the details of scientific work which has been carried out in National Parks by outside organisations and Government Departments during the preceding twelve months. Copies of the report are made available to the various Park Boards and other interested organisations, for general information.

Some difficulty is being encountered in getting a complete report. The report is compiled from information submitted by each Park Board and it is understood that some Boards have had considerable difficulty in the past in finding out from some of the persons engaged in the investigations just what work is being done and it is quite possible that there are instances too when the Park Board is not aware that a study or project is in fact in progress. To overcome this difficulty the Authority and Boards would be very grateful if all organisations and Departments would, as a matter of course, advise either the Board Secretary or the Chief Ranger of the Park concerned of any scientific work which is to be undertaken in the park and supply a brief elaboration of the objects of the work.

I also wish to refer to reports and publications prepared after the studies have been completed. The Authority is endeavouring to compile a central index and library specifically covering scientific studies which have been carried out in the Parks and if a copy of each report or publication can be made available to this library I am sure that scientific organisations and the Authority would derive considerable benefit. If any particular work is not for publication the Authority will naturally respect the author's wishes. It is appreciated, too, that in some circumstances it may not always be possible for a copy to be made available for the library. In such cases the Authority would appreciate comprehensive details of the study, for recording in the index of publications.

The Authority feels that science has something to contribute to the full utilisation of National Parks and your assistance in the matters I have mentioned would be very much appreciated.

National Parks Authority
P.O. Box 8003
Wellington.

R. J. MacLACHLAN, Chairman

FINAL NOTICE

THIRD PAN-AFRICAN ORNITHOLOGICAL CONGRESS

Readers are reminded that the date (15 - 19th September, 1969) at which the Congress will be held in the Kruger National Park, South Africa, is drawing nearer. Anyone who wishes to attend the Congress should, without delay, ask for particulars and entry forms from:

The Hon. Secretary,
South African Orinthological Society,
C/o Percy FitzPatrick Institute of African Ornithology,
University of Cape Town,
Rondebosch, C.P.,
South Africa.

XV INTERNATIONAL ORNITHOLOGICAL CONGRESS

Under the Patronage of His Royal Highness
The Prince of The Netherlands

SECOND ANNOUNCEMENT

2nd August, 1968

The *dates* for the Congress have been determined as follows: The Hague, 30th August - 5th September, 1970 (inclusive).

Congress Fee: Full Members — Dutch Guilders 150; Associate Members — Dutch Guilders 100.

Membership of the Congress is open to all ornithologists over the age of 18 years. *Full members* are entitled to attend all functions of the Congress and to receive the Proceedings.

Wives, husbands and children over the age of 18 of full members can register as *Associate Members* at a reduced fee, which entitles them to attend all functions, but not to receive the Proceedings.

Restriction of the number of memberships is *not* considered.

After a formal opening on the Sunday evening, 30th August, the rest of the week will be devoted to scientific meetings. These will consist of *Plenary Sessions* in the mornings and *Sectional Sessions* in the afternoons. Some of the Plenary Sessions will have the character of a *Symposium* on well advanced or promising fields of ornithological research; at others recent advances in selected fields of ornithology will be reviewed. Forum discussions in the afternoon will give the opportunity to pay additional attention to the subjects treated in the morning. At the Sectional Sessions short, offered papers will be read. Part of the afternoon sessions will be devoted to special or specialists' meetings.

In addition there will be exhibits, a whole-day excursion on Wednesday and film shows in the evenings.

There will be ample opportunity for informal contacts, but *no excursion* before or after the Congress will be organised.

The congress will meet in the new buildings of the Netherlands Congress Centre, where all meals (except breakfast) will be served and where each night coffee shops and bars will be open. Accommodation will be arranged in hotels in the vicinity or on caravan or camping sites, if desired.

Along with the application form a list of hotels with prices will be supplied.

Application forms with full details can be obtained from *(note new address)*:

The Secretary-General
XV International Ornithological Congress
C/o Netherlands Congress Centre
10, Churchillplein
The Hague
The Netherlands.

Completed forms must be returned to the above address not later than 1st May, 1970, at which date registration for membership will be closed.

Those wishing to contribute papers for the Sectional Sessions, exhibits or films are requested to apply for the appropriate application sheets *as early as possible* and to have these returned not later than 1st December, 1969, after which date unfortunately no papers or films can be accepted, as scrutinising, section allocation and production of the Abstracts Volume require considerable time.

Prof. Dr. K. H. VOOUS,
Secretary-General

LABOUR DAY WEEK-END STUDY COURSES, 1969

Preliminary advice is given of week-end courses to be held in October 1969 in the following areas:—

North Island: Lake Waikaremoana.
South Island: Lake Ellesmere.

Full details will be announced later.

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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:

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.

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REGIONAL REPRESENTATIVES

FAR NORTH & NORTHLAND: A. T. Edgar, Inlet Road, Kerikeri
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