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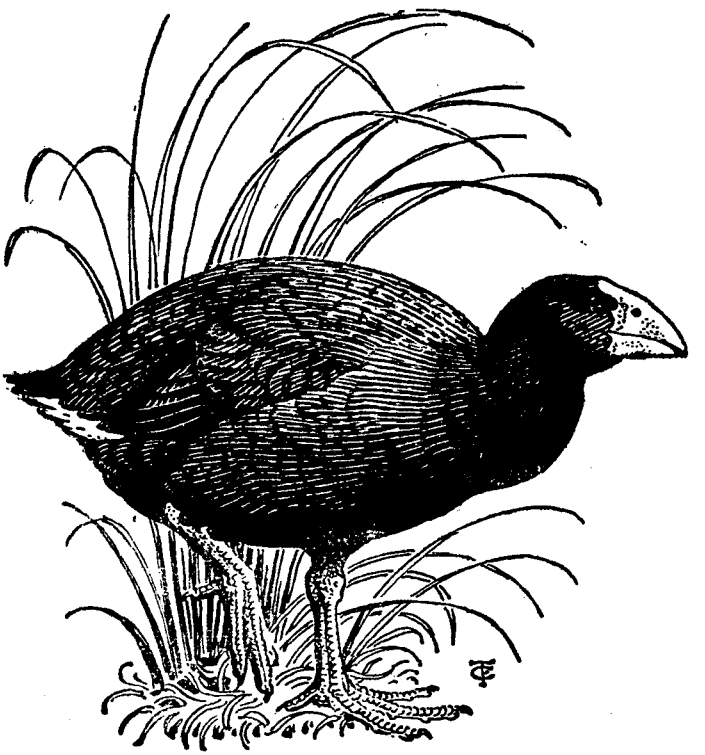

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BREEDING AND DEVELOPMENT OF THE NEW ZEALAND FANTAIL Rhipidura fuliginosa

By IAN G. McLEAN and PETER F. JENKINS

ABSTRACT

Fantail breeding was studied on Cuvier Island during the summers of 1972 and 1973. Data are presented on nest sites, nest building, and breeding success on the island. A summary of the information available in the OSNZ nest record cards for fantails suggests that clutch size increases through the season but that numbers of fledglings do not.

INTRODUCTION

Available information on breeding by the New Zealand Fantail *(Rhipidura fuliginosa)* is limited to anecdotes or to detailed studies of only one or two pairs (see especially Moncrieff 1931; Cunningham 1954; Oliver 1955; Blackburn 1965, 1966). In general these birds are monogamous breeders, with a breeding season extending from August until early February. A single pair may have five successful nests and fledge 15 young in one season (Blackburn 1965).

Fantails nest in a small cup built in the trees and shrubs of the bush understorey. A tail may be attached to the cup, and there is often a sheltering overhang of leaves. Usually three or four white eggs with brown spots are laid. Incubation and feeding of young are shared by both male and female for the first clutch, but for subsequent clutches the female may incubate while the male continues to feed the fledglings of the previous brood. A new nest is built for each brood although there are reports of nests being re-used (Coates 1966; Blackburn 1966; four in OSNZ nest records). Other examples of unusual nesting are summarised in McLean (1975).

The aims of this paper are to present some new data on breeding

by the fantail and to provide a summary of the information available on this species in the OSNZ nest record cards.

METHODS

We worked on a 35 hectare study area on Cuvier Island (36° 26′ S 175° 64′ E) off the Coromandel Peninsula. The island was visited in the periods 15 November-20 December 1972, 7-23 November 1973, and 5-12 December 1973. I. G. McLean also visited the island for 10 days in May and 14 days in August 1973. The island has been described by Jenkins (1978). At least one individual of each of the 10 (1972) or 12 (1973) pairs resident in the study area were individually colour-banded. Adult birds were caught with mist nets, or by hand while on the nest. Young birds were banded in the nest after hatching. Most nests were found by following adults, and nests were most easily located if the pair was building or feeding nestlings. Sex was determined by watching to see which bird laid the eggs (three pairs). Males sang much more than females during the day and were more difficult to follow to nests. Only males sang from song posts in the early morning (see McLean 1980).

RESULTS

All fantail nests on Cuvier Island were built in the bush understorey (up to 3 m, Table 1). Of the 46 nests, 44 (96%) had an overhead sheltering canopy, 43 (93%) were at a forked branching site, and 44 (96%) were on a horizontal branch. All trees used were

TABLE 1 — The distribution of nesting heights and tree species used for fantail nests on Cuvier Island.

Tree species*	Number of nests	Height range (m)	Mean height	Use of each species (%)
Macropiper excelsum	24	1.0 - 3.0	1.6	52
Brachyglottis repanda	7	1.0 - 3.0	2.0	15
Cyathea sp.	5	2.5 - 3.0	2.8	11
Geniostoma ligustrifolium	4	0.8 - 1.8	1.3	9
Dysoxylum spectabile	4	1.3 - 1.7	1.5	9
Entelea arborescens	1	3.2	3.2	2
Coprosma robusta	1	1.7	1.7	2
Total	46	0.8 - 3.2	1.68	100

* From Cheeseman (1925), and Cockayne and Phillips Turner (1967).

common in the bush understorey, and all except *Geniostoma ligustrifolium* had leaves broad enough to provide a canopy. Two nests built in *G. ligustrifolium* had a canopy of leaves from a nearby tree. *Macropiper excelsum* was the most common shrub in the area and was used most often. There were no significant differences in the success of nests built in different tree species ($P > 0.1$, Kruskal Wallis test), although two of the seven nests built in tree ferns (*Cyathea* sp.) failed because the frond in which they were built fell to the ground.

Nests were built of small pieces of dried wood, dried grass, tree fern fibre, mosses and lichens, and were bound together with spider web. Materials were generally gathered within 15 m of the nest site. Mean tail length of 21 nests was 10.5 cm, range 0.0 to 28.5 cm. Nests built in November and December (presumably second or third nests) were completed in 4-6 days, but the only nest begun in August had part of the tail completed after one week.

Full details for all nests are lodged with the OSNZ Nest Record

TABLE 2 — The success of each breeding stage for fantails from Cuvier Island and the OSNZ nest record cards.

	No. of nests observed containing					
No. of eggs or chicks in nest	Eggs		Nestlings		Fledglings	
	*CI	OS	CI	OS	CI	OS
1	-	-	4	4	2	8
2	-	1	2	4	6	7
+ 3	3	23	7	30	6	15
4	3	25	1	17	3	8
5	-	1	-	1	-	-
Mean	3.5	3.5	2.4	3.1	2.6	2.6
Total	6	50	14	56	17	38

* CI = Cuvier Island, OS = OSNZ cards.

+ Example for reading table:

3(CI) and 23(OS) nests were found containing three eggs, 7(CI) and 30(OS) were found containing three nestlings, and 6(CI) and 15(OS) families of three fledglings were found.

TABLE 3 — The length of time for each breeding stage.

Breeding stage	No. nests observed	Mean time period (days)	Range (days)	Mean no. of eggs/chicks in nest	Range of eggs/chicks in nest
Building/ laying	4	7.25	6-9	3.25	3-4
Incubation	1	14	-	4	-
Nestling*	2	11.5	11-12	1	1
Fledgling	6	12.5	3-30+	2.5	1-4

* Estimates from several other nests indicated that this period was slightly longer for a larger number of nestlings.

\+ This period based on (i) day on which juveniles were last seen fed if no new nest was begun;

(ii) day next nest was begun. In two of the six cases, the female renested three days after fledging had occurred. The male probably continued to feed the young but was difficult to find (c.f. Blackburn, 1966). In the other four cases both parents fed the fledgings.

Scheme. The data for each breeding stage (Table 2) and for the length of time of each breeding stage (Table 3) are based on different samples of nests due to discontinuous study periods. All results agree with those of Cunningham (1954) and Blackburn (1966).

Eggs were laid one per day (5 nests) except for one clutch in which the fourth egg was laid on the fifth day. All clutches contained three or four eggs (Table 2). Incubation began immediately after the last egg was laid with both birds sitting for alternating periods of 10-30 minutes. The female sat at night.

Nestlings in each nest hatched naked and blind over a period of up to 24 hours. They were fed and brooded by both parents with the adults spending more time gathering food and less time brooding as the chicks grew older. Mean number of nestlings per nest immediately after hatching was 2.35 (14 nests). Broods of three or four became overcrowded in small nests. This resulted in increased chances of a chick being pushed out (seen once in Auckland), or of early fledging (Blackburn 1966).

Young birds could barely fly at fledging. Fledglings were fed by one or both parents until the beginning of the next breeding cycle. On two occasions the female left the family to begin the next nest

3 days after fledging occurred (broods of 1 and 3) while the male continued to feed the young. Mean fledging per nest was 2.58 young (17 nests). Two of 36 fledged young died during the first week.

Development until fledging was monitored in four chicks (two broods of one, one brood of two). Measurements after fledging were taken from any young bird captured whose age was known (complete data in McLean, 1975). Young birds attained adult size in beak, toe, and leg lengths, and in weight by fledging, but not in wing or tail lengths (Fig. 1).

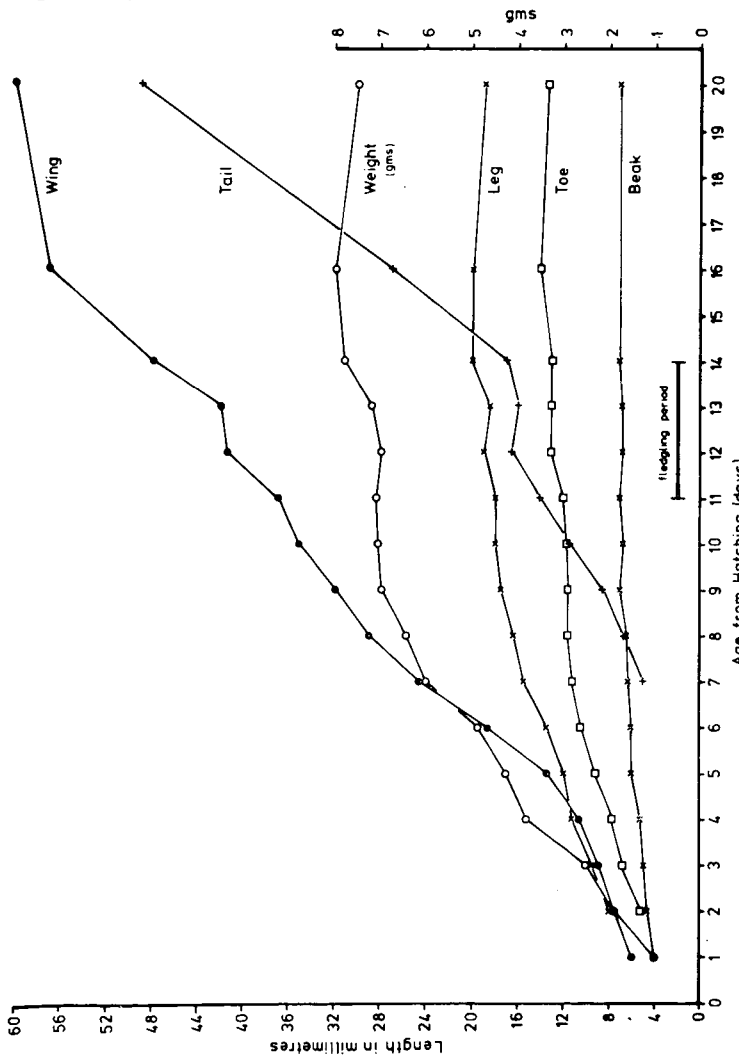

FIGURE 1 — Development of juvenile fantails on Cuvier Island (each point represents a mean of between one and four measurements).

The wings continued to grow rapidly through fledging, but tail growth slowed then increased again after fledging occurred. Neither wings nor tail had attained adult size by 20 days after hatching. Differences between adult and juvenile plumage, which are distinctive, have been noted by Andersen (1926) and Wilkinson (1952). Colour prints are in McLean (1975). We quote Wilkinson (p. 64):

> " The young pied fantail lacks the light eyebrows of the adult bird and also the light and dark bars on the throat. The head is almost black, the back pinkish brown, breast yellowish brown, and tail white with the centre feathers black."

Unlike Wilkinson, we found no easily distinguishable differences in coloration of the head or tail. The most useful distinguishing field characteristics were the brown " eyebrows," the lack of a solid white bar on the throat, and the rufous breast. In addition, the wing bars, which in the adult were white, were brown in the juvenile. Five birds banded as juveniles in the breeding season had moulted to adult plumage by the following May. After becoming independent, juveniles remained on the breeding areas and occasionally formed flocks in places where swarms of insects occurred. Adult birds that encountered juveniles did not attack them as aggressively as they did other adults and usually allowed them to continue feeding in the area.

Wing length of adult males was significantly greater than females ($P < 0.05$, Mann Whitney U test, Table 4). No other adult measurement was significantly different.

Adult survival was high and juvenile survival was low during this study. All of nine breeding adults banded in November of 1972 survived to breed in November of 1973. Three probable adults banded

TABLE 4 — Measurements of adult male and female fantails from Cuvier Island.

	N		Mean		Range	
	M	F	M	F	M	F
Beak (mm)	6	6	7.25	7.17	6.5- 8.0	7.0- 7.5
Leg (mm)	6	6	19.00	18.25	17.5- 21.0	18.0-21.0
Toe (mm)	6	6	13.75	12.67	12.0- 15.0	11.0-14.0
Wing (mm)	6	6	74.25*	70.67*	71.5- 76.0	69.0-73.0
Tail (mm)	7	5	86.71	84.80	80.0-101.0	80.0-91.0
Weight (gm)	8	6	7.95	7.95	7.0- 9.6	6.8- 8.8

* Significantly different (see text).

by C. R. Veitch in January 1972 all bred in November 1972, and one of these bred in November 1973. Of 26 banded juveniles known to become independent in 1972, five were seen in May 1973, two were seen in August, and one bred in the study area in 1973. Most of the island was searched on each visit and birds not seen had probably died. One individual banded during this study was still alive in December 1979 (Lovegrove, pers. comm.) and so was 5+ years old.

At least four nests were robbed by predators. Possible nest predators were the kiore *(Rattus exulans)* and the Long-tailed Cuckoo *(Eudynamis taitensis)*. Droppings found by egg shells below one nest were probably those of the cuckoo. Possible predators of juveniles included the Australasian Harrier *(Circus approximans)*, Kingfisher *(Halcyon sancta)*, Long-tailed Cuckoo, and Bellbird *(Anthornis melanura)*. Bellbirds were seen to knock young fantails to the ground on two occasions, but they did not continue the attack. Kingfishers almost certainly took young Bellbirds on the island, but I saw no attacks on fantails.

Data from OSNZ Nest Record Cards

Information was available from 204 cards dating from 1950 to 1973. Figure 2 does not include the Cuvier data.

Of 185 nests for which the tree species was noted, 74.6% were in native species, 23.8% were in exotic species, and 1.6% were not built in trees (two on wire, and one on a rock ledge). Many native species were used, although *Macropiper excelsum* was one of the most common, as it was on Cuvier Island. Mean height of 190 nests was 3.7 m (range 0.7 to 24 m). Three (1.6%) were over 10 m high, and 61 (32%) were over 3.0 m.

Data on number of eggs laid, number of chicks hatched, and number of chicks fledged, were extracted from cards in which the actual day of the event was noted (Table 2). The most frequent clutch sizes were three and four, and less than one chick was lost between laying and fledging. Overall breeding success could not be calculated, as failure and predation were recorded erratically in the cards. An estimate of success between each breeding stage was obtained (Fig. 2), but these data do not include nests that failed during each stage.

The number of fledglings decreased through the season despite an increase in clutch size of almost one egg (Fig. 2). This decrease was due primarily to nestling mortality in September and October and to egg mortality in December. Egg and nestling mortality were similar in November.

DISCUSSION

Fantails have a long breeding season, a short breeding cycle, and several nests per season. Nests were built rapidly once breeding had begun, eggs were laid every day, chicks fledged when they could barely fly, and a new nest was sometimes begun before fledglings

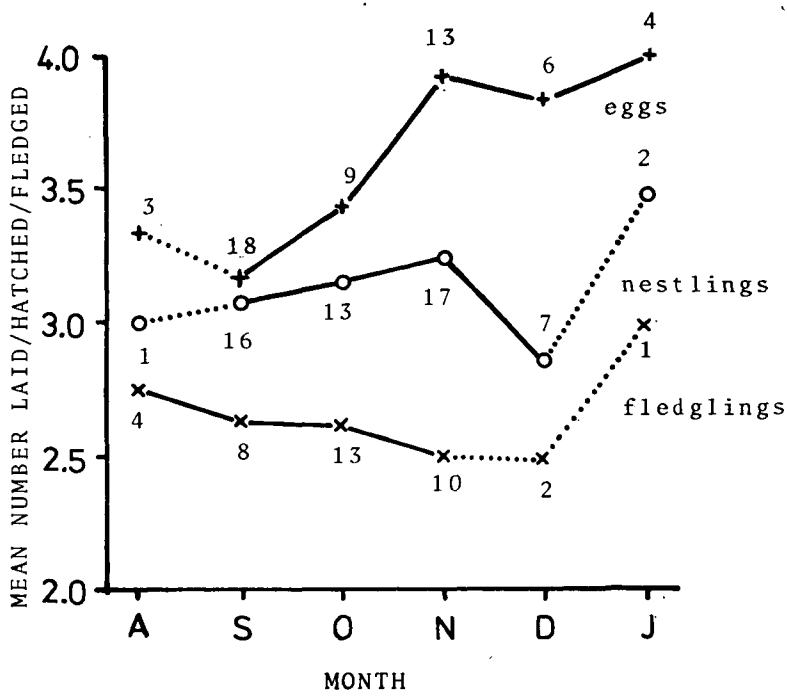

FIGURE 2 — Monthly breeding success for fantails from OSNZ nest record cards. Sample size (number of nests) for each point is indicated.

became independent. These observations suggest that fantails attempted to produce a large number of young, possibly at the expense of parental care.

Some differences were found between mainland (from OSNZ nest records) and Cuvier Island birds. Mean nest height on Cuvier was much lower than on the mainland, perhaps because of the lack of introduced predators on the island or because the island vegetation is still regenerating after the eradication of feral goats. Breeding had barely begun on Cuvier at the end of August 1973 (one incomplete nest), whereas a number of nests were recorded for August in the OSNZ cards. The start of breeding in small birds is affected by the availability of food (Perrins 1970; Kallander 1974), and in fantails is affected by the weather (Blackburn 1966). August 1973 was a wet month on Cuvier Island and this may have delayed breeding. Wet weather could either prevent breeding directly by causing decreased activity, or indirectly by affecting the food supply. The start of breeding probably varies considerably between years and location in this species.

The presence of both dependent and independent juveniles in the breeding territories later in the season may cause the decreased breeding success that was suggested by the OSNZ nest record cards. Adult birds were sometimes feeding fledglings during courtship and copulation, and may also be competing with independent juveniles for food for themselves and fledglings. The relatively high nestling mortality found for November could also be a result of decreased food availability due to the activities of independent juveniles. Alternatively, higher survival of young hatching from heavier eggs has been found in other species (Ankney 1980), and so fantails could be laying lighter eggs later in the season.

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LITERATURE CITED

ANDERSEN, J. C. 1926. Bird song and New Zealand song birds. Auckland: Whitcombe & Tombs. 215 pp.
ANKNEY, C. D. 1980. Egg weight, survival, and growth of iLesser Snow Goose goslings. J. Wildl. Manage. 44: 174-182.
BLACKBURN, A. 1965. Breeding of the North Island Fantail. Notornis 12: 127-137.
BLACKBURN, A. 1966. Some further observations on the nesting of the North Island Fantail. Notornis 13: 21-31.
CHEESEMAN, T. F. 1925. Manual of the New Zealand flora. 2nd ed. Wellington: Govt. Printer. 1163 pp.
COATES, N. F. 1966. Nesting report on a pair of South Island Pied Fantails. Notornis 13: 197-198.
COCKAYNE, L.; PHILLIPS TURNER, E., 1967. The trees of New Zealand. 6th ed. Wellington: Govt. Printer. 182 pp.
CUNNINGHAM, J. M. 1954. Three observations of Fantails. Notornis 6: 47.
JENKINS, P. F. 1978. Cultural transmission of song patterns and dialect development in a free-living bird population. Anim. Behav. 26: 50-78.
KALLANDER, H. 1974. Advancement of laying of Great Tits by the provision of food. Ibis 116: 365-367.
McLEAN, I. G. 1975. Aspects of the social and feeding ecology of the Fantail, **Rhipidura fuliginosa.** MSc. thesis, University of Auckland. 138 pp.
McLEAN, I. G. 1980. The influence of song behaviour and breeding success on spacing between nests of the Fantail, **Rhipidura fuliginosa.** Ibis 122: 98-103.
MONCRIEFF, P. 1931. Fantails in Nelson Province, New Zealand. Emu 31: 111-117.
OLIVER, W. R. B. 1955. New Zealand birds. 2nd ed. Wellington: A. H. & A. W. Reed. 661 pp.
PERRINS, C. M. 1970. The timing of birds breeding seasons. Ibis 112: 242-255.
WILKINSON, A. S. 1952. Kapiti Bird Sanctuary. A natural history of the island. Masterton Printing Co. 190 pp.

IAN G. McLEAN and PETER F. JENKINS, *Department of Zoology, University of Auckland, Private Bag, Auckland, New Zealand.*

SHORT NOTE

HARRIERS FISHING

A. Habraken's (1979) recent observation of a Harrier *(Circus approximans)* seizing fish from the surface waters of the Waikato estuary coincides exactly with a fishing technique of the Harrier which I have often seen in Fiji.

Fiji Harriers commonly hunt low over rivers and creeks, tending to concentrate their activity about the heads of rapids and Fijian fish-trap weirs, where fish are exposed in very shallow, clear water. When catching a fish the Harrier swoops low over the surface and rakes the water with its feet, seizing a fish and flying with it to the river bank or a gravel bar to eat. Fish up to 15 cm long are often taken, their violent flexing and flapping leaving no doubt as to their being alive when seized.

Eels up to 90 cm long are also caught by this method, the ones I have seen being seized from shallow water fringed by dense grass or sedges.

I have also seen smaller fish *(Tilapia mossambica)* 7-10 cm long taken from pools in rice fields by Harriers. The Harrier typically swoops low over the rice, dropping down to alight in the shallow water to seize the fish in one foot. Frequently an unsuccessful bird will splash after the fish on foot, punching at the water. Once secured fish are carried to a dyke, either in the foot or in the beak, and eaten there. Where many fish are restricted to shrinking evaporating pools, this method can be highly successful, the dykes being littered with the remains of half-eaten fish. Several Harriers can be seen fishing a single field or sitting gorged on the dykes separating the fields, and despite the plentiful food, prey piracy and squabbles are commonplace, the birds sometimes even knocking feathers from each other. I have seen this kind of fishing several times since it was first reported by me (Clunie 1972: 4-5) and regard it as typical hunting behaviour of Harriers under these conditions.

Fish and eels are not the only prey taken from river shallows by Harriers, large freshwater prawns (Palaemonidae) also being taken. Fiji Goshawks *(Accipiter rufitorques)* also take prawns from time to time, and I have recorded one feeding on a fish, but do not know whether the fish was taken alive or stranded. These large freshwater prawns were probably responsible for Gurney's (1876) comments on the stomach contents of a Fiji Harrier. It contained " lizards and shrimps, the latter a remarkable diet for a bird of this genus."

LITERATURE CITED

CLUNIE, F. 1972. Fijian Birds of Prey. Fiji Museum Educational Series No. 3. 14 pp. Suva.
GURNEY, J. H. 1876. Letter to the Editor of **Ibis** concerning **Accipiter rufitorques** and **Circus approximans**. Ibis 6: 383-384.
HABRAKEN, A. 1979. Harrier imitating Osprey. Notornis 26: 422.

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

SEABIRDS FOUND DEAD IN NEW ZEALAND IN 1978

By C. R. VEITCH

ABSTRACT

During 1978, 4350 kilometres of coast were patrolled by 195 members of the Ornithological Society of New Zealand and their friends. 15 605 dead seabirds were found. There was a major wreck of Sooty Shearwaters *(Puffinus griseus)* in November and December. In late August and September there was a wreck of Antarctic Fulmars *(Fulmarus glacialoides)* and Antarctic Petrels *(Thalassoica antarctica)*. Localised wrecks caused high annual totals of Fairy Prions *(Pachyptila turtur)*, Flesh-footed Shearwaters *(Puffinus carneipes)*, Buller's Shearwaters *(P. bulleri)*, Fluttering Shearwaters *(P. gavia)* and Diving Petrels *(Pelecanoides urinatrix)*. This is the third year that specimens of Soft-plumaged Petrel *(Pterodroma mollis)* and Wedge-tailed Shearwater *(Puffinus pacificus)* have been found; the second year for Black-fronted Tern *(Chlidonias albostriatus)* and Little Tern *(Sterna albifrons)*; a new record on the New Zealand mainland for Rockhopper Penguin *(Eudyptes crestatus = chrysocome)* and Leach's Fork-tailed Storm Petrel *(Oceanodroma leucorhoa)* is a new record for beach patrolling.

INTRODUCTION

This paper records the results of the Ornithological Society of New Zealand's Beach Patrol Scheme for 1978. The coastline of New Zealand is divided into 15 sections (Imber & Boeson 1969) with an additional grouping "OI" for Outlying Islands, which this year includes patrols from the Chatham Islands. This year patrols were carried out on all sections of coast except Fiordland. 741 Beach Patrol Cards and 64 Specimen Record Cards were filed.

RESULTS AND DISCUSSION

The numbers of birds found and kilometres of beach travelled and covered per month and per coast are recorded in Table 1. The total distance travelled (5600 km) is the highest ever recorded (previous highest was 4582 km in 1975). The total number of birds found (15 605) is the third highest. The average number of birds found per kilometre of coast covered monthly (3.6) is a 44% increase over the average for previous years. Kilometres travelled (Table 1) are the total lengths of coast patrolled; kilometres covered are the lengths of coast covered monthly. Hence, if a kilometre of beach is patrolled three times in one month, three kilometres have been travelled but only one kilometre covered per month.

NOTORNIS 27: 115-124 (1980)

TABLE 1 — Numbers of dead seabirds recorded and kilometres patrolled in 1978.

COAST	CODE		MONTH											TOTALS		BIRDS/KM
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	KM	BIRDS	/COAST
AUCKLAND WEST	AW	KM	112	101	127	123	139	132	173	220	222	211	183	98	1841		
		BIRDS	67	151	85	86	174	90	606	908	719	279	5640	1289		10094	5.5
TARANAKI	TA	KM	5	1	3	14	2	10	28	29	91	7	13	29	232		
		BIRDS	11	1	1	11	6	7	77	96	132	12	40	155		549	2.4
WELLINGTON WEST	WW	KM	1	59	22	27	42	5	38	67	79	157	20	9	527		
		BIRDS	2	113	22	34	16	3	25	256	159	251	56	45		982	1.9
WESTLAND	WD	KM	1	6	–	–	3	–	11	–	–	–	5	8	34		
		BIRDS	0	0	–	–	0	–	0	–	–	–	0	4		4	0.1
AUCKLAND EAST	AE	KM	38	48	23	70	50	35	69	64	46	15	43	36	537		
		BIRDS	43	214	51	179	45	26	137	381	88	27	51	155		1397	2.6
BAY OF PLENTY	BP	KM	69	23	21	22	24	10	34	24	8	5	8	15	263		
		BIRDS	145	42	17	47	64	4	55	79	14	4	4	62		537	2.0
EAST COAST NORTH IS	EC	KM	–	13	–	–	–	–	–	–	–	–	–	–	13		
		BIRDS	–	1	–	–	–	–	–	–	–	–	–	–		1	0.1
WAIRARAPA	WA	KM	–	–	–	–	–	–	–	–	2	–	–	8	10		
		BIRDS	–	–	–	–	–	–	–	–	8	–	–	4		12	1.2
CANTERBURY NORTH	CN	KM	5	–	2	2	4	6	6	–	11	8	1	16	61		
		BIRDS	35	–	8	0	10	1	4	–	12	8	4	56		138	2.3
CANTERBURY SOUTH	CS	KM	7	6	6	10	5	5	8	6	14	8	5	–	80		
		BIRDS	51	3	38	23	35	22	15	6	14	9	17	–		233	2.9
OTAGO	OT	KM	–	2	–	27	21	20	8	2	2	–	–	2	84		
		BIRDS	–	13	–	72	22	31	5	5	4	–	–	14		166	2.0
SOUTHLAND	SD	KM	13	6	12	12	16	17	12	27	12	12	14	6	159		
		BIRDS	9	1	8	7	190	9	2	162	2	36	19	53		498	3.1
WELLINGTON SOUTH	WS	KM	16	37	14	19	38	24	17	28	55	106	10	13	377		
		BIRDS	73	13	10	48	279	51	81	57	78	68	20	33		811	2.2
NORTH COAST SOUTH IS	NS	KM	–	19	–	–	4	–	1	–	46	–	2	15	87		
		BIRDS	–	51	–	–	8	–	1	–	37	–	3	44		144	1.7
OUTLYING ISLANDS	OI	KM	35	–	–	–	–	–	–	–	–	5	–	5	45		
		BIRDS	31	–	–	–	–	–	–	–	–	0	–	8		39	0.9
TOTAL KM TRAVELLED			347	383	269	461	427	333	710	533	838	586	402	311	5600		
TOTAL KM COVERED			302	321	230	326	349	264	405	467	588	534	304	260	4350		
TOTAL BIRDS			467	603	240	507	849	244	1008	1950	1267	694	5854	1922		15605	
BIRDS/KM COVERED/MONTH			1.5	1.9	1.0	1.6	2.4	0.9	2.5	4.2	2.1	1.3	19.3	7.4			3.6

TABLE 2 — Seabirds of which 1 to 15 specimens were found dead in 1978.

SPECIES OR SUBSPECIES	NUMBER FOUND	COAST(S)	MONTH(S)
Megadyptes antipodes	13	WW(2),CN,CS,OT(5),SD(2),WS(2).	MAR,APR(2),MAY(7),AUG,OCT(2).
Eudyptula albosignata	11	CN(5),CS(5),NS.	JAN(2),FEB,MAR(2),AUG,SEP(2),DEC(3).
Eudyptes crestatus	1	CN.	MAR.
p. pachyrhynchus	3	OT(2),SD.	APR,MAY,AUG.
Diomedea exulans	1	AE.	AUG.
epomophora	5	TA,WW,SD,OI(2).	JAN(3),JUN,SEP.
melanophris	11	AW(7),TA(2),WW(2).	AUG(4),SEP(4),NOV(2),DEC.
bulleri	10	AW(2),SD(4),WS(4).	APR,MAY(4),JUL,AUG(3),SEP.
cauta subspp*	12	AW(6),TA,WW,OT,WS(3).	FEB,MAR,APR,MAY(3),JUN(2),JUL,AUG,NOV(2).
salvini	11	AW,WW(2),AE,BP,WS(6).	JAN,FEB,AUG(3),SEP,OCT(4),DEC.
Phoebetria palpebrata	5	AW(5).	MAY,AUG,DEC(3).
Pterodroma spp*	5	AW,AE(2),OI(2).	JAN(2),APR(2),MAY.
mollis	1	WS.	JUN.
h. nigripennis	8	AW(7),AE.	FEB(3),APR,OCT,NOV,DEC(2).
Pachyptila desolata	11	AW(10),BP.	APR(2),JUN,JUL(6),AUG(2).
crassirostris	8	AW,WW,WA,WS(5).	JUL,AUG(4),SEP(3).
Procellaria cinerea	4	AW,TA,WW,AE.	AUG,OCT(2),DEC.
parkinsoni	6	AW,AE(5).	JAN,FEB,APR,OCT,NOV(2).
westlandica	11	AW(6),SD,WS(4).	APR(2),MAY,JUL,AUG(2),OCT,NOV(3),DEC.
aequinoctialis	5	AW(5).	FEB,NOV(2),DEC(2).
Puffinus pacificus	1	AW.	APR.
Oceanodroma leucorhoa	1	AW.	AUG.
Garrodia nereis	1	WS.	SEP.
Phalacrocorax spp*	2	AW,OT.	APR,MAY.
sulcirostris	2	AW,BP.	AUG,SEP.
brevirostris	10	TA,WW(4),AE,BP,CN,WS(2).	JAN,FEB(4),MAY(2),JUN,SEP,DEC.
Leucocarbo carunculatus chalconotus	10	OT(5),SD(5).	MAR(2),APR(4),JUL,AUG,OCT,NOV.
Stercorarius spp*	1	AE.	APR.
skua lonnbergi	2	AW,SD.	AUG,NOV.
parasiticus	3	AW(2),OI.	JAN,APR,MAY.
Chlidonias albostriatus	1	BP.	JUL.
Hydroprogne caspia	10	AW(5),WW(3),AE,BP.	FEB(2),MAR,JUL(2),AUG,SEP,OCT,NOV(2).
Sterna albifrons sinensis	1	AW.	NOV.
fuscata	1	AW.	JUL.
TOTAL	188		

*Species or subspecies could not be identified by patroller.

TABLE 3 — Coastal distribution of the more common seabirds found dead in 1978.

SPECIES OR SUBSPECIES	COAST															TOTAL
	AW	TA	WW	WD	AE	BP	EC	WA	CN	CS	OT	SD	WS	NS	OI	BIRDS
Eudyptula minor	462	35	37	1	313	117	–	–	8	2	6	35	18	17	7	1058
Diomedea spp*	10	2	3	–	–	–	–	–	–	–	1	4	3	2	–	25
chrysostoma	32	1	5	–	–	–	–	–	–	–	–	1	1	–	–	40
cauta cauta	14	2	4	–	–	–	–	–	–	–	–	2	2	–	–	24
Macronectes giganteus	11	4	2	–	7	1	–	–	1	1	–	2	4	–	4	37
Fulmarus glacialoides	352	38	46	–	–	1	–	–	1	–	–	4	8	7	1	458
Thalassoica antarctica	62	4	3	–	–	–	–	–	–	–	–	4	–	–	–	73
Daption capensis	57	8	20	–	9	4	–	2	–	7	1	11	25	2	–	146
Pterodroma macroptera	12	–	–	–	33	19	–	–	–	–	–	1	2	–	–	67
lessoni	33	1	4	–	1	–	–	–	–	–	1	–	1	–	–	41
inexpectata	26	–	1	–	1	–	–	–	–	–	1	27	–	–	2	58
brevirostris	24	3	3	–	–	1	–	–	1	–	1	–	1	–	–	34
cooki	3	–	1	–	20	1	–	–	–	–	–	–	–	–	–	25
Halobaena caerulea	38	4	10	–	4	2	–	–	–	–	1	–	1	–	–	60
Pachyptila spp*	121	12	122	–	20	2	–	–	26	–	6	18	34	27	2	390
vittata	9	2	6	–	–	1	–	–	4	26	1	49	1	–	2	101
salvini	13	–	–	–	–	–	–	–	–	–	–	2	1	–	–	16
belcheri	65	2	6	–	2	1	–	–	1	5	–	–	–	2	–	84
turtur	637	37	150	–	100	23	–	3	5	2	7	28	96	10	1	1099
Puffinus spp*	13	2	–	–	–	2	–	–	–	–	3	1	–	–	–	21
carneipes	32	–	1	–	66	19	–	–	2	–	–	–	2	–	–	122
bulleri	369	10	12	–	57	12	–	–	–	1	–	–	8	1	–	470
griseus	6082	109	46	–	31	27	–	1	25	30	37	252	264	2	7	6913
tenuirostris	110	8	6	–	98	85	–	–	–	–	2	2	3	–	–	314
gavia	699	144	165	–	368	71	1	3	13	25	–	–	40	8	–	1538
huttoni	18	1	5	–	–	1	–	–	2	–	–	–	2	–	–	29
assimilis	76	1	–	–	7	9	–	–	–	–	–	–	1	–	–	93
Pelagodroma marina	4	–	–	–	9	8	–	–	–	11	–	–	1	–	–	33
Pelecanoides urinatrix	290	37	153	–	116	70	–	1	–	–	2	16	69	10	1	765
Sula bassana	128	7	4	–	31	5	–	–	–	–	–	–	–	1	–	176
Phalacrocorax carbo	9	1	1	–	2	1	–	–	–	–	1	–	4	–	–	19
varius	5	–	–	1	12	4	–	–	3	–	–	1	–	–	–	26
Stictocarbo punctatus	6	1	2	–	–	4	–	–	13	76	8	2	2	5	–	119
Larus dominicanus	132	23	129	1	30	13	–	1	10	33	45	11	140	41	7	616
novaehollandiae	51	36	11	1	29	24	–	–	13	1	17	5	40	8	–	236
bulleri	–	–	1	–	–	–	–	–	–	6	11	4	–	–	–	22
Sterna striata	22	8	6	–	17	3	–	–	2	1	–	1	9	–	–	69
TOTALS	10027	543	965	4	1383	531	1	11	130	227	152	483	783	143	34	15417

*Species or subspecies could not be identified by patroller.

TABLE 4 — Monthly distribution of the more common seabirds found dead in 1978.

SPECIES OR SUBSPECIES	MONTHS												TOTAL BIRDS
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Eudyptula minor	33	53	37	115	124	33	118	244	163	39	50	49	1058
Diomedea spp*	–	1	–	–	–	1	4	6	8	3	2	–	25
chrysostoma	–	–	–	–	–	–	3	16	11	4	4	2	40
cauta cauta	–	1	–	–	2	–	5	6	2	2	2	4	24
Macronectes giganteus	6	1	1	1	1	5	6	5	5	3	3	1	37
Fulmarus glacialoides	1	–	–	–	–	–	1	49	280	72	52	3	458
Thalassoica antarctica	–	–	–	–	–	–	–	8	64	1	–	–	73
Daption capensis	1	4	2	1	2	3	12	48	33	23	14	3	146
Pterodroma macroptera	8	18	2	3	12	1	3	10	3	2	–	5	67
lessoni	1	–	–	2	–	1	–	4	5	7	13	8	41
inexpectata	6	7	2	1	8	1	–	18	–	–	–	15	58
brevirostris	–	–	–	–	–	–	2	5	22	5	–	–	34
cooki	2	7	2	11	–	–	–	1	–	–	–	2	25
Halobaena caerulea	–	–	–	1	–	–	7	20	23	7	–	2	60
Pachyptila spp*	30	65	6	9	9	4	31	87	38	36	43	32	390
vittata	33	4	–	1	4	–	1	5	3	1	1	48	101
salvini	–	–	–	–	2	1	8	3	–	1	1	–	16
belcheri	–	3	–	1	–	–	39	32	8	–	1	–	84
turtur	15	43	15	17	8	4	374	310	72	77	114	50	1099
Puffinus spp*	3	2	1	4	2	–	–	2	–	–	5	2	21
carneipes	11	34	12	12	4	2	–	–	–	4	32	11	122
bulleri	21	50	13	28	9	3	1	–	7	43	259	36	470
griseus	22	28	17	43	452	49	9	94	15	47	4937	1200	6913
tenuirostris	62	29	4	9	13	6	–	–	1	11	36	143	314
gavia	29	100	51	59	31	6	135	625	247	91	107	57	1538
huttoni	2	–	–	–	2	–	–	1	–	9	11	4	29
assimilis	1	2	–	1	–	2	13	5	11	12	38	8	93
Pelagodroma marina	9	2	2	3	2	–	–	1	4	2	4	4	33
Pelecanoides urinatrix	34	32	2	11	13	7	155	237	118	66	11	79	765
Sula bassana	6	9	6	11	6	9	12	17	15	27	37	21	176
Phalacrocorax carbo	1	2	1	1	2	2	2	2	2	2	1	1	19
varius	2	2	4	1	3	1	1	3	3	1	2	3	26
Stictocarbo punctatus	16	2	7	11	22	12	10	7	7	11	8	6	119
Larus dominicanus	83	47	31	72	59	53	27	33	57	60	28	66	616
novaehollandiae	13	31	13	41	25	24	11	10	13	8	12	35	236
bulleri	3	5	–	8	1	2	–	1	–	–	2	–	22
Sterna striata	2	6	1	8	9	6	3	5	11	4	7	7	69
TOTALS	458	590	232	483	827	238	993	1920	1251	681	5837	1907	15417

*Species or subspecies could not be identified by patroller.

Monthly and coastal distribution of the less common birds is given in Table 2 and of the more common birds in Tables 3 and 4.

Throughout the year there was an increase in numbers of Blue Penguins *(Eudyptula minor)* and Black-backed Gulls *(Larus dominicanus)* found. Part of this appears to be due to increased patrolling, particularly in the Bay of Plenty with respect to Blue Penguins and Wellington South for Black-backed Gulls.

The largest wreck of the year was of Sooty Shearwaters *(Puffinus griseus)* found during November and December on Auckland West and Taranaki beaches. From mid-October into December the weather over most of the Tasman Sea was considered to be fine. South of a line between Tasmania and Stewart Island there were brief periods of strong south-west winds and north of this line there were moderate but persistent south-west winds. A Sooty Shearwater wreck at this time of the year is now expected. The weather this year does not appear to have been bad enough to cause the wreck. Other, unknown, causes are more likely, and the persistent winds, with the south-west sea currents in this area, carried the birds to shore. A number of birds were alive when found. The total number of Sooty Shearwaters found during November is higher than the total for any previous year. On Auckland West beaches in November Sooty Shearwaters were found at a rate of 26.7 birds per kilometre covered; this is some five times higher than previously recorded for this species (Veitch 1977).

TABLE 5 — The distribution of Antarctic Fulmars and Antarctic Petrels on the west coast of the North Island from August to October 1978.

		Aug	Sep	Oct
Auckland West	Fulmarus glacialoides	23	227	47
	Thalassoica antarctica	4	58	0
Taranaki	Fulmarus glacialoides	4	32	1
	Thalassoica antarctica	0	4	0
Wellington West	Fulmarus glacialoides	18	9	19
	Thalassoica antarctica	0	2	1

During late August and September, with some birds still being found until December, there was a wreck, mainly on the west coast of the North Island (Table 5), of Antarctic Fulmars *(Fulmarus glacialoides)*, Antarctic Petrels *(Thalassoica antarctica)*, and lesser numbers of Blue Petrels *(Halobaena caerulea)*. The total numbers of birds found was not high (Tables 3 & 4), but when numbers found previously and the normal range of these species are considered, this wreck is very interesting. Seven Antarctic Fulmars were found between 1935 and 1959, one in 1964, one in 1965, and subsequent records are shown in Table 6. Antarctic Fulmars breed south of the Antarctic Circle but are now regarded as regular stragglers to New Zealand waters (Falla 1979). Falla (1979) records this species as breeding

TABLE 6 — Previous records of Antarctic Fulmars and Antarctic Petrels on New Zealand beaches.

	1970	1971	1972	1973	1974	1975	1976	1977	1978
Fulmarus glacialoides	16	3	5	134	19	639	10	0	455
Thalassoica antarctica	0	0	0	2	0	3	0	1	73

around the edge of Antarctica, moving north with the pack ice, but seldom north of 60° south latitude (c. 15 000 km south of Invercargill). Towards the end of winter 1978 there were unusual numbers of Antarctic Petrels (some hundreds) from Preservation Inlet to Stewart Island (Barlow 1979). During 1978 the numbers of Blue Petrels found dead was about five times the normal level. It appears that most of this wreck was of first-year birds (M. P. Kearns, pers. comm.). The three species involved feed their young mainly on the krill *Euphausia.* The identified diet of young Blue Petrels is known to be 82% by weight *Euphausia superba* (Prince, 1980), which was noticeably scarce around South Georgia during the 1977-78 summer (Bonner *et al.* 1978) and presumably equally scarce throughout its circumpolar distribution. During recent years, owing to the reduction in numbers of baleen whales, which eat similar food, it is likely that these Antarctic-breeding petrels have increased in number (M. J. Imber, pers. comm.). This increase would have accentuated the effect of the observed krill shortage, and all birds would have moved further north than usual in their search for food. From 20 August there was a period of strong south-west winds to the south and west of New Zealand, but these rapidly moderated and during the first two weeks of September north-west winds prevailed over the Tasman Sea. It appears that the prevailing south-west sea currents brought the birds ashore despite the north-west winds. M. J. Imber (pers. comm.) examined the stomachs of several of these beach-wrecked birds and found that they had been eating the same species of squid that Grey-faced Petrels *(Pterodroma macroptera)* eat. He considers that in such a competitive feeding situation the Antarctic Fulmars and Petrels would not get sufficient squid to replace their normal krill intake.

Ten Specimen Record Cards were completed for Antarctic Petrels. Data from these are summarised in Table 7.

TABLE 7 — Measurements of Antarctic Petrels **(Thalassoica antarctica)** found dead during August and September 1978.

	bill length	bill depth	bill width	mid toe & claw	tarsus	wing	tail	total length	span	weight
Number of specimens	10	8	8	10	10	10	10	8	8	8
Mean	36.2	14.3	14.6	61.6	44.4	310	127	430	1003	399
Range	32.0	13.3	13.1	57.0	41.1	293	112	420	970	300
	38.3	15.3	15.8	65.0	46.4	325	139	445	1100	525

In February and April frequent moderate easterly winds brought increased numbers of Fairy Prions *(Pachyptila turtur)*, Flesh-footed Shearwaters *(Puffinus carneipes)*, Buller's Shearwaters *(P. bulleri)* and Fluttering Shearwaters *(P. gavia)* to Auckland East beaches.

During December higher numbers than usual of Short-tailed Shearwaters *(Puffinus tenuirostris)* were found on Auckland East and Bay of Plenty beaches. There was also an increase in numbers of Broad-billed Prions *(Pachyptila vittata)* found on Southland beaches. There are no apparent reasons for these wrecks, although a Short-tailed Shearwater wreck may be expected at this time of year.

Other apparent wrecks, e.g. Southland in August, may generally be attributed to patrols in new areas where many old specimens were found.

Black-winged Petrels *(Pterodroma nigripennis)* have been recorded during most years since 1969 but never more than two in any one year. During 1978 eight birds were found, perhaps the result of increased patrolling on Auckland West beaches. This species is considered to be expanding its range (R. B. Sibson, pers. comm.).

Fulmar Prions *(Pachyptila crassirostris)* were first recorded in 1970 when three were found (AW, 2; WW). Subsequent records are 1971 two birds (CS), 1973 two birds (CN), 1977 one bird (WS), and eight in 1978. There is no obvious reason for this large increase but five of these specimens were found on Wellington South beaches where the amount of patrolling more than doubled in 1978.

This is the fifth year that Sooty Terns *(Sterna fuscata)* have been found. Previous records are: 1960 four birds; 1964 one (TA); 1968 one (TA); 1971 seven (AW, 4; TA, 1; AE, 2).

Wedge-tailed Shearwaters have been found in two previous years: 1962 two birds (WW) and 1966 one (AW).

The Soft-plumaged Petrel *(Pterodroma mollis)* found on Petone Beach in June is the third time this species has been found during beach patrols. Previous records are from 1971 (BP) and 1974 (AE).

In 1978, a Black-fronted Tern *(Chlidonias albostriatus)* and a Little Tern *(Sterna albifrons)* were found for the second time during beach patrolling. Previous records are of single birds in 1976 (WS) and 1975 (CS) respectively.

This is the first time a Rockhopper Penguin *(Eudyptes crestatus = chrysocome)* has been found during beach patrolling. It breeds on our subantarctic islands, regularly moults on Snares Island and live birds have been found ashore occasionally as far north as Gisborne.

The Leach's Fork-tailed Storm Petrel *(Oceanodroma leucorhoa)* found near Dargaville (AW) in August is a new record for the Beach Patrol Scheme and the third time this species has been found in New Zealand. The previous records are of single birds found on Muriwai

Beach in 1922 (OSNZ 1970) and near Waharoa in April 1978 (Fooks 1978).

Miscellaneous birds recorded, but not considered to be seabirds, totalled 252. These were: 44 magpies (both subspecies), 33 Rock Pigeons, 28 Mallard Ducks, 26 Black Swans, 16 Blackbirds, 15 Grey Ducks, ten Pukekos, eight Domestic Fowls, seven Domestic Geese, six unidentified ducks, six Harriers, five Song Thrushes, five Variable Oystercatchers; four each of Pipit, Starling and California Quail; three each of Goldfinch, Pheasant, Godwit and White-faced Heron; two House Sparrows, two Mute Swans, and one each of Skylark, Tui, NZ Pigeon, SI Weka, NZ Dotterel, Morepork, heron sp., Shoveler Duck, Banded Dotterel, Pied Stilt, NI Kaka, Paradise Duck, SI Pied Oystercatcher and Spine-tailed Swift.

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LITERATURE CITED

BARLOW, M. L. 1979. Many Antarctic Petrels around Foveaux Strait. Notornis 26: 329.
BONNER, W. N.; EVERSON, I.; PRINCE, P. A. 1978. A shortage of krill, **Euphausia superba**, around South Georgia. ICES CM1978/L:22. 4pp.
FALLA, R. A. 1979. **In** Falla, R. A.: Sibson, R. B.; Turbott, E. G. 1979. A new guide to the birds of New Zealand. Collins: Auckland and London.
FOOKS, P. 1978. Leach's Fork-tailed Storm Petrel. Notornis 25: 278.
IMBER, M. J.; BOESON, B. W. 1969. Seabirds found dead in New Zealand in 1964. Notornis 16: 50-56.
OSNZ, 1970. Annotated checklist of the birds of New Zealand. The Checklist Committee (F. C. Kinsky, Conv.), Ornithological Society of New Zealand Inc. 99 pp. Wellington. A. H. & A. W. Reed.
PRINCE, P. A. 1980. The food and feeding ecology of Blue Petrel **(Halobaena caerulea)** and Dove Prion **(Pachyptila desolata)**. J. Zool. London. 190: 59-76.
VEITCH, C. R. 1977. Seabirds found dead in New Zealand in 1975. Notornis 24: 41-49.

C. R. VEITCH, *Wildlife Service, Department of Internal Affairs, P.O. Box 2220, Auckland.*

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SHORT NOTE

GLOSSY IBIS AMONG SOUTH ISLAND PIED OYSTERCATCHERS

During a beach patrol along Ward Beach on 18 January 1980 (part of the field work of OSNZ summer school), I became separated from the rest of the party and, while fossicking on the beach opposite Chancet Rocks, saw about 50 Pied Oystercatchers *(Haematopus finschi)* flying north in a fairly tight flock just offshore at about 5 m high above sea level. Among them was a Glossy Ibis *(Plegadis falcinellus)* whose long curved bill was clear and unmistakable. The ibis was completely integrated in the flock, near the front but not in the lead. The flock flew steadily north as though on migration.

Previous to this I have not seen any other species flying with SIPO except the occasional Variable Oystercatcher *(H. unicolor)*. Pied Stilt will often fly adjacently but not on a migration flight.

SYLVIA REED, *4 Mamaku Street, Meadowbank, Auckland 5.*

PENGUIN PROPORTIONATE EGG WEIGHT

By ANTHONY J. WILLIAMS

Proportionate egg weight — the relation of egg weight to female body weight — is used to compare the relative cost of egg production in birds (Lack 1968). Reid (1965) and Lack (1968) calculated the proportionate egg weight of seven and 15 species of penguins respectively. Both found that the proportionate egg weight of penguins was typical of birds with altricial hatchings; yet penguins have semi-altricial, not altricial, hatchlings (Nice 1962). Both Reid (1965) and Lack (1968) used the weight of females at the time of laying for their calculations, and their error arises because the weight of penguins at laying cannot validly be compared with that of other birds.

Penguins have varying feeding regimes during the laying period: females of some species feed shortly before laying or during the laying interval, whereas females of other species lay their eggs during a period of fasting (Table 1). The extreme case is that of the Rockhopper and Macaroni Penguins, *Eudyptes chrysocome* and *E. chrysolophus,* in which the female lays the eggs in the middle of a 4-5 week fast (Warham 1963, 1971). Before starting a fast, penguins accumulate substantial fat deposits (Johnson & West 1974, Williams *et al.* 1977), which greatly enhance their weight. Consequently the weight of female penguins that lay their eggs during a fast is not comparable at the time of laying either with the weight of female penguins in species that do not fast during the laying period, or with the weight of other birds.

Healthy female birds in general have food reserves in their body tissues after laying, but in most species these reserves are unlikely to sustain the bird for more than a day or two. Penguins probably spend more of their lives in water than any other birds. One adaptation penguins possess for maintaining their body temperature higher than that of the water in which they swim is the accumulation of subdermal fat deposits which provide insulation (Frost *et al.* 1976). Such fat deposits are probably greater than those carried by most birds at the time of laying, and so the weight of female penguins which do not fast in the laying period will also be enhanced relative to that of most other birds.

Penguin body weights are probably most comparable with those of other birds at the end of the annual moult, when penguins after two or more weeks without food have minimal fat deposits (Williams *et al.* 1977). Body weight at the end of moult is known for only eight species of penguins. These data have been used to recalculate proportionate egg weight (Table 2). Application of the data in Table 2

to Lack's (1968: Fig. 17) graph comparing proportionate egg weight of several families of seabirds indicates that the proportionate egg weight of penguins calculated using lean (end of fast) weights are indeed typical of heavy birds with semi-altricial hatchlings.

TABLE 1 — The feeding regime of penguins during the laying period.

Species	Feeding regime during laying	Reference
Emperor Penguin		
Aptenodytes forsteri	Fasts	Le Maho (1977)
King Penguin		
A. patagonicus	Fasts	Stonehouse (1960)
Eudyptes penguins		
(all 5 species)	Fast	Warham (1975)
Fairy Penguin		
Eudyptula minor	Feeds	Kinsky (1960)
Yellow-eyed Penguin		
Megadyptes antipodes	No data	
Adélie Penguin		
Pygoscelis adeliae	Fasts	Sladen (1958)
Chinstrap Penguin		
P. antarctica	No data	
Gentoo Penguin		
P. papua	Feeds	This study
Jackass Penguin		
Spheniscus demersus	Feeds	J. Cooper (pers. comm.)
Magellanic Penguin		
S. magellanicus	No data	
Humboldt Penguin		
S. humboldtii	No data	
Galapagos Penguin		
S. mendiculus	Feeds	Boersma (1974)

TABLE 2 — Proportionate egg weight of eight species of penguins.

Species	Weight (g) of Female[a]		Egg[b]	Proportionate egg weight (%)	
Emperor Penguin *Aptenodytes forsteri*	20 000[1]		450[1]	2.3	(1.5)
King Penguin *A. patagonicus*	11 500[2]		302[2]	2.6	(2.0)
Rockhopper Penguin *Eudyptes chrysocome*	1 900[3]	A	76[3]	4.0	-
		B	109	5.7	(4.4)
Macaroni Penguin *E. chrysolophus*	3 200[3]	A	98.5[3]	3.1	-
		B	156.5	4.9	(3.7)
Fiordland Penguin *E. pachyrhynchus*	2 500[4]	A	100[4]	4.0	-
		B	120	4.8	-
Adélie Penguin *Pygoscelis adeliae*	3 400[5]	A	123[6]	3.6	(2.5)
		B	118	3.5	-
Gentoo Penguin *P. papua*	5 500[7]	A	141[3]	2.6	(2.2)
		B	134	2.4	-
Jackass Penguin *Spheniscus demersus*	2 300[8]	A	107[3]	4.7	(3.6)
		B	105	4.6	-

Notes: [a] Weights at end of fast.

[b] Weights of first-laid (A) and second-laid (B) eggs given when known.

[c] Calculated from data in previous columns. Lack's (1968) calculations in parentheses.

References: [1] Le Maho (1977), [2] Barrat (1976), [3] This paper, [4] Warham (1974), [5] Sladen (1958), [6] Reid (1965), [7] Stonehouse (1970), [8] Cooper (1978).

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LITERATURE CITED

BARRAT, A. 1976. Quelques aspects de la biologie et de l'ecologie du Manchot Royal (**Aptenodytes patagonicus**) des iles Crozet. C.N.F.R.A. 40: 9-52.
BOERSMA, P. D. 1976. An ecological and behavioural study of the Galapagos Penguin. Living Bird 15: 43-93.
COOPER, J. 1978. Moult of the Black-footed Penguin. Int. Zoo Ybk. 18: 22-27.
GWYNN, A. M. 1953. The egg-laying and incubation periods of Rockhopper, Macaroni and Gentoo Penguins. A.N.A.R.E. Ser. B. 1: 1-19.
JOHNSON, S. R.; WEST, G. C. 1973. Fat content, fatty acid composition and estimates of energy metabolism of Adelie Penguins (**Pygoscelis adeliae**) during the early breeding season fast. Comp. Biochem. Physiol. 45B: 709-719.
KINSKY, F. C. 1960. The yearly cycle of the Northern Blue Penguin **Eudyptula minor novaehollandiae** in the Wellington Harbour area. Rec. Dom. Mus. 3: 145-218.
LACK, D. 1968. Ecological adaptations for breeding in birds. London: Methuen.
LE MAHO, Y. 1977. The Emperor Penguin: a strategy to live and breed in the cold. Am. Sci. 65: 680-693.
NICE, M. N. 1962. Development of behaviour in precocial birds. Trans. Linn. Soc. N. Yk. 8: 1-211.
REID, B. E. 1965. The Adelie Penguin (**Pygoscelis adeliae**) egg. NZ Jl. Sci 8: 503-514.
SLADEN, W. J. L. 1958. The pygoscelid penguins. I Methods of study. II The Adelie Penguin. Falklands Isl. Depend. Surv. Sci. Rep. 17: 1-97.
STONEHOUSE, B. 1960. The King Penguin **Aptenodytes patagonica** of South Georgia. Falkland Isl. Depend. Surv. Sci. Rep. 23: 1-81.
STONEHOUSE, B. 1970. Geographic variation in Gentoo Penguins **Pygoscelis papua**. Ibis 112: 52-57.
WARHAM, J. 1963. The Rockhopper Penguin, **Eudyptes chrysocome**, at Macquarie Island. Auk 80: 229-256.
WARHAM, J. 1971. Aspects of breeding behaviour in the Royal Penguin, **Eudyptes chrysolophus schlegeli**. Notornis 18: 91-115.
WARHAM, J. 1974. The Fiordland Crested Penguin **Eudyptes pachyrhynchus**. Ibis 116: 1-27.
WILLIAMS, A. J.; SIEGFRIED, W. R.; BURGER, A. E.; BERRUTI, A. 1977. Body composition and energy metabolism of moulting Eudyptid penguins. Comp. Biochem. Physiol. 56A: 27-30.

ANTHONY J. WILLIAMS, *FitzPatrick Institute, University of Cape Town, Rondebosch 7700, South Africa.*

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SHORT NOTE

FEMALE BLACKBIRD DIVERTED FROM TASK

In September 1978, we found the old nest of a Song Thrush *(Turdus philomelos)* blown on to the path. We put it on top of a fence and placed in it two old eggs, one each of House Sparrow *(Passer domesticus)* and Starling *(Sturnus vulgaris)*. A short time later a female Blackbird *(T. merula)* deserted her mate, with whom she had been building a nest in a nearby shrub, to sit firmly on the foreign nest and eggs. The male Blackbird uttered continuous cries of distress while fluttering, strutting and displaying along the fence between the shrub and his mate. After about 20 minutes, he was successful in persuading his mate to rejoin him in nest-building. The offending nest and eggs were removed to the rubbish bin.

MARION LANE, *21 Philip Street, Ashburton*

NOTES ON THE BROWN CREEPER
(Finschia novaeseelandiae)

By B. J. GILL, M. H. POWLESLAND and R. G. POWLESLAND

ABSTRACT

Observations are given on vegetable foods of Brown Creepers and on aspects of breeding. We examined 21 nests in the field and recorded some details of nesting, eggs (colour, clutch-size, proportion of time spent incubating) and nestlings (description of the hatchling, weights and tarsal lengths).

INTRODUCTION

The Brown Creeper or Pipipi is widespread in the South Island and Stewart Island (Bull *et al.* 1978), in subalpine shrublands, scrub, and intact and second-growth forest. It also occurs in pine plantations (Soper 1976). Very little is known about the life of Brown Creepers; the only paper to deal with them exclusively (Henderson 1977) covers the behaviour of flocks in autumn and winter.

During our work with other birds at Kowhai Bush, Kaikoura, we found 21 Brown Creeper nests from which we collected limited information on breeding. We present these fragmentary data to help fill the gap in knowledge. Brown Creepers are one of the commonest birds at Kowhai Bush in all seasons, achieving densities there apparently far in excess of those in some climax forests (Gill, pers. obs.). Kowhai Bush is described in detail by Hunt & Gill (1979).

VEGETABLE FOODS

Although Brown Creepers are primarily insectivores, Henderson (1977) reported that they eat the fruits of *Coprosma propinqua, C. rotundifolia* and possibly lancewood *(Pseudopanax crassifolius)*. At Kowhai Bush we saw them eating berries of karamu *(C. robusta)* and possibly the fruits of tutu *(Coriaria arborea)* and kohuhu *(Pittosporum tenuifolium)*.

NESTS

At Kowhai Bush we first saw Brown Creepers building in early September. They nested in the canopy and upper and lower understoreys of the forest, in low scrub and in a small six-years-old pine-lot. Species of trees nested in were kanuka *(Leptospermum ericoides)*, which dominates much of the forest, 11 nests; and akiraho *(Olearia paniculata)*, 3 nests. We also found one nest in each of akeake

(Dodonaea viscosa), kohuhu, tutu, gorse *(Ulex europaeus)* and Douglas fir *(Pseudotsuga menziesii)*.

The average height of nests was 4.2 m (n = 19, range 1.2-8.0 m), but this figure is biased because we more readily found low nests. At Kowhai Bush the canopy is 5-15 m high.

Nests were built in forks of bare twigs or in clumps of dense foliage. The nest in tutu was on a horizontal branch densely overgrown with the vine pohuehue *(Muehlenbeckia australis)*. Nests were thick, deep, tightly-woven cups sparsely lined with feathers. Materials used in construction were cobwebs, strips of kanuka bark, and dried moss and grass. It seemed that only one bird of the pair built. Six nests weighed 9-14 g after drying indoors (adult Brown Creepers weigh 13 g). Nests were elliptical in outline from above, with outside diameters of 9-10 x 8-9 cm and inside diameters of 5 x 4-5 cm. Inside depth was about 4 cm and outside depth 6-7 cm.

EGGS

Brown Creeper eggs were variable in colour, as noted by Falla *et al.* (1970) and Oliver (1955). There were three colour-types:

1. Chalky white with dark brown blotches and speckles concentrated at the larger end.
2. Pale brown with large blotches and streaks of dark brown, often so dense, particularly at the larger end, that the background colour was difficult to determine.
3. Pale reddish brown with darker reddish-brown blotches and speckles concentrated at the larger end.

Two colour-types were present in one clutch.

TABLE 1 — Incubation attentiveness at two Brown Creeper nests in 1978. Percentage attentiveness was A/A+B where A = sum of attentive periods, and B = sum of an equal number of inattentive periods.

	Nest 1	Nest 2
Dates	18-28 October	1-5 December
Mean monthly temperature (°C)	11.1	15.1
Total hours observation	12.1	6.7
Attentive period (minutes; mean, range, n)	21.9, 9.7-35.4, 18	13.8, 6.5-24.1, 16
Inattentive period (minutes; mean, range, n)	8.1, 4.5-13.0, 23	7.7, 5.1-12.3, 18
Attentiveness (%)	72.9	63.9

Egg-laying was noted in October, November and early December. Three eggs within three days of laying weighed 1.8 g, 1.9 g and 1.9 g. Three other eggs a day or so before hatching weighed 1.5 g, 1.6 g and 1.7 g. On three occasions the interval between the laying of consecutive eggs in a clutch was one day. Clutch sizes were two (one clutch), three (10 clutches) and four (four clutches), with a mean of 3.2. This confirms Oliver's statement (1955) that Creepers lay 2-4 eggs. At two nests Brown Creepers incubated one egg, but other eggs were lost from at least one of these clutches.

At one nest 19 days elapsed from laying to hatching of the first egg (day of laying = day 1). Incubation of another clutch lasted at least 17 days. Incubation attentiveness at two nests was 64% and 73% (Table 1). We determined that proportions of time spent incubating at Kowhai Bush were: 68% in Grey Warblers *(Gerygone igata)*, in which the female incubates alone without food from the male; 81% in Robins *(Petroica australis)*, in which the female incubates alone but is fed by the male; and 97% in Fantails *(Rhipidura fuliginosa)*, in which both sexes incubate. These data suggest by analogy that only female Brown Creepers incubate, as stated by Soper (1976). Usually incubating Creepers left the nest in response to a call nearby, or they quitted the nest, called a short distance away, and were answered. We never saw one bird relieving another at incubation, but often two birds approached the nest before incubation resumed.

NESTLINGS

We saw nestlings from late October to December. One brood that hatched in late December would have fledged in January.

A Brown Creeper at hatching weighed 1.4 g. Newly hatched nestlings had orange skin, grey-brown natal down, yellow rictal flanges and buccal lining, white claws and a white egg-tooth. In nestlings up to 2 days old (day of hatching = day 0), the tip of the lower mandible sometimes protruded beyond that of the upper, but thereafter the tips met at the same point. Eyes often began to open as early as the 5th day. The egg-tooth was lost on or after day 8. Feathers of the

TABLE 2 — Weights and tarsal lengths of nestling Brown Creepers; day 0 = day of hatching.

		Day									
		0	1	2	3	4	5	6	7	8	9
Weight (g)	$\bar{x}$	1.7	2.2	2.9	3.6	4.5	5.8	6.6	7.3	8.8	9.6
Tarsal length (mm)	$\bar{x}$	7.8	8.3	9.8	11.1	12.7	14.8	16.1	17.4	20.1	21.4
	n	5	6	6	7	5	3	4	4	3	2

sterno-abdominal tracts erupted from their sheaths on about the 7th day, soon followed by feathers of the spinal, humeral, alar and pectoral tracts. Nestlings gripped the nest's lining from 9 days old.

Table 2 gives average weights and tarsal lengths of nestlings 0-9 days old. All older nestlings under observation were preyed upon, probably by introduced rodents and mustelids. Tarsal length was taken with vernier calipers laterally from the ankle joint to the articulation of the folded toes.

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REFERENCES

BULL, P.C.; GAZE, P. D.; ROBERTSON, C. J. R. 1978. Bird Distribution in New Zealand. A Provisional Atlas 1969-1976. Wellington: OSNZ.
FALLA, R. A.; SIBSON, R. B.; TURBOTT, E. G. 1970. A field guide to the birds of New Zealand. 2nd ed. London: Collins.
HENDERSON, N. M. 1977. Autumn and winter flocking behaviour of the Brown Creeper **Finschia novaeseelandiae**). Mauri Ora 5: 75-88.
HUNT, D. M.; GILL, B. J. (Eds.). 1979. Ecology of Kowhai Bush, Kaikoura. Mauri Ora Special Publication 2.
OLIVER, W. R. B. 1955. New Zealand birds. 2nd ed. Wellington: Reed.
SOPER, M. F. 1976. New Zealand birds. 2nd ed. Christchurch: Whitcoulls.

B. J. GILL and R. G. POWLESLAND, *Department of Zoology, University of Canterbury, Christchurch;* M. H. POWLESLAND, *Department of Botany, University of Canterbury, Christchurch.*

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SHORT NOTES

GODWITS SHOW CURIOSITY

At Mataitai, Clevedon, on 14 October 1978, I found a New Zealand Dotterel *(Charadrius obscurus)* with two day-old chicks. Its broken-wing display attracted a nearby flock of 50+ Bar-tailed Godwits *(Limosa lapponica)*, which marched towards it with great curiosity and chattering. When they were some 75 cm away, the dotterel ran and then flew, followed by the godwits. The godwits lost interest only when the dotterel ceased displaying.

A. HABRAKEN

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GREY TERNLET

At 1330hrs on 14 March 1980, two Grey Ternlets *(Procelsterna cerulea)* were seen at 34°19'S 172°08'E, which is just south of the Three Kings Islands.

JOHN JENKINS

SOUTHERN GREAT SKUAS ON ANTIPODES ISLAND, NEW ZEALAND: OBSERVATIONS ON FOODS, BREEDING, AND GROWTH OF CHICKS

By P. J. MOORS

ABSTRACT

Between 8 November and 4 December 1978 observations were made on Southern Great Skuas *(Stercorarius skua lonnbergi)* at Antipodes Island in the Southern Ocean. Their food habits were determined by observing birds and identifying prey remains. Penguin eggs and chicks were the dominant prey of coastal skuas, whereas those with inland territories relied on petrels and shearwaters. Clutch size in 11 nests averaged 1.8 eggs; most eggs in nine study nests hatched during the first fortnight of November. Hatching success was 54%, but only 3 of 10 chicks survived until 4 December. At that stage of the breeding season, and allowing for unnatural losses of eggs and chicks, productivity was 0.50 chicks per breeding pair.

Six chicks were weighed and measured for 5-20 days. Hatching weight averaged 74.3 g. Initial weight gains were small, but after day 4 the average growth rate was 31.6 g/day. Chicks which were heavier at hatching remained so subsequently. Mean bill length at hatching was 17.8 mm and mean depth 9.9 mm. Little growth occurred for the first five days, but afterwards the average growth rate was 1.0 mm/day for bill length and 0.4 mm/day for bill depth. The ratio of bill length to depth changed during growth, and attained the adult condition by age 17-20 days. There were no consistent differences between chicks from coastal and inland nests in their weight gains, or in the growth of their bills.

INTRODUCTION

Southern Great Skuas *(Stercorarius skua lonnbergi)* have a circumpolar distribution in the southern hemisphere. They breed on most islands at higher latitudes and on parts of the Antarctic Peninsula and disperse northwards to about 33°S during the winter. In the New Zealand region they nest on Stewart Island, the Chatham Islands, and their outliers, and on all the subantarctic islands. Information on the breeding biology and food habits of populations from this region has been given by Stead (1932), Oliver (1955), Young (1978) and Warham & Bell (1979), among others. These aspects of the Southern Great Skua's biology have also been studied on South American subantarctic islands, notably by Murphy (1936) and Stonehouse (1956) on South Georgia and by Burton (1968) on Signy Island.

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Little has been published about the growth of Southern Great Skua chicks, apart from the few measurements made by Stonehouse (1956). However, Young (1963a) and Reid (1966) measured the growth of chicks in two populations of the closely related Antarctic Skua *(S. maccormicki)*. Reid provided a detailed description of growth in body weight and in bill, wing and foot measurements.

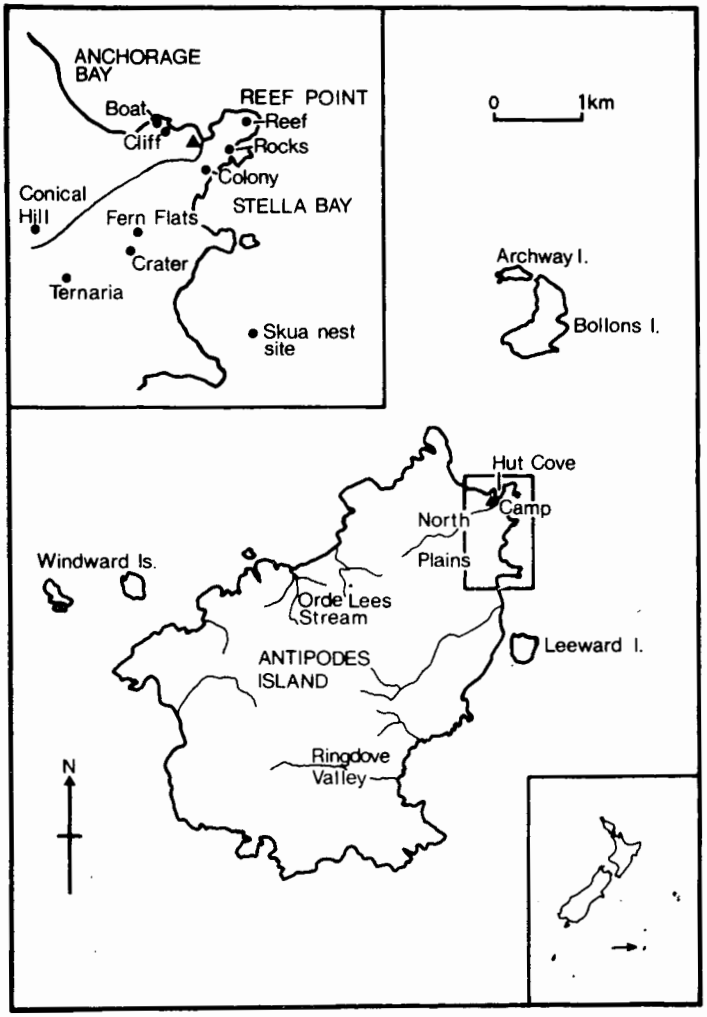

FIGURE 1 — Map of the Antipodes Islands. The upper inset shows the locations of the nine study nests.

Young (1963b) also studied the foraging habits of Antarctic Skuas at Cape Royds, Antarctica. He observed that whereas most fed entirely at sea, a few consistently obtained at least part of their food at a nearby colony of several thousand Adelie Penguins *(Pygoscelis adeliae)*. Skuas feeding in the colony had a higher breeding success than those foraging at sea, but Young (1963a) found no differences between the growth rates of chicks reared by each group.

In November 1978 the New Zealand Wildlife Service mounted a short expedition to the Antipodes Islands (49° 42′ S, 178° 48′ E) in the Southern Ocean. Southern Great Skuas are reasonably common there in summer, and breeding pairs are distributed widely over the islands (Warham & Bell 1979). On the main Antipodes Island some skuas nest along the coasts near mixed colonies of Erect-crested and Rockhopper Penguins *(Eudyptes sclateri* and *E. crestatus)* and feed predominantly on penguin eggs and nestlings. Other skuas nest inland where, judging from regurgitated pellets and the remains of prey, they subsist on petrels and shearwaters. Thus, each pair of skuas apparently depended on either concentrated or dispersed supplies of food, in a similar way to the Antarctic Skuas studied by Young (1963b). This paper reports observations of the food habits and breeding of Southern Great Skuas on Antipodes Island and compares the early growth rates of chicks reared in coastal and inland nests.

METHODS

The expedition was on Antipodes Island only from 8 November until 6 December 1978, which limited the extent of my investigations. The skuas had begun laying before our arrival, and none had fledged chicks before our departure. Therefore my data do not encompass a complete breeding season, and I could measure only the early growth rate of chicks.

Most data were collected from nine study nests. All were within 1.5 km of the expedition's camp near Reef Point on the north-east coast (Fig. 1): five nests (hereafter called " coastal nests ") were close to penguin colonies in Stella and Anchorage Bays and on Reef Point, and four (" inland nests ") were inland on the North Plains. When first located seven nests contained eggs and two contained chicks.

Eggs were measured with vernier calipers to the nearest 0.1 mm. Volumes and shape indices were calculated using Coulson's (1963) formulae:

$$\text{Volume (ml)} = 4.78 \times 10^{-4} \text{ (length} \times \text{breadth}^2\text{)};$$
$$\text{Shape index} = 100 \text{ (breadth} \div \text{length)}$$

Nests with eggs were visited irregularly until the eggs were pipping, and thereafter daily to determine the hatching date. Nests with chicks were visited usually daily to weigh and measure the nestlings. Chicks were weighed with Pesola scales accurate to 1 g

for weights up to 300 g, and to 5 g for weights above 300 g. The upper bill length (from tip to edge of downy area at base) and the bill depth at base were measured using vernier calipers accurate to 0.1 mm.

Information on clutch size and egg dimensions was also obtained from four other inland nests, three being on North Plains. Notes were also taken of the contents of all skua nests encountered during brief visits to Bollons and Archway Islands (approximately 2 km north of Antipodes) on 29 November and 2 December.

Both species of penguin were incubating when the expedition arrived on Antipodes. The Erect-crested Penguins began hatching about 14 November, and the Rockhopper Penguins about 1 December. The colonies in the study area were composed predominantly of Erect-crested Penguins, and so the hatching of Rockhopper chicks did not add greatly to the potential food supply of skuas.

The numbers of petrels visiting the island nightly varied with the weather and the stage of each species' breeding cycle. Both White-headed Petrels *(Pterodroma lessonii)* and White-chinned Petrels *(Procellaria aequinoctialis)* had begun laying by late November, but most Soft-plumaged Petrels *(Pterodroma mollis)* were away before laying; fledglings of Grey Petrels *(Procellaria cinerea)* were leaving throughout November.

RESULTS AND DISCUSSION

Food habits

All the skuas from coastal study nests were individually colour-banded so that their foraging areas could be determined. Each pair patrolled part or all of one of the penguin colonies near their nest-site (Fig. 1). The pair actively defended its area against intruding skuas, and was rarely seen elsewhere. Hunting was concentrated within the territory, apart from occasional scavenging forays to places such as the boulder beach in Hut Cove or the areas on Reef Point frequented by the non-breeding skua flock. Colour-banded birds were regularly observed preying on penguin chicks and eggs; and, when handled, skua chicks sometimes regurgitated meals containing these items. These observations, together with the many remains of skua meals found in the colonies, leave little doubt that these skuas were obtaining almost all their food from penguin colonies. Skuas were not seen foraging at sea, nor did they harry other seabirds to make them disgorge food, behaviour reported by Warham & Bell (1979) to occur later in the season.

The extent of skua depredations was illustrated by the large numbers of broken eggs littering the colonies and the many empty penguin nests. For example, between 14 November and 4 December, 41 of 43 Rockhopper Penguin nests were plundered in one section of the Stella Bay colony. During the same period I collected 101 penguin eggs eaten there by skuas, and about 70% of these were Rockhopper eggs. Predation occurred even though both species of penguin vigorously

defended their eggs and chicks and many skua attacks were unsuccessful. However, the speed, manoeuvrability and persistence of the skuas enabled them eventually to snatch an egg or chick left unguarded. The skuas usually swooped on their prey from a vantage point in the colony or flew low over the penguins until, in the resulting disturbance, they could grab an unprotected egg or chick. Similar behaviour has been described for Southern Great Skuas elsewhere (e.g. Oliver 1955, Stonehouse 1956). Nevertheless, the penguin colonies on Antipodes did not provide the skuas with an abundance of easy prey, and it is likely that as the penguin chicks grew older and formed creches they would have become increasingly difficult to capture. This pattern has been observed by Young (1963b) for Antarctic Skuas hunting in an Adelie Penguin colony.

Petrels and shearwaters were the most important foods of inland skuas. Partly dismembered carcasses of these prey and regurgitated pellets containing their feathers and bones littered the skua territories. White-headed Petrels were by far the most frequent prey, forming 73.4% of all remains collected from inland areas (Table 1), a preponderance already noted by Oliver (1955) and Warham & Bell (1979). Grey Petrels (9.4%) and White-chinned Petrels (7.0%) were also taken. The scarcity of small petrels such as prions in the diet reflects both their exceptionally low breeding numbers on the island (Imber, pers. comm.) and the greater difficulty in finding their remains. The only sample of which they formed a large part (number 5, Table 1) came from a nest near where Fairy Prions *(Pachyptila turtur)* were breeding.

Remains of penguin eggs or chicks were not found on any inland territories.

White-chinned Petrels do not usually fall prey to skuas (Murphy 1936), presumably because they are large enough to repel most skua attacks. However, on Antipodes these petrels occurred in two samples of prey remains and formed 20% of the sample (number 1, Table 1) collected from the territories of the Fern Flats and Crater skua pairs on the North Plains (Fig. 1). Several fresh carcasses of White-chinned Petrels were also found on nearby areas of the Plains. Many White-chinned Petrels arrived back from sea late in the afternoon and spent the few remaining daylight hours circling the island. Expedition members witnessed several half-hearted attacks by skuas on these birds, but the petrels escaped easily. However, I once saw a pair of skuas bring down a White-chinned Petrel on the North Plains. One of the skuas pursued and caught the petrel from behind, and both birds tumbled downwards from an altitude of about 15 metres before the petrel disengaged itself and hurriedly landed. Both skuas landed and tried to attack the petrel, which lunged at them and succeeded in keeping them at bay. The stalemate continued at least until I left 20 minutes later, with the skuas slowly circling the petrel just out of its pecking range. Next morning a trail of feathers led about 2

TABLE 1 — Bird remains identified by M. J. Imber in collections of Southern Great Skua prey from various localities on Antipodes Island, and from Bollons and Archway Islands.

Prey Species	Antipodes Island* 1	2	3	4	Inland Total	5	Bollons Island	Archway Island	Offshore Island Total	Grand Total
Pterodroma lessoni	27	127	23	2	179			1	1	180
P. mollis	4				4					4
Pterodroma sp.	1				1					1
Procellaria aequinoctialis	13	4			17					17
P. cinerea**	8	2	7	6	23		11		11	34
Puffinus griseus**	2				2					2
P. assimilis	4	4			8		149	41	190	198
Pelecanoides urinatrix	2	2			4	1				5
Pachyptila turtur		1			1	6				7
Garrodia nereis		1		1	2					2
Fregetta tropica			2		2		2		2	4
Sterna vittata**		1			1					1
Eudyptes crestatus								1	1	1
Cyanoramphus sp.								1	1	1
Total	61	142	32	9	244	7	162	44	206	457

* Sample numbers indicate locality of collection: 1 = Territories of Fern Flats and Crater pairs of skuas (Fig. 1); 2 = North Plains generally; 3 = Ringdove Valley; 4 = Orde Lees Stream; 5 = Coastal skua nest away from penguin colonies.

** Approximately half the P. cinerea remains were from fledglings; all the remains of P. griseus and S. vittata were from fledglings.

metres from where the birds had landed to the recently plucked and eaten carcass of the White-chinned Petrel. The carcass was cold, and apparently had been killed during the night. Warham & Bell (1979) reported similar incidents, but none ended with the death of the petrel.

White-chinned Petrels may be exploited on Antipodes because of the relatively small breeding populations of smaller petrels, a staple prey of Southern Great Skuas elsewhere (e.g. Oliver 1955, Burton 1968, Young 1978). A similar situation has been described in two valleys on Ile de l'Est in the Crozet Archipelago where penguins and small

TABLE 2 — Average measurements of Southern Great Skua eggs from Antipodes Island.

Nest locality	Egg type*	n	Length (mm)	Breadth (mm)	Volume (ml)	Shape index
Coastal	Larger	4	77.0	53.0	103.7	68.9
	Smaller	4	74.2	52.7	98.7	71.0
Inland	Larger	7	75.7	53.5	103.6	70.8
	Smaller	5	73.3	52.6	95.6	72.8
Overall mean		20	74.8	53.0	100.6	71.0
± SD			(2.55)	(1.57)	(6.93)	(3.21)

*Larger or smaller eggs in two-egg clutches; measurements from one-egg clutches included with larger eggs.

petrels are relatively few, and Southern Great Skuas take White-chinned Petrels instead (Despin *et al.* 1972).

The situation on Antipodes contrasts with that on Bollons and Archway Islands just to the north, where White-headed and White-chinned Petrels are few but Little Shearwaters *(Puffinus assimilis)* are abundant. The shearwaters are preyed on heavily by skuas, and their remains comprised 92.2% of samples collected (Table 1). The large colony of Erect-crested Penguins on Archway and the mixed colonies on Bollons are presumably also exploited by skuas, but we saw little debris from such meals.

Hatching and breeding success

The clutch size in four coastal and seven inland nests averaged 1.8 eggs. Nine nests contained two eggs, and two inland nests contained only one; no nests had three eggs. Table 2 gives the average dimensions and shape indices of these 20 eggs. Eggs from coastal nests tended to be bigger overall than those from inland nests, but larger samples are needed to confirm the significance of this difference. Mean egg size calculated from the combined data was 74.8 x 53.0 mm, slightly smaller than the average of 75.5 x 53.2 mm (n = 20) for eggs from South Georgia (Stonehouse 1956). The mean shape index of Antipodes eggs varied only slightly but tended to be higher for smaller eggs in two-egg clutches, and also for eggs from inland nests. The higher index indicates that these eggs were relatively broad for their length.

Table 3 records the contents and subsequent fate of each of the nine study nests. Of the seven found with eggs, four hatched between

TABLE 3 — Description of the Southern Great Skua nests studied on Antipodes Island in 1978, and the fates of their eggs and chicks.

Nest	Type*	Date found	Contents	Hatching date**	No. eggs hatched	Fate of chicks
Colony	C	8 Nov	2 eggs	-	0	Nest destroyed 28 Nov by skuas
Reef	C	9 Nov	2 eggs	12 Nov	2	1 died 13 Nov, other died 1 Dec
Rocks	C	9 Nov	2 eggs	-	0	Deserted 15 Nov
Crater	I	9 Nov	1 egg	16 Nov	1	Disappeared 4 Dec
Fern Flats	I	9 Nov	2 eggs	30 Nov	1	Alive 4 Dec
Ternaria	I	12 Nov	2 eggs	14 Nov	2	1 died 18 Nov, 1 alive 4 Dec
Boat	C	13 Nov	2 eggs	15 Nov	1	Alive 4 Dec
Cliff	C	14 Nov	1 chick	?	?	Died 21 Nov
Conical Hill	I	17 Nov	2 chicks	?	?	Smaller disappeared 21 Nov, larger 28 Nov

* C = coastal nest near penguin colony; I = inland nest.

** Hatching date of first chick when two-egg clutch.

12 and 16 November and one on 30 November. Judging from the size of the nestlings, the two nests with chicks had hatched about 5 and 10 days before they were discovered. Thus, six of the seven nests hatched during the first fortnight of November. This timing is similar to that of Southern Great Skuas breeding on Rangatira Island (44°S) in the Chathams Group (Young 1978) but is about a fortnight earlier than on Macquarie Island (54°S) (Jones & Skira 1979) and 4-6 weeks earlier than on both South Georgia (54°S) and Signy Island (61°S) (Burton 1968). There is a trend towards later breeding in higher latitudes, but it may reflect availability of food more than climate.

Of 13 eggs laid in the study nests, seven (54%) hatched, three (37%) from coastal nests and four (80%) from inland nests. The large difference in hatching success was due to the failure of the Colony and Rocks nests, probably as a result of human disturbance. One egg in the Fern Flats nest was infertile, and a chick in the Boat nest died while hatching. When both eggs in a two-egg clutch hatched, the larger egg hatched first.

Initially, 10 chicks were present in seven nests, but only three (30%) were still alive when last visited on 4 December; one was

in a coastal nest and two in inland nests. Conical Hill nest contained two chicks when discovered, but the smaller disappeared shortly afterwards, possibly expelled by the larger (see Procter 1975), and the remaining one lost weight and disappeared after two days of stormy weather. Another chick (Ternaria 1) died after storms, one fell over a cliff (Cliff), two died of unknown causes (Crater, Reef 2) and one was accidentally killed (Reef 1). The low overall productivity at 4 December of 0.33 chicks per breeding pair was caused partly by human activities, but if only the six unaffected pairs are included, productivity is increased to 0.50 chicks per breeding pair.

Expedition members found 11 skua nests during visits to Bollons and Archway Islands. Two nests held only eggs, two held a hatchling together with an egg, and seven held chicks. Three nests held pairs of chicks, the largest pair being about three-quarters adult size. The oldest chick found was a singleton of adult size with its primaries fully developed. The presence of several nests containing two chicks contrasted with the situation on Antipodes and suggests that skuas may be more productive on these two offshore islands, presumably as a result of the abundance there of Little Shearwaters.

Although the sample is small and does not cover a complete breeding season, the hatching success and productivity of Antipodes skuas appear to be lower than those known elsewhere. For example, Burton (1968) observed an average hatching success of 66% over three seasons for Southern Great Skuas on Signy Island, and Young (1963a) and Spellerberg (1971) reported successes of 80.5% and 58.3-81.1% respectively for Antarctic Skuas. Productivity on Antipodes was much less than the range of 0.74-1.55 chicks per pair (mean 1.13 chicks per pair) reported for five other populations of Southern Great Skuas (Downes *et al.* 1959, Wood 1971, Young 1978, Jones & Skira 1979). None of my study pairs successfully reared a two-chick brood, in contrast to the abilities of Southern Great Skuas elsewhere (e.g. Burton 1968, Young 1978), and apparently on Bollons and Archway Islands. This appeared to be the major cause of low productivity on Antipodes, possibly due to a shortage of food. The productivity was similar to those summarised by Wood (1971) for Antarctic Skuas breeding along the Antarctic coast, where the average was 0.42 chicks per pair; successful two-chick broods were also rare in these populations.

Weight gains of chicks

The weight at hatching of seven chicks averaged 74.3 g (range 65-87 g). The two eggs in Reef nest hatched about 48 hours apart, the first chick weighing 70 g and the second 65 g; in Ternaria nest the eggs hatched about 72 hours apart and the chicks weighed 81 g and 67 g. Reid (1966) reported that eight Antarctic Skua chicks weighed 61-76 g (mean 69.2 g) within 15 minutes of hatching.

Four chicks, two from coastal and two from inland nests, were weighed and measured for 17-20 days, and two others for five days

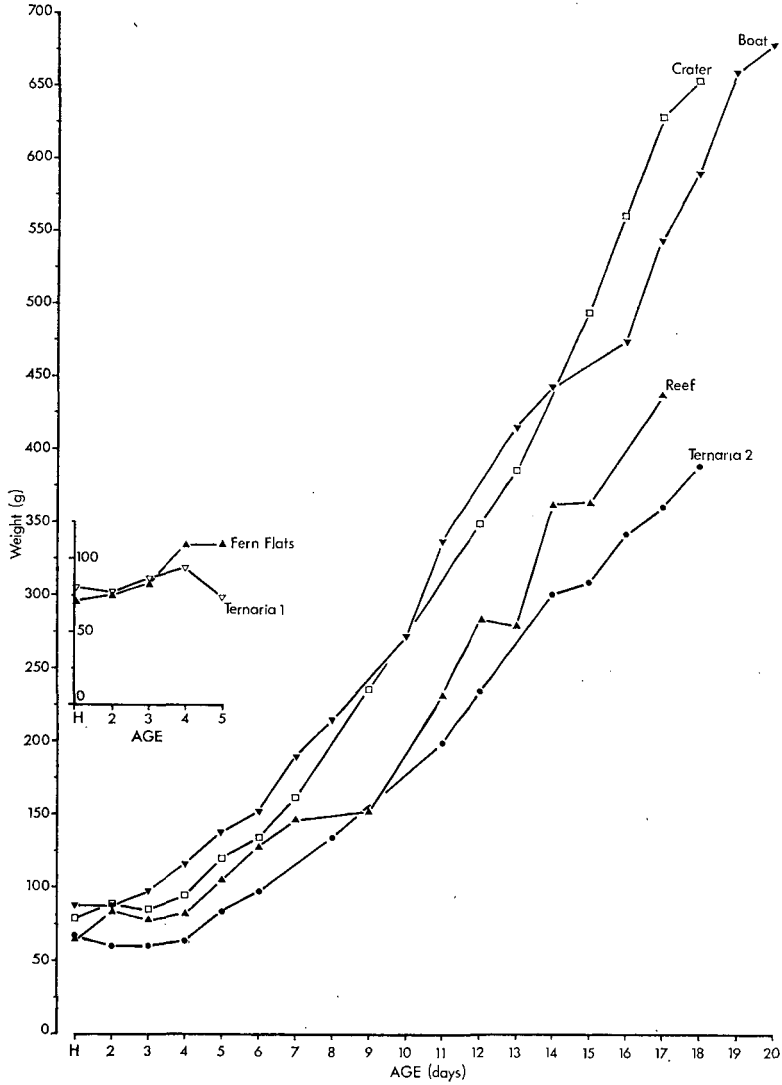

FIGURE 2 — Growth in weight after hatching (H) of Southern Great Skua chicks.

(Fig. 2). The initial weight gains, particularly during the first four days, were small. Five actually lost weight at some stage during this period, the greatest 24-hour reduction being 7 g (10.4% hatching weight) on day 2 for Ternaria chick 2. Ternaria chick 1 lost 20 g (21.3% initial weight) between days 4 and 5 during wet windy weather and was found dead in the morning. The other weight changes were probably due to the opposing effects of the absorption of the remnants of the yolk sac and the food brought by parents. Reid (1966) stated that at hatching the yolk reserve in Antarctic Skuas averaged 11.1% of chick body weight and lasted about 72 hours. He also observed slow growth rates for several days after hatching.

The four surviving chicks doubled their hatching weight in an average of 6.9 days. The two chicks in coastal nests required only six days each, whereas the two inland chicks took seven and eight days. These periods are all appreciably longer than the 4-5 days noted for Antarctic Skuas by Reid (1966).

After day 4, the body weights of Antipodes chicks increased rapidly (Fig. 2). Crater chick had the greatest daily increase in weight (40.4 g/day) and Ternaria chick 2 the least (23.1 g/day); the average of the four chicks was 31.6 g/day. Two other chicks, one from the inland Conical Hill nest and the other from the coastal Cliff nest, put on 15.0 g/day over 10 days and 30.3 g/day over seven days, respectively.

There were no consistent differences between the growth rates of chicks fed from penguin colonies and those fed petrels, but by day 17 there were large individual differences in weight. At that age, Crater chick was heaviest (630 g) and Ternaria chick 2 lightest (362 g), a difference of 74%, even though both were being fed petrels. The chicks which were heavier at hatching remained so subsequently, even though each of the lighter ones was the only chick being fed by its parents. Crater chick (hatching weight 78 g) came from a one-egg clutch and Boat chick (87 g) was the first hatched and larger of a two-egg clutch; in contrast, both Reef chick (65 g) and Ternaria chick 2 (67 g) were from second eggs. The differences in growth rates are clearly evident in Figure 2. More data are required to determine if Southern Great Skua chicks from one-egg clutches and first hatched chicks from two-egg clutches always grow faster than second-hatched chicks. Neither Young (1963a) nor Reid (1966) found such differences for Antarctic Skuas, although the pairs of chicks they compared were from the same nests. However, it is possible that the growth rates of siblings and differences between nests may depend more on the hunting experience and abilities of the parents than on intrinsic factors.

Changes in bill measurements of chicks

The average bill length at hatching was 17.8 mm (n = 4; range 17.3-18.2 mm) and the average depth was 9.9 mm (n = 4; range

9.3-10.4 mm). The rates of increase in bill length and depth (Fig. 3) did not vary as widely between chicks as did weight. Both bill measurements increased little in the first 4-5 days but increased steadily thereafter. As with weight, Ternaria chick 2 lagged behind the others in both initial and later bill dimensions. The average daily growth rate after day 4 was 1.0 mm (n = 6; range 0.7-1.2 mm) for bill length, and 0.4 mm (n = 6; range 0.3-0.7 mm) for bill depth. The bills of chicks from coastal and inland nests did not differ consistently in either size or growth.

Boat chick showed the largest overall increase in bill size: between days 2 and 20 length increased from 17.8 mm to 35.3 mm, and depth from 9.7 mm to 16.0 mm. These final measurements were 65% and 64% of the corresponding averages from eight breeding adult skuas caught near camp.

The ratio of bill length to depth changed during growth. Within three days of hatching, bill length was, on average, 1.79 times bill

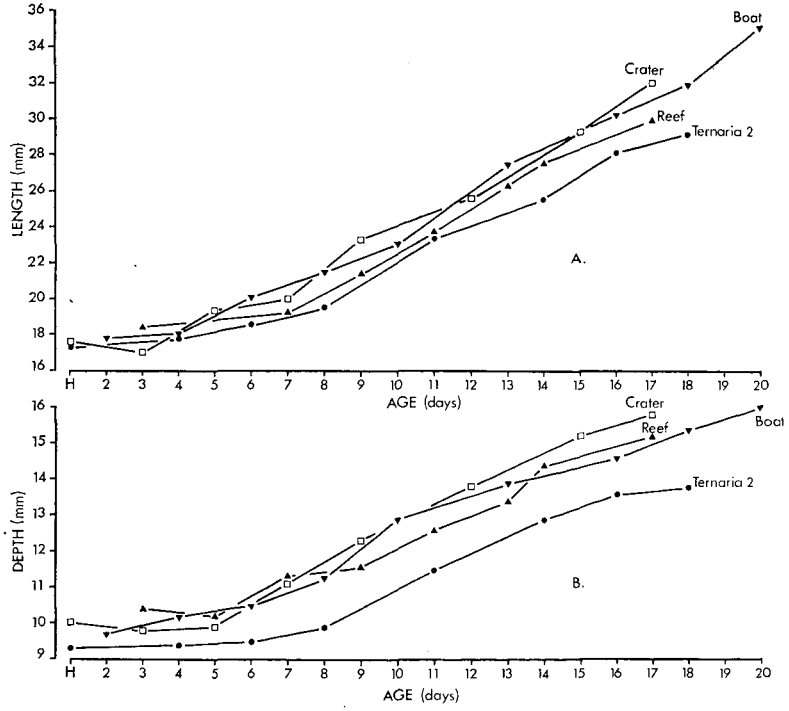

FIGURE 3 — Growth in the length (A) and depth (B) of the bills of Southern Great Skua chicks.

depth (n = 7; range 1.72-1.86), whereas by day 17-20 the multiplication factor had increased to 2.10 (n = 4; range 1.97-2.21), a highly significant difference ($t = 6.13$; $p < 0.001$). This higher factor was similar to, and not significantly different from, the average of 2.20 (range 1.92-2.47) from eight unsexed adults. It is clear that at hatching the proportions of the bill differ from the adult condition, which is achieved by a faster gain in length than in depth.

CONCLUSION

The data presented here show that on Antipodes Island penguin colonies do not provide Southern Great Skuas with a better food supply for their chicks than do petrels. Chicks grow just as fast or slowly when being fed penguins or petrels, and the foraging skill of the parents is at least as important as the overall abundance of food. Weather and the relative timing of breeding in skuas, penguins and petrels are also likely to be influential. Similar conclusions were reached by Young (1963a, b) after his investigation of the breeding success and growth of Antarctic Skuas at Cape Royds. Both there and on Antipodes Island, penguin colonies were not especially favourable food sources for skuas, despite appearances to the contrary. Skuas apparently fare much better in areas where there are dense breeding populations of the smaller petrels and shearwaters.

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This study was carried out during the 1978 New Zealand Wildlife Service Expedition to the Antipodes Islands. Transport was kindly provided by the Royal New Zealand Navy aboard HMNZS *Waikato*. Several expedition members assisted me with fieldwork and gave me egg measurements or other information, for which I am most grateful. I particularly appreciate permission from M. J. Imber to present his identifications of birds in the several collections of skua prey gathered by himself and others. He also provided some general information on the breeding and abundance of petrels on the islands and made useful comments on a draft manuscript. I also wish to thank J. A. Mills and H. A. Best for commenting on an earlier draft.

LITERATURE CITED

BURTON, R. W. 1968. Breeding biology of the Brown Skua, **Catharacta skua lonnbergi** (Mathews), at Signy Island, South Orkney Islands. Br. Ant. Surv. Bull. 15: 9-28.

COULSON, J. C. 1963. Egg size and shape in the Kittiwake (**Rissa tridactyla**) and their use in estimating age composition of populations. Proc. Zool. Soc. Lond. 140: 211-227.

DESPIN, B.; MOUGIN, J. L.; SEGONZAC, M. 1972. Oiseaux et mammiferes de l'Ile de l'Est. Paris: Com. Nat. Fr. Rech. Ant. 31: 1-106.

DOWNES, M. C.; EALEY, E. H. M.; GWYNN, A. M.; YOUNG, P.S. 1959. The birds of Heard Island. ANARE Rep. Ser. B 1: 1-135.

JONES, E.; SKIRA, I. J. 1979. Breeding distribution of the Great Skua at Macquarie Island in relation to numbers of rabbits. Emu 79: 19-23.

MURPHY, R. C. 1936. Oceanic birds of South America. 2 Vols. New York: Am. Mus. Nat. Hist. 1245 pp.

OLIVER, W. R. B. 1955. New Zealand birds. 2nd ed. Wellington: A. H. & A. W. Reed. 661 pp.

PROCTER, D. L. 1975. The problem of chick loss in the South Polar Skua **Catharacta maccormicki**. Ibis 117: 452-459.

REID, B. E. 1966. The growth and development of the South Polar Skua (**Catharacta maccormicki**). Notornis 13: 71-89.

SPELLERBERG, I. F. 1971. Aspects of McCormick Skua breeding biology. Ibis 113: 357-363.

STEAD, E. 1932. The life histories of New Zealand birds. London: Search Pub. Co. 162 pp.
STONEHOUSE, B. 1956. The Brown Skua (**Catharacta skua lonnbergi**) (Mathews) of South Georgia. Falkland Is. Dep. Surv. Sci. Rep. 14: 1-25.
WARHAM, J.; BELL, B. D. 1979. The birds of the Antipodes Islands. Notornis 26: 121-169.
WOOD, R. C. 1971. Population dynamics of breeding South Polar Skuas of unknown age. Auk 88: 805-814.
YOUNG, E. C. 1963a. The breeding behaviour of the South Polar Skua (**Catharacta maccormicki**). Ibis 105: 203-233.
YOUNG, E. C. 1963b. Feeding habits of the South Polar Skua (**Catharacta maccormicki**). Ibis 105: 301-318.
YOUNG, E. C. 1978. Behavioural ecology of **lonnbergi** skuas in relation to environment on the Chatham Islands, New Zealand. NZ J. Zool. 5: 401-416.

P. J. MOORS, *Wildlife Service, Department of Internal Affairs, Private Bag, Wellington.*

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SHORT NOTE

COLONISATION OF COPPERMINE ISLAND BY THE NORTH ISLAND SADDLEBACK

The North Island Saddleback *(Philesturnus carunculatus rufusater)* was formerly abundant on the mainland and major offshore islands (Williams 1976). Today it is confined naturally to Hen Island in the Hen and Chickens Group (Fig. 1). Since 1964, Wildlife Service staff have transferred wild-captured birds from Hen to six other islands in the outer Hauraki Gulf (Mills & Williams 1978). All but one of these liberations have resulted in the establishment of successful populations (Merton 1975 a, b). Liberation of birds on to Fanal Island has failed (C. R. Veitch, pers. comm.).

Two populations were established on islands in the Hen and Chickens Group. Birds were transferred to Whatupuke Island in 1964 (Merton 1965) and to Lady Alice (Marotiri) Island in 1971 (Merton 1975 a, b). The birds are weak fliers and were considered incapable of crossing the 150 m from Whatupuke to Coppermine Island. They were believed capable of " only about 50 m of sustained flight " (Merton 1975 b).

Between 20 November and 3 December 1979, a party consisting of Dick Anderson, John Craig, Duncan Cunningham, Rod Hitchmough, Ian McFadden, Don Newman, Joan Robb and Anne Stewart visited Lady Alice, Whatupuke and Coppermine Islands to investigate the distribution and status of tuataras *(Sphenodon punctatus)*, and Polynesian rats *(Rattus exulans)*. During this period at least 10 pairs of Saddlebacks were seen on Coppermine dispersed over the entire island. Joan Robb and Rod Hitchmough also reported seeing a lone Saddleback on Middle Stack, which lies at least 250 m from both Lady Alice and Whatupuke Islands (Fig. 1). On two subsequent checks of the Stack, however, the bird was not seen.

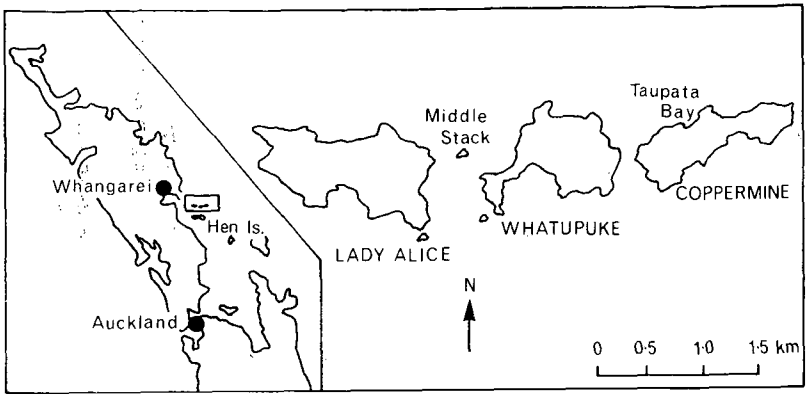


FIGURE 1 — Map of Chicken Islands, showing Lady Alice, Whatapuke and Coppermine Islands.

An earlier sighting of Saddlebacks on Coppermine Island was made by J. S. Macdonald, G. McMillan and E. F. I. Blackmore in 1967 (J. S. Macdonald, pers. comm.). During a brief visit on the afternoon of 2 February 1967, they saw " several " Saddlebacks flying over their heads at the northern side of the island west of Taupata Bay. However, in later surveys, particularly those led by Merton (24-31 October 1968) and Veitch (18-31 March 1971), no birds were seen (D. V. Merton, C. R. Veitch, pers. comm.).

Both Lady Alice and Whatupuke Islands currently support Saddleback populations of equivalent density to that on Hen Island (C. R. Veitch, pers. comm.). As adult Saddlebacks are both long-lived (4 banded birds on Lady Alice are at least 8 years old) and strongly territorial, there must now be considerable pressure for young birds to move away from these islands. Under this stimulus to move in order to attain a territory and breeding status, Saddleback must occasionally be capable of flights, over water, of up to 250 m.

LITERATURE CITED

MERTON, D. V. 1965. Transfer of Saddlebacks from Hen Island to Middle Chicken Island, January 1964. Notornis 12: 213-222.
MERTON, D. V. 1975a. The saddleback: its status and conservation. Pp. 61-74 **in** MARTIN, R. D. (ed.) Breeding endangered species in captivity. London: Academic Press.
MERTON, D. V. 1975b. Success in re-establishing a threatened species: the saddleback — its status and conservation. XII Bull. Intern. Council Bird Preservation. 150-158.
MILLS, J. A.; WILLIAMS, G. R. 1978. The status of endangered New Zealand birds. Pp. 147-168 **in** TYLER, M. J. (ed.) The status of endangered Australasian wildlife. Adelaide: Roy. Zool. Soc. S. Aust.
WILLIAMS, G. R. 1976. The New Zealand wattlebirds (Callaeatidae). Proc. 16th Int. Orn. Cong. 161-169.

DONALD G. NEWMAN, *Wildlife Service, Department of Internal Affairs, Private Bag, Wellington.*

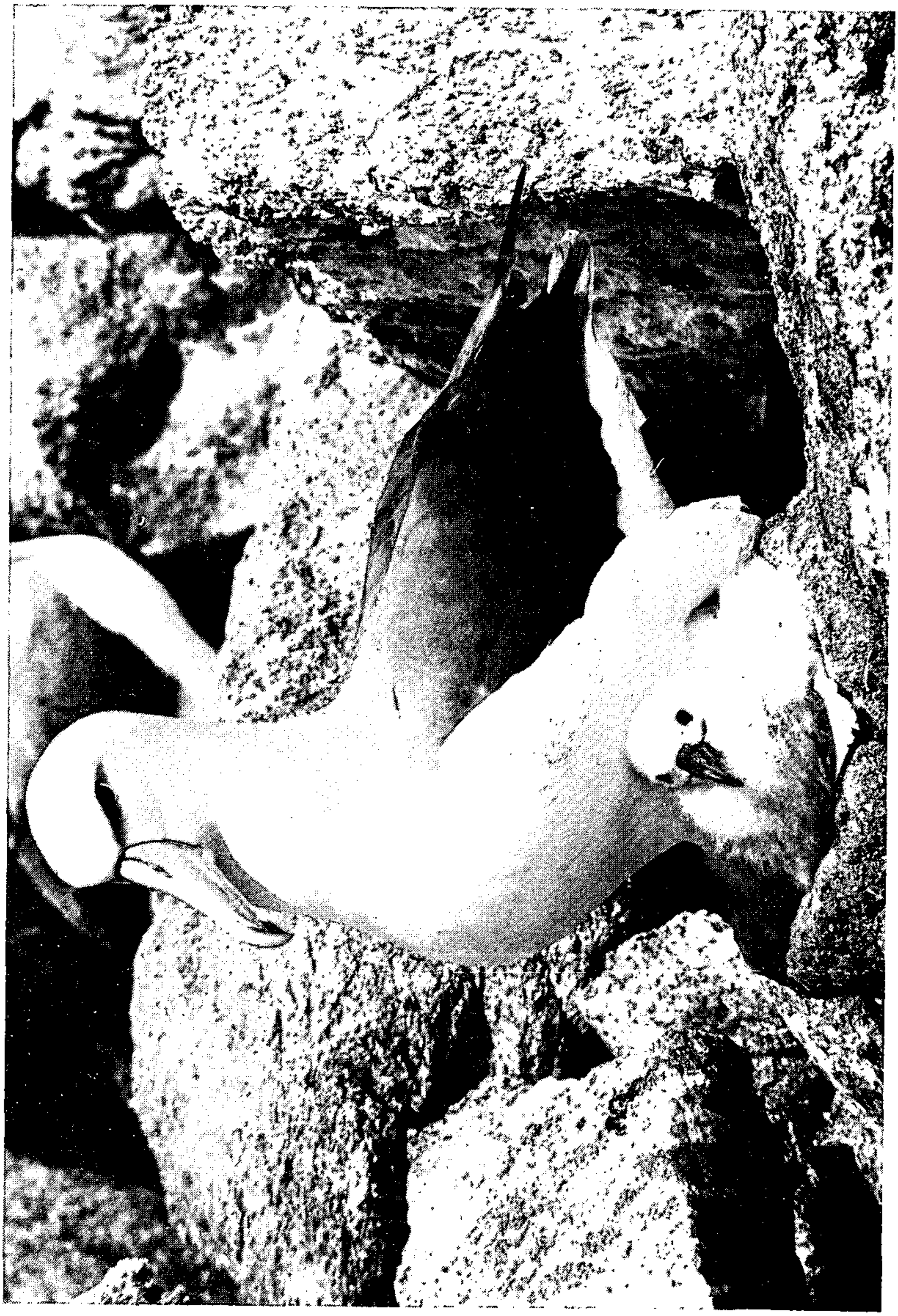


PLATE I — Salvin's Mollymawk, Snares Western Chain, 21 November 1976. Photo: Joy L. Woods

Photo: P. M. Sagar

PLATE II — Mottled Petrel, The Snares, February 1977.

Photo: Bay of Plenty Times Ltd.

PLATE III — An Oriental Cuckoo **(Cuculus saturatus)** in a garden in Sherwin Street, Greerton, a suburb of Tauranga. The bird was reported in the **Bay of Plenty Times** of 16 January 1980, and had been present about 10 days. The post is about 6 inches wide. (PCM Latham)

THE BIRDS OF SAVAI'I, WESTERN SAMOA

By SYLVIA REED

A group of 17 members of OSNZ visited Savai'i from 19 August to 6 September 1979. Participants were: D. Baker, K. Bond (organiser), E. Bowie, M. Child, P. Child, J. Clark, S. Chamberlin, P. Fooks, A. Goodwin, H. Hagen, R. Lockley, P. Millener, S. Reed, D. Russell, N. Rothwell, G. Schischka, M. Taylor.

The island of Savai'i, the westernmost of Samoa's main islands, comprises 703 square miles and lies between 13 and 14°S. Entirely volcanic, it rises to over 1800 m at the highest point, making access to the interior difficult. There are few tracks and Samoans seldom venture far from the coast where all the settlements are found. The wet season extends from November to April. The southern coasts of both Savai'i and Upolu receive two or three times more rain than the northern. At both camp sites light showers, mostly at night, were not infrequent.

From 19 to 29 August the base camp was at Palauli, in a clearing about 320 m a.s.l. above a coconut plantation. From here, small parties walked in different directions, making bird lists for the area visited. Excursions were made by bus and/or truck to Satupai'itea and beyond along the coast westwards for about 40 km. Five members, with

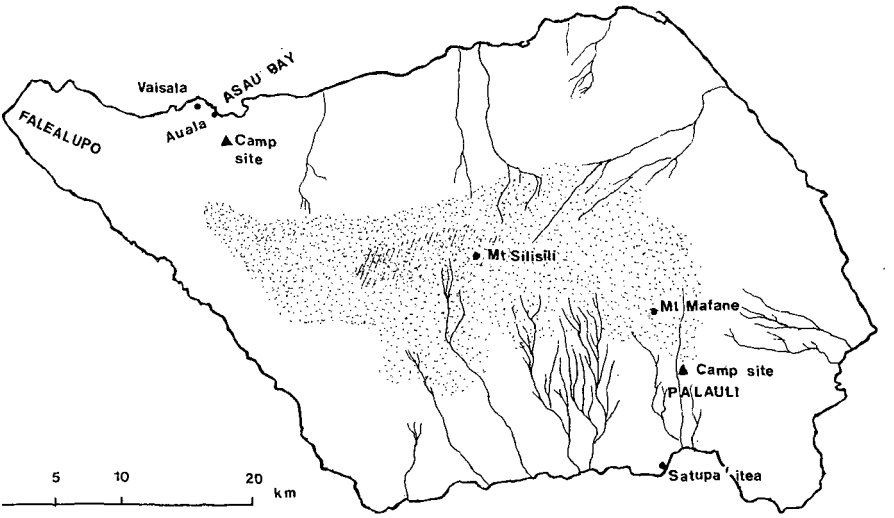


FIGURE 1 — Savai'i, showing camp sites, places mentioned in text, and main drainage pattern.

Samoan guides, made an overnight excursion to Mt Mafane (1000 m) on 23-24 August. Another long trek was part way up the track to Mt Silisili to reach about 1500 m. The forest flora on the northern slopes of Mt Silisili was noticeably different from forests at Palauli, being more lush even at the upper levels with more and larger creeping and perching plants and constant dampness underfoot.

From 29 August to 6 September, the party was based at Asau, two days on the coast, then at a Forestry Dept nursery at about 350 m. From the latter, tracks leading to various points higher were used as survey routes, including a small upper nursery at 700 m and a hut just above (about 800 m) used overnight by three of the party. One day was spent surveying the Falealupo peninsula in the north-west of the island.

Five mist nets were erected in the vicinity of the Palauli and Asau camps. The total catch was 31 birds of 10 species. These were measured, photographed and colour banded, notes being made on moult before release. One kingfisher, caught twice at Palauli, had lost the inner toe of its left foot. A Samoan Whistler was twice caught in the same net. Flying foxes (*Pteropus* sp.) were common, their appearance hawk-like.

In the following list, descriptions of plumage are purposely omitted as these are mostly covered by other authors. Table 1 represents the largest counts by one group in one place at one time; figures therefore show only *relative,* not *actual* numbers at various heights.

SEABIRDS

Few were seen during the ferry crossing from Upolu to Savai'i. Curiously, more were sighted crossing land.

WHITE-TAILED TROPICBIRD *Phaethon lepturus*

Commonly seen flying over the forest and at sea from various points on the coast. One seen flying through the coconut plantation at Palauli.

BROWN BOOBY *Sula leucogaster*

One recorded during ferry crossing.

GREATER FRIGATEBIRD *Fregata minor*

Three seen when crossing from Upolu to Savai'i on 19 August. On 31 August, an extraordinary flight of about 126 passed over Asau forest between 1500 and 1600 hours. They flew from the interior to the coast in a northwesterly direction, high in the sky and, consequently, the white belly could be seen on only three. Between 0800 and 0930 on 1 September, an estimated 900+ were observed following the same flight path, much higher in the sky but still clearly distinguishable. None of the local inhabitants knew where they came from nor how often this flight occurred. Possibly the birds are largely unnoticed as their flight was so high, binoculars being necessary to identify them

TABLE 1

Species	Height a.s.l. (m) 0 - 300	300 - 500	500 - 600	600 - 850	850 - 1500
White-tailed Tropicbird	6				
Brown Booby	1				
Greater Frigatebird		900			
Common Noddy	40	3			
White-capped Noddy	8				
White Tern	12				5
Golden Plover	70				
Turnstone	12				
Wandering Tattler	48				
Grey-tailed Tattler	2				
Reef Heron	10				
Grey Duck	7				
Jungle Fowl		8	2		
Banded Rail	13	12			
White-browed Rail	6	2			
Swamphen	3	1			
Crimson-crowned Fruit Dove	5	22		7	4
Many-coloured Fruit Dove		5	7	4	
Pacific Pigeon	1	3	1	8	2
White-throated Pigeon	5	6		12	6
Tooth-billed Pigeon		1			

Species	Height a.s.l. (m) 0 - 300	300 - 500	500 - 600	600 - 850	850 - 1500
Feral Pigeon	16				
Blue-faced Lory	11	23	10	32	
Long-tailed Cuckoo	2				
Barn Owl	2	2	1		
White-rumped Swiftlet	100	100	50	21	8
Flat-billed Kingfisher	5	2	1		
Polynesian Triller	17	15		6	4
Samoan Triller		2			6
Red-vented Bulbul	6	2			
Island Thrush		2	2	2	9
Samoan Fantail		1	2	6	
Samoan Broadbill	5	5			
Samoan Robin		5	4	9	3
Samoan Silvereye					6
Giant Honeyeater					12
Wattled Honeyeater	50	50	20	12	12
Cardinal Honeyeater	30	10	8	11	15
Parrot Finch	1	4			
Polynesian Starling		20	8	2	1
Samoan Starling	20	30	22	17	8

on 1 September. The following day, a similar procession was seen, starting at 0700 hours, but the birds were much fewer. At dusk on both days, the sky was searched for about an hour but no returning frigatebirds were sighted.

COMMON NODDY *Anous stolidus*

Lived up to its name in being fairly common. Again, often seen flying over the tops of trees as well as at sea.

WHITE-CAPPED NODDY *Anous minutus*

A flock of 8 seen from the coast west of Palauli.

WHITE TERN *Gygis alba*

Common at sea. Many circled over the forest but none was seen to settle. On the upper level (1300 m) of Mt Silisili, the track passed a clear area (lava flow) where five were flying low from a distant dead tree. One and a half hours later, on the downward trek, the same observation was made. Possible nesting ? In this area grew small blue edible berries on low bushes.

SHORE BIRDS

GOLDEN PLOVER *Pluvialis fulva*

The most numerous. Often turned up on the grass of playing fields and airstrips and in unexpected places such as under the coconut palms a mile or more from the coast.

TURNSTONE *Arenaria interpres*

Seen in small numbers at various points on the coast.

WANDERING TATTLER *Tringa incana*

From a few up to 50 on rocks and lagoons. One seen flying over a creek bed on the descent from Mt Mafane.

GREY-TAILED TATTLER *Tringa brevipes*

Two seen off the coast at Palauli, identified by their call (PC).

REEF HERON *Egretta sacra*

Common, including around villages. The white phase was not seen either on Savai'i or Upolu.

GREY DUCK *Anas superciliosa*

Seen only in small numbers, in small coastal swamps and pools at Vaisala and Falealupo.

LAND BIRDS

JUNGLE FOWL *Gallus gallus*

Rather timid and more often heard than seen, in forest and scrub, not near the coast. One seen with chicks in Asau Forest.

BANDED RAIL *Rallus philippensis*

Common near the coast in clearings, coconut plantations and in low-level forest. Much less furtive than in New Zealand, it was seen throughout the day. Colours possibly less contrasting than in NZ birds. Young seen at Asau.

WHITE-BROWED RAIL *Poliolimnus cinereus*

Uncommon. Seen in swamps of Vaisala and Falealupo. Much more timid than the Banded Rail. A dark stripe through the eye is more noticeable than the white stripe above. Like the Banded Rail, it flicks its tail while walking.

SWAMP HEN *Porphyrio samoensis*

The Samoan name is *manu-alii,* but *pukeko* is also recognised. Scattered individuals at different altitudes.

SAMOAN WOOD RAIL *Pareudiastes pacificus*

Mr Kurt Stoentzer of Apia confirmed that this species is extinct, probably since 1907.

CRIMSON-CROWNED FRUIT DOVE *Ptilinopus porphyraceus*

The more common of the two fruit doves. The persistent call could be heard frequently in the vicinity of Palauli and Asau Forest. One of its favourite foods is the fruit of the ylangylang tree *(Canagra odorata).* Keeps to the upper canopy. Not always easy to distinguish from the next species. in spite of its yellow-tipped tail. One was shot by a guide on the Mt Mafane trek.

MANY-COLOURED FRUIT DOVE *Ptilinopus perousii*

Not quite as plentiful as the Crimson-crowned but often seen closely associated, feeding in the same trees. Pink undertail coverts are a mark to distinguish the mainly green female from the female of the Crimson-crowned. Samoans hunt all doves and pigeons for food. We were told shooting is permitted only in September, October and November, but this regulation is almost impossible to police. In some parts under Forestry control, the policy has been to remove native trees and replace with exotics, most of which do not provide food for birds.

PACIFIC PIGEON *Ducula pacifica*

Not plentiful, and rare near the coast. Keeps very much to the top canopy. More common in wet forest at higher altitudes. Also hunted.

WHITE-THROATED PIGEON *Columba vitiensis*

More plentiful than the Pacific Pigeon. Seen at all altitudes. One appeared regularly over the Palauli camp site. A shot specimen was photographed by KB.

TOOTH-BILLED PIGEON *Didunculus strigirostris*

Only one example of this rare and endangered species was seen, by three of the party (EB, DB, HH). Notes and sketches made at the time leave no doubt as to identification. Perched on a branch 15 m up, it remained under observation for 8 minutes. The enormous hooked bill was clearly seen and also the chestnut brown of the back and the blue-grey of the breast. Mr Kurt Stoentzer of Apia, who used to keep this species in captivity, says it is suffering through loss of food trees due to sawmilling. His last bird died following a stress moult after being borrowed for several days by a National Geographical group intending to publish an article. A possible sighting of another bird at

Asau Forest could not be confirmed. It is known to the Samoans in the area below Mt Silisili forest. During the trek up to Mt Silisili, our Samoan guide claimed he saw one, but this could not be confirmed by the rest of the party.

GROUND DOVE *Gallicolumba stairii*

This species may still exist but was not found.

FERAL PIGEON *Columba livia*

16 seen between Asau and Lalamalava in the area of Sasina and Faletagaloa.

BLUE-FACED LORY *Vini australis*

Common in forest and plantation. Recognised in flight by its narrow curved wings with rapid beat. Calls while feeding, and in flight utters a very high shrill whistle. Often flies very high. One netted, Asau Forest.

LONG-TAILED CUCKOO *Eudynamis taitensis*

Only two seen once in Palauli plantation. This species is not known to call in its Samoan winter quarters.

BARN OWL *Tyto alba*

Heard almost every night at Palauli. Five seen in daylight at various altitudes from sea level up. Common and widespread. A dead specimen (collected for skeleton) was found in Asau Forest; one was shot in Auala village; another, alive, seen in the same village.

WHITE-RUMPED SWIFTLET *Collocalia spodiopygia*

Abundant everywhere, over and within the forest. Up to hundreds seen over clearings. Active all day long, especially in the afternoon until dusk when they vanish almost abruptly. Said to roost and nest in caves and lava tunnels. Never seen to alight or perch, it weaved through the understorey with great agility. At Palauli, monarch butterflies were often seen following swiftlets. A twittering call is made in flight. Rather distracting when one is trying to watch other species among the trees. One netted, Palauli.

FLAT-BILLED KINGFISHER *Halcyon recurvirostris*

Common. Could be heard calling on most days. The call is very similar to that of *Halcyon sancta vagans*. In the hand, the bill is softer and more flexible. Three netted, Palauli, banded green left.

POLYNESIAN TRILLER *Lalage maculosa*

Very common, seen at all altitudes. Several family parties observed, the juveniles paler and more brown, like females. Perches on large boulders and flicks its tail like a pipit.

SAMOAN TRILLER *Lalage sharpei*

Uncommon. Not seen near the coast or villages. At Palauli a nest was found (possible first record) securely placed 2-3 m up in the fork of a young pometia tree in a fairly open situation. The nest was a deep cup, densely woven of fine rootlets, grass, cobwebs and white patches of spider cocoon material. The birds brought additional

cobwebs. The single egg was blue with reddish flecks at the thick end. Both birds incubated, changing over at 10-15 minute intervals. The male had slightly more accentuated barring on the sides of the breast. The main distinguishing character of this species is the bright yellow bill.

RED-VENTED BULBUL *Pycnonotus cafer bengalensis*

Present in small numbers around the coast and in villages. Seen feeding on mangrove flowers. One pair seen at 300 m at Palauli.

ISLAND THRUSH *Turdus poliocephalus samoensis*

A very shy bird. Not seen on the coast, this species belongs to high level forest where it is more often heard than seen. Plentiful through rain forest, alpine scrub and cinder cones. The alarm call resembles that of a European Blackbird; it also has an extremely metallic, rapid chatter.

SAMOAN FANTAIL *Rhipidura nebulosa*

Uncommon at Palauli and not present on the coast. Seen in the higher forest at Asau where it frequents the lower storey. The song is a soft little trill and the squeak is not as harsh as that of *R. fuliginosa.* Occasionally gives a loud, typical fantail chatter.

SAMOAN BROADBILL *Myiagra albiventris*

Quite common at sea level, at Asau, and around and above Palauli plantation where a nest was found perched on a horizontal branch of a hibiscus tree. Patches of white material incorporated into the rounded, cup-shaped nest of moss and lichen proved to be from spider cocoons. No eggs were in the nest. Both birds came and went frequently, with one sitting on the nest from time to time making shaping movements. Two distinct types of call were recorded, a repeated *to-eet* and a fast *cher cher cher.* Prey such as small moths and butterflies are held in the foot while being dismembered. It can hover like a hummingbird when taking prey from the underside of leaves. Two netted, Palauli; one banded red on left.

SCARLET ROBIN *Petroica multicolor*

Reasonably common, especially in high-altitude wet forest where it keeps to the understorey. Not heard singing at all. A nest with 3 young was found attached to the side of a slender tree trunk in the forest at Asau above 600 m. Both parents fed the young in turn and removed faecal sacs. During 30 minutes' observation, the male visited the nest twice as often as the female.

SAMOAN WHISTLER *Pachycephala flavifrons*

Song, which might have been expected at this season, was not heard. Females were making a soft but clear *chip chip chip.* Seen mainly in thick undergrowth along stream banks. One was mistnetted twice. Two males, two females banded black on right, Palauli; three males, one female banded black on left, one female green on right, Asau forest. One netted female had the two central rectrices in moult.

SAMOAN SILVEREYE *Zosterops samoensis*

Rare. Observed only from 900 m upwards on tops of peaks in alpine scrub. Most Samoans have never seen one.

GIANT HONEYEATER *Gymnomyza samoensis*

This, the biggest of the honeyeaters, is present only at high altitudes. Observed in an area of cinder cone, heathland scrub and the edge of the forest. Commoner on the very tops of peaks. The first one sighted was in wet forest at about 760 m.

WATTLED HONEYEATER *Foulehaio carunculata*

Abundant throughout. An aggressive species which could be heard calling loudly and seen all day long. At Palauli they also sang during the night. Often chased Cardinal Honeyeaters. A nest found about 6 m up in a hupa tree *(Adenanthera pavonina)* in the garden of the plantation house at Palauli. A pair of this species, a pair of Cardinal Honeyeaters and three whistlers were seen all fighting together. Four banded red on left, Palauli; four banded red on left, Asau forest; one had secondary coverts in moult, another had one rectrix in moult.

CARDINAL HONEYEATER *Myzomela cardinalis*

Abundant, though slightly less numerous than the Wattled Honeyeater. Seen feeding on low shrubs, flowers of coconut palm, and in tall trees with nectar-bearing flowers. One male, one female, netted Palauli, one male, Asau forest, banded yellow on left.

RED-HEADED PARROT FINCH *Erythrura cyanovirens*

Not common and difficult to see among thick foliage. Seen feeding on the ground in the open occasionally and working up a tree trunk like a nuthatch. One banded red on right, Palauli.

POLYNESIAN STARLING *Aplonis tabuensis*

Common, but not seen on the coast. Flight is direct and fast. One caught in the net was undergoing body moult, had brood patches and moderately worn rectrices. One banded red on left, Palauli. This bird was in body moult and had brood patches. The rectrices were moderately worn.

SAMOAN STARLING *Aplonis atrifuscus*

Abundant. This large starling, with a variety of calls, makes its presence known everywhere. The colour varies between black and blackish-brown. At close quarters in the bush, wing beats had a noisy *flop-flop-flop.* One caught in the net defended itself with powerful claws and bill, drawing blood from the hand of the unwary bander. One banded red on right, Palauli. Its flight feathers were worn at the edges.

JUNGLE MYNA *Acridotheres fuscus*

Not seen on Savai'i, although in considerable numbers on Upolu where it is no longer confined to Apia.

The party spent 3 days on Upolu. Fantails were much more plentiful than on Savai'i. Among some Golden Plovers and tattlers

seen behind Parliament Building at Apia were 15 Black-naped Tern *(Sterna sumatrana)* and one stint *(Calidris* sp.) on 7 September 1979.

This report is compiled from lists given by members each day and from remarks in notebooks and personal comments. I would like to thank all members of the group for their help and co-operation in adding and commenting.

ENTOMOLOGICAL FOOTNOTE

By Derek Russell

The insect fauna is of no great distinction and the major groups are familiar to New Zealand entomologists. Because Samoa lies at the eastern end of a great island chain, the insects now present are derived almost entirely by island-hopping from the west. Also, since the trade winds blow from east to west in general, only the hardier and more widespread species are to be found.

Nevertheless, among the 300 or so specimens collected for DSIR and Auckland Museum (say, 8% of the known insect fauna) several species were new to science or had not before been recorded on Savai'i.

In these islands there is plenty of work for the amateur entomologist.

REFERENCES

ARMSTRONG, J. S. 1932. Hand-list to the birds of Samoa. 91 pp. London: John Bale, Sons & Danielsson.
ASHMOLE, M. J. 1963. Guide to the birds of Samoa. 21 pp. Honolulu: Pac. Sci. Inf. Centre, Bernice P. Bishop Mus.
CHILD, P. 1979. Some bird observations from Western Samoa. Notornis 26: 171-179.
DHONDT, A. 1976. Bird observations in Western Samoa. Notornis 23: 29-43.
LAYARD, E. L. 1876. Birds of the Navigators Islands. Proc. Zool. Soc. 1876: 489-498.
MAYR, E. 1945. Birds of the Southwest Pacific. New York: Macmillan.
YALDWYN, J. C. 1952. Notes on the present status of Samoan birds. Notornis 5: 28-30.

SYLVIA REED, *4 Mamaku Street, Meadowbank, Auckland 5.*

★

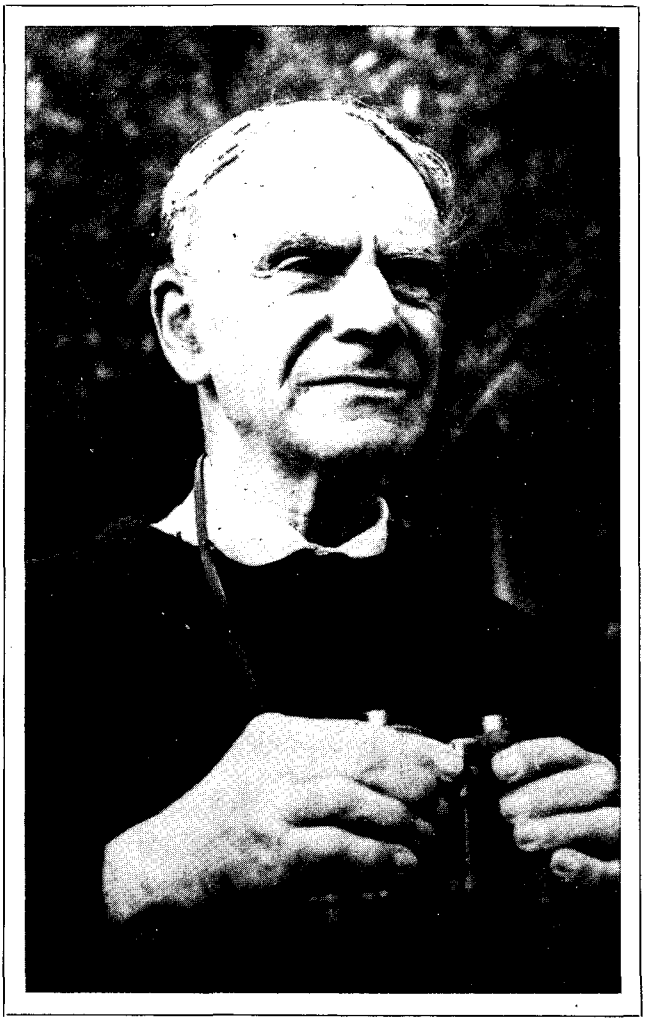
SHORT NOTE

NEW ZEALAND DOTTEREL TAKES FISH

At Karaka, south Manukau Harbour, on 13 May 1979, I noted a group of three New Zealand Dotterel *(Charadrius obscurus)*. One noticed a movement in the very shallow water, flew over, and chased a small fish. A second bird flew over but showed little interest, and then the third took up the pursuit. The fish dodged, but was caught. It must have been killed immediately because it was dropped in the water but did not try to escape. The dotterel picked it up, went on to the sand, put it down, picked it up, shuffled it about in its bill, manoeuvring it into position, and swallowed it. The fish was about twice the length of the bird's bill, c. 60 mm, and about 5-6 mm wide.

A. HABRAKEN

OBITUARY



ROBERT HECTOR DONALD STIDOLPH
1900-1979

Some Reminiscences by J. M. Cunningham

His friends will remember " Stid " as kindly, friendly, unassuming, unobtrusive, knowledgeable, capable, according to how well they knew him. To me he was all those. He had a love for his family which came before all, and some of my earliest and fondest recollections of him were of family picnics in the bush at Kiriwhakapapa and on the Ruamahunga riverbed at Te Whiti. Here he developed as uncanny an instinct for finding Banded Dotterel nests as Edgar Stead did for Wrybill nests in Canterbury. There seemed to be rarely a weekend go by but he and his young family tootled off to a favoured bird haunt in the Wairarapa in the tiny Baby Austin. This little car, almost one of the family, was purchased about 1928 for £150 (from the proceeds of newspaper articles) and served him well (he always greased it and changed the oil himself) until the early 1950's. With its purchase he was able to extend his travels and knowledge of birds and their habitats (*Holiday Jaunts in New Zealand,* Emu XXXI 7: 1931). No observation was too trifling for him, and he kept copious notes in 16 uniform-style diaries, giving a continuous record from 1 January 1921 until shortly before his death. He could find any entry: once I showed him a letter which said that Waxeyes left a certain district in the summer and did not breed there. He was quickly able to reassure me from the appropriate diary that he had seen birds in that precise locality in the middle of the breeding season. Reference to his book *The Birds Around Us* (1971) will show the value of such entries and also demonstrate the readable style which came from his literary experience. Perfection is reached in a note (p. 108) made on January 6 1924: " The sublime beauty of the morning chorus of the Bellbird is a rich, unforgettable experience. This morning, on Mount Holdsworth, in the Tararua Ranges, not long after dawn on a bright day, at a height of 4,000 feet, the chiming of the Bellbird, floating up from the depths of the cool, darkened forest in the valley below, held our party spellbound, as we rested on a rocky outcrop in the first beams of the rising sun. Judging from the volume of the melody a good many voices contributed to the chorus."

He was essentially a field naturalist and was not particularly interested in taxonomy or avian physiology, although he had a full appreciation of both. With his love of birds and the countryside he had a boyish enthusiasm. While he was helping me to ring Waxeyes to trace their local movements in Masterton in 1942 he scorned a funnel trap. He used a baited box trap which fell when the string was pulled. What a sight it was to see his excitement when, while eating his lunch with one hand, he pulled the string through the window with the other and caught a good box of birds. The caricature illustrated was drawn by Duncan McPhee at this time and he agreed many years ago that it should eventually be published.


R.H.D STIDOLPH
PROFESSOR
OF
BIRDS and BAROMETER

An avid reader, his library was the envy of many and it did not consist entirely of books about birds, although these were his chief interest. And he did not collect books only: at the age of nine he was saving newspaper clippings, and his books of James Drummond's nature articles are probably complete from 1910 to 1934. Once again, he could readily locate any entry. When I was documenting the spread of the Myna (*Distribution of the Myna in New Zealand,* NZ Bird Notes 3 (2): 57, October 1948), he was able to show me a note by Drummond of 9 September 1923 that " the first two seen at Te Mawhai, south of Te Awamutu, appeared that week."

Some of his other collections were of shells of New Zealand — dated and with localities recorded, they are obviously of great scientific value. His collection of New Zealand stamps was extensive and was the result of a lifelong hobby. To complete his collection of postmarks from every Post Office in the country he would hand me letters to post from various parts of New Zealand when I was touring on holiday, and naturally did the same himself. His collection of model soldiers, in mint condition, was the envy of hobbyists, and in recent years he built many model ships which are a dazzling sight.

It was understandable that with his interest in nature, he became a foundation member of the Royal Forest and Bird Protection Society (March 23 1923). What he had to do with its formation I do not know, but as early as 1922 he was writing to R. A. Falla (later Sir Robert) about ways and means of protecting New Zealand's birds. His interest in this topic was recognised when he was appointed a member of the Native Fauna Advisory Council to the Department of Internal Affairs, a position he held for 14 years.

His own writings were extensive. Some of the earliest were in the *New Zealand School Journal* and in the *New Zealand Life and Forest Magazine,* and he was a regular contributor to *The Emu,* published by the Royal Australasian Ornithologists' Union, of which he was a member for 40 years. He had his own weekly column *Nature Notes* in the *Evening Post,* a Wellington newspaper, from 1926 up to 1940 when shortage of newsprint in the war brought his column to an end. There is much valuable material buried in these notes. Many of his writings were however published in *Notornis,* formerly *New Zealand Bird Notes,* the journal of the Ornithological Society of New Zealand. He was a foundation member of this body also and his name appears in the society's first publication. His contributions continued until his death, and under his editorship from 1946 to 1955 the journal gained a world-wide reputation. Although he believed in co-operative investigations and took part in many, he was often disappointed in their results. In particular he was critical of the poor response of ornithologists to his request for information on the numbers and distribution of the Godwit in New Zealand (" *Godwit inquiry," Notornis* 4 (6): October 1951 p. 135). It was an indication of his independence that when he was offered the joint editorship of *New*

Zealand Bird Notes in 1946 he refused, but no one will regret his taking on this onerous and honourable duty on his own shortly after. One of his tenets was to publish on time and he never failed, even though sometimes he (and I as secretary-treasurer) had to work late on many nights to prepare the journal for posting before the deadline. The first issue he edited nearly missed: he rang me when the type was set to say he was two pages short, could I write something that night ? Fortunately the answer was yes !

Apart from his own writing he edited and published two books: *Kapiti Bird Sanctuary* by A. S. and Amy Wilkinson (1952) and *Kapiti Diary* by Amy Wilkinson (1957).

Born on 4 November 1900, the youngest of the 12 children of Sidney (who came from Kent in the 1850s) and Sarah, his early days were spent in Wellington where he lived above the Gear Meat Company's shop in Lambton Quay. After attending the Terrace School and Wellington Technical College, he eventually became a journalist with the *Evening Post.* In 1926 (the family having moved to Masterton in 1919), he joined the literary staff of what became the *Wairarapa Times-Age* newspaper, retiring in 1965 as sub-editor. His knowledge and love of Kapiti Island was reinforced by his marriage on 4 January 1933 to Nora, daughter of A. S. Wilkinson, who was Custodian of the Bird Sanctuary from 1924 to 1942. He died on 12 August 1979. His wife, son and two daughters survive him. To them I offer my sympathy but gratitude for many an enjoyable hour spent with them and Stid.

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SHORT NOTE

BROWN TEAL, NZ DOTTEREL, AND VARIABLE OYSTER-CATCHER — AN UNUSUAL ROCK GROUP

Slightly north of the mouth of Kaitoke Creek on the east coast of Great Barrier Island are two small clusters of rocks, the only isolated rocks exposed on the sand for the full 4 km of Kaitoke and Palmer Beaches. Both clusters are submerged at high tide but the inner cluster is exposed and free of wave splash from half-tide onwards and the outer cluster, some 10 metres further down the beach, is partly or wholly exposed at low tide, depending on the amount of sand on the beach.

These rocks, which have smooth contours, consist of irregular flat-topped blocks with vertical sides, forming many flat-topped ledges or platforms, and with irregular block summits. They vary from 1/3 to 1½ metres high. Most surfaces have dense mats of the small black mussel *Xerostrobus pulex,* which are up to 20 mm long and have reasonably fragile shells. Sometimes they are anchored among beds of *Corallina* or of tiny barnacles. Patches of a short puffy alga are sparse on the inner cluster but quite extensive on the outer.

On 14 January 1979, my wife and I were at these rocks for over an hour at low water. Both clusters were fully exposed, surrounded by sandy beach. Between them ran the territorial boundary of two pairs of New Zealand Dotterels *(Charadrius obscurus)*, one breeding on Palmer Beach, the other on the southern side of Kaitoke Creek.

The northern (Palmer Beach) bird, sometimes joined by a second bird, stood and ran on the sand among and around the inner cluster, watching the southern (Kaitoke Beach) bird, which was on the outer cluster energetically feeding on the mussels, gripping and tugging them out one at a time and swallowing them whole. Confrontations on the sand were frequent, the two birds puffing out their breast and flank feathers and racing at each other like clockwork mice, head held low and forward, the whole upper surface horizontal. These horizontal runs often ended in the pursuer becoming the pursued or in abrupt upward leaps by both birds. Sometimes a bird would stand erect, puffing itself out, revealing its dull-white breast and small chestnut belly-patch, looking rather unimpressive compared with most plovers.

Although the challenging call uttered on rock or sand was the usual *prrrp* of the New Zealand Dotterel (the high-pitched sharply rising *wheet* call is characteristic of the nest area), encounters on the sand were often preceded or followed by an aggressive *che-wee-wrrrr,* in which the first syllable is short, the second heavily emphasised, and the third prolonged and pitched lower. The equivalent call that I have noted in Bay of Plenty birds is an aggressive monosyllabic *shweeerr,* which surges up and down in pitch.

Whenever the southern bird was away from its rocks or had wandered along the shore examining freshly washed-up shells, the northern bird would move to the outer rock-cluster to feed on mussels also, keeping to parts out of sight of the absent bird.

The many small droppings of the dotterels on the sand round the rocks contained mussel shells.

On 19 January 1980, we were again at these rocks. The sand levels on the beach were lower than in 1979. At low tide the waves still just reached the inner rock-cluster and the larger waves still splashed across the outer cluster, now some 10 metres below low-tide level. The mussels and algae seemed much more luxuriant than in 1979, especially on the outer cluster. When we arrived it was about half tide, and the inner cluster was occupied by two New Zealand Dotterels, which we watched for an hour. The territorial boundary ran through the centre of the cluster, the southern bird having in its share the largest and widest rocks. Disputes were few because each bird could feed out of sight of the other; indeed, an isolated boulder in the mid-line sometimes had both dotterels feeding on mussels on opposite sides, trouble arising only when one moved round to where it could be seen by the other. Disputes took place only on the sand beside the rocks, not on the rocks themselves. Again, the birds fed

only on mussels, preferring the flat top-surfaces where the mussels were smaller, pulling off and swallowing one at a time — over a randomly timed minute, one bird swallowed 13 mussels, the other 15. Mussels were taken mostly from horizontal faces but some also from vertical ones.

A pair of Variable Oystercatchers *(Haematopus unicolor)* had two well-grown downy chicks, one black and one pied, feeding on the wet sand flat 50 m away on Palmer Beach. Sometimes one or both adults visited the rocks and fed there for a while, apparently taking the larger mussels and probing down into crevices, perhaps for the limpets that were also there. Their visits were brief, however, and they preferred to probe randomly into the wet sand and runnels around the base of the rocks, occasionally coming up with what appeared to be small univalves. They would gradually move away to the general tideline, fly back to the chicks, or fly to pipe at one of the next oystercatchers along the beach. The rocks seemed to provide the oystercatchers with only a casual change of diet.

When we returned an hour later, it was almost low water and the dotterels were still feeding on the inner rock-cluster. After a while, the southern dotterel flew south towards its 3-egg nest on the south side of Kaitoke Creek. A few minutes later, a different bird, evidently just off the nest, flew in from the south and shook and settled its plumage. After challenging the northern bird spiritedly, it flew to the largest rock and began feeding avidly, taking 20 mussels in a timed minute.

Soon after our return, round the headland from Kaitoke Creek, low to the sand, flew three Brown Teal *(Anas aucklandica chlorotis)*. They headed straight for the inner rock-cluster but pitched several metres short in the shallow edge of the tide and, riding the breaking waves nonchalantly, swam and then paddled to the rocks, flew and clambered on to various parts of them, and began also to feed on mussels. Twenty minutes later, another five Brown Teal arrived in similar fashion.

For the next 1½ hours, as the tide rose steadily, teal and dotterels continued to feed. When we had to leave, we had to disturb them before we could examine where they had been browsing. At that stage, the waves were breaking over many of the rocks, and only one teal had broken off and returned to Kaitoke Creek.

The teal kept loosely together, gradually working from one rock to another, each bird concentrating on its own selected patch. Sometimes one bird would push aside another and take over its patch, without a noticeable threat posture. Sometimes, the teal shifted to sieve the sand in the swirling wavelets at the base of the rocks, but they would soon return to the rocks themselves. They seemed to prefer to stand on wide ledges or the tops of rocks from where they could reach mussel mats on vertical faces, but several teal worked at mats at their feet. The mats of larger mussels were preferred. Each teal worked on one spot thoroughly, forming a circular bare patch in the mat, the mandibles vibrating rapidly to work at and

loosen groups of mussels at the edge of the patch, which thus was gradually widened. Whenever a sizeable billful had been removed, the mandibles were vibrated rapidly and at length, presumably to macerate the shells, and the whole was swallowed. Sometimes, a teal would seem to feed on *Corallina* turf or on algae, but on at least some of these occasions it could be seen that isolated mussels were being picked out from among them.

One bird chose to swim to the outer cluster of rocks and feed there for several periods. It selected a spot on top and, as usual, worked at it with great concentration, ignoring the repeated spray that broke over it from the low-tide waves striking the rocks. As the tide rose, however, this teal became increasingly deluged, until the larger waves were repeatedly sweeping it from the rocks. It persisted in clambering back to the same spot until one particularly violent surge tumbled it over and over in the water, and it swam back to join the others, which by now were also being splashed and knocked about if feeding on the lower parts of their rocks.

The dotterels continued to use the rocks while the teal were there but not the same parts. The teal made no audible calls; a casual passer-by would not have noticed them. Their whole behaviour was assured — they knew exactly where and when to come and what to do there. The mussel mats were seen to have many round bare patches like those made by the teal that day. Unless this mussel has rapid regenerative powers, the rocks would not seem to be able to support too many teal feeding too often in this way.

It would be interesting to know whether this mussel-feeding habit occurs only on fairly calm days, as this was, whether it occurs year-round, and whether elsewhere on Great Barrier outside the breeding season. Certainly, the Brown Teal on Great Barrier is not, outside the breeding season, the secretive nocturnal feeder that reports of mainland birds have us believe. Wherever creeks emerge on the shore, its daytime feeding activities closely follow the tides, at least in January and especially on the western harbours and bays. Most of the creeks open on to sandy or muddy bays at low tide or have tidal lower reaches where small groups of Brown Teal quietly sieve along the margins, paddling or swimming. Few of these places have free-standing rocks with beds of mussels. However, on 21 January 1980, at the south end of Okupu on the west coast, we disturbed a party of five Brown Teal from among the many mussel and oyster covered boulders that strew the low-tide sand there.

In January 1980, the mouth of Kaitoke Creek was largely blocked by a sand bar and so the tidal margins of the lower reaches of the creek would have been a less profitable feeding place than usual. Had this caused some of the teal to adopt a mussel diet or is it a regular habit? Moreover, do the dotterels feed on these rocks all year, and in what numbers when not breeding?

B. D. HEATHER, *10 Jocelyn Crescent, Silverstream.*

Photo: From colour slide by R. N. Holdaway

ROYAL SPOONBILLS NESTING NEAR BLENHEIM

In November 1979, four pairs of Royal Spoonbill *(Platalea regia)* were found nesting at two sites in the Vernon Lagoons area, near Blenheim, Marlborough. At one site three pairs deserted after hatching (R. Frost, pers. comm.), but at another site (Fig. 1) a fourth pair raised one chick. Later a pair was found on a nest near the first site, but this nest was also deserted. In January 1980 three pairs were found occupying nests at the site where successful breeding had occurred; the young bird from this first successful nest had not yet flown and was still being fed within a few metres of the nest. Two pairs, including one using the original nest, each raised a chick and the remaining pair deserted from the nest most exposed to waves built up by the prevailing north-west winds. Both fledglings were seen on the nests in mid-February 1980. Therefore, three young birds altogether were raised in the 1979-80 season.

The successful nestings all occurred at a colony of Pied Shags *(Phalacrocorax varius)* on logs at the confluence of the Opawa and Wairau rivers. All were in nests originally built and used by Pied Shags. The four unsuccessful nests were all built on the ground in or near a large colony of Black-backed Gulls *(Larus dominicanus)* on a low island 2.5 km from the Pied Shag colony. Ground nesting of spoonbills has been recorded elsewhere, e.g. Europe, North Africa, and Australia; in New Zealand the previous sites have been high in standing trees, especially kahikatea. Breeding in association with other species is apparently quite common with spoonbills, but in Marlborough the birds have successfully used nests built by another species.

One of the non-breeding Royal Spoonbills present in the area during the 1979-80 summer had the dark-tipped primaries of a juvenile in its first year. This presence of a juvenile may indicate that breeding had occurred unnoticed in the area in at least the previous season. This known juvenile was one of a group of four non-breeding birds, without crests and with no yellow on the upper breast, which were present near the colony during the 1979-80 season. All four were at the colony together with the four breeding pairs and one fledgling on 13 January 1980.

The nesting pairs tolerated human activity close to the colony, such as fishing boats and casual visitors and it is hoped that they will breed again at this site if disturbance does not increase.

R. N. HOLDAWAY

FIGURE 1 — Royal Spoonbills at nest site, Vernon Lagoons, 2 January 1980. The bird on the right is the first chick raised in the 1979-80 season; note the short bill. An adult is standing on the nest in which the chick was raised. This and the nest above and to the right, occupied by a Pied Shag, were used by the successful pairs later in January 1980.

JUVENILE ROYAL SPOONBILLS AT THE MANAWATU ESTUARY

The Manawatu Estuary is recognised as the main wintering grounds of the Royal Spoonbill *(Platalea regia)* in New Zealand. From 1943 when Stidolph (1948) recorded four birds, the number of Royal Spoonbills overwintering increased slowly until a peak of 42 was reached in 1963 (Andrew 1972). This coincided with the establishment and growth of a breeding colony near Okarito. After 1963, the numbers at the Manawatu Estuary stabilised at 30-35, but increasing numbers of Spoonbills overwintered on estuaries elsewhere in New Zealand. Although many Royal Spoonbills continue to return to Okarito each spring, for some unknown reason they have not bred successfully there since the 1971-72 season. This has coincided with a decrease in the numbers overwintering at the Manawatu Estuary. By 1979 no more than 23 were seen in successive monthly censuses by members of the Manawatu branch of the Ornithological Society.

On 9 September 1979 the number had dropped to eight. During the count these birds moved from their normal roost on the south side of the estuary to the Foxton Beach spit where they settled 40 m away from us, near a flock of waders. From this range, with a 25x telescope, details of plumage and facial markings were very clear.

Six of the birds had a yellow "eyebrow" above and behind the eye, which contrasted with the black forehead, ocular region and wrinkled spatulate bill. Five of these birds had long drooping crests and of these, three had a buff wash on the foreneck. Falla *et al.* (1979) noted that the crests and a sandy-buff foreneck are characteristic of breeding birds, and Oliver (1955) noted that adults have a yellow spot above each eye.

The remaining two birds had a dark grey "eyebrow" rather than yellow, lacked crests and buff wash, and the spatulate bill was smooth and of a paler steel-blue colour. We saw the birds only briefly in flight as they landed and did not note the brown on the primaries which Falla *et al.* (1979) referred to as being present on young birds. However, we believe that these two birds were juvenile because, although we can find no reference to juvenile Royal Spoonbills having a smooth bill, Witherby *et al* (1941) noted that juveniles of *Platalea leucorodia* have no corrugations on the bill, whereas the adults do. This is illustrated (Plate 50) but not described in the text in Cramp & Simmons (1977).

On 16 March 1980 HAR closely studied a flock of 21 Royal Spoonbills at the Manawatu Estuary. Three juveniles were present: these birds lacked the yellow " eyebrow," had smooth bills and had dark-tipped outer primaries. By this stage the adults had lost their nuptial crests and sandy-buff wash on the foreneck.

The recent occurrence of a Yellow-billed Spoonbill *(Platalea flavipes)* and Intermediate Egrets *(Egretta intermedia)* in New Zealand (Billing 1977, Seddon & Seddon 1979) and the regular movement of Little Egrets *(E. garzetta)* and Cattle Egrets *(Bubulcus ibis)* to and from Australia suggest that these juvenile Royal Spoonbills could have come from Australia. However, as a small colony of Royal Spoonbills was discovered in November 1979 at Vernon Lagoons, Marlborough, and had reputedly bred also the previous year (R. N. Holdaway, pers. comm.), it is also possible that both groups of juvenile Royal Spoonbills seen at the Manawatu Estuary were raised in New Zealand.

LITERATURE CITED

ANDREW, I. G. 1972. Royal Spoonbill **in** Classified Summarised Notes 1963-1970. Supplement to Notornis 19: 29.
BILLING, A. E. 1977. The first occurrence of the Yellow-billed Spoonbill **(Platalea flavipes)** in New Zealand. Notornis 24: 192.
CRAMP, S.; SIMMONS, K. E. L. 1977. Handbook of the birds of Europe, the Middle East and North Africa. Oxford: Oxford University Press.
FALLA, R. A.; SIBSON, R. B.; TURBOTT, E. G. 1979. A new guide to the birds of New Zealand. London: Collins.
OLIVER, W. R. B. 1955. New Zealand Birds. 2nd ed. Wellington: A. H. & A. W. Reed.
SEDDON, J. H.; SEDDON, B. H. 1979 Sight record of **Egretta intermedia** in New Zealand. Notornis 26: 330.
STIDOLPH, R. H. D. 1948. Royal Spoonbill in New Zealand. N.Z. Bird Notes 2: 195-196.
WITHERBY, H. F.; JOURDAIN, F. C. R.; TICEHURST, N. F.; TUCKER, B. W. 1941. The Handbook of British Birds. Vol. III. London: H. F. & G. Witherby.

H. A. ROBERTSON, *Ecology Division, DSIR, Private Bag, Lower Hutt;*
B. E. PREECE, *24 Lyndhurst Street, Palmerston North.*

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BLACK-WINGED PETRELS ON PORTLAND ISLAND

Portland Island, 137 ha, at 39° 18'S 177° 52'E, is situated off the tip of Mahia Peninsula at the north-east of Hawkes Bay. It comprises 14 ha of lighthouse reserve and 123 ha of grassland on which sheep are run. There are mice on the island but no rats or cats. No petrels have previously been reported breeding there.

Since before Christmas, an occasional high-pitched call from a bird on the wing has been heard after dark. A search in the evening of January 11 revealed three Black-winged Petrels *(Pterodroma nigripennis)* in a grassy gully 500 metres north of the lighthouse reserve. One was captured and photographed, and the identification was confirmed by Mr Imber of the Wildlife Service, Wellington.

Calls were heard more frequently during February; a few incoming birds were seen at dusk and one at 0920 on the 12th, but no nest burrows could be found in the capture or any other area until February 16 when nine (and as many 'blind' burrows) were discovered in spinifex-covered sand about 50 metres above high water line 2 km north of the station.

FIGURE 1 — Black-winged Petrel, Portland Island.

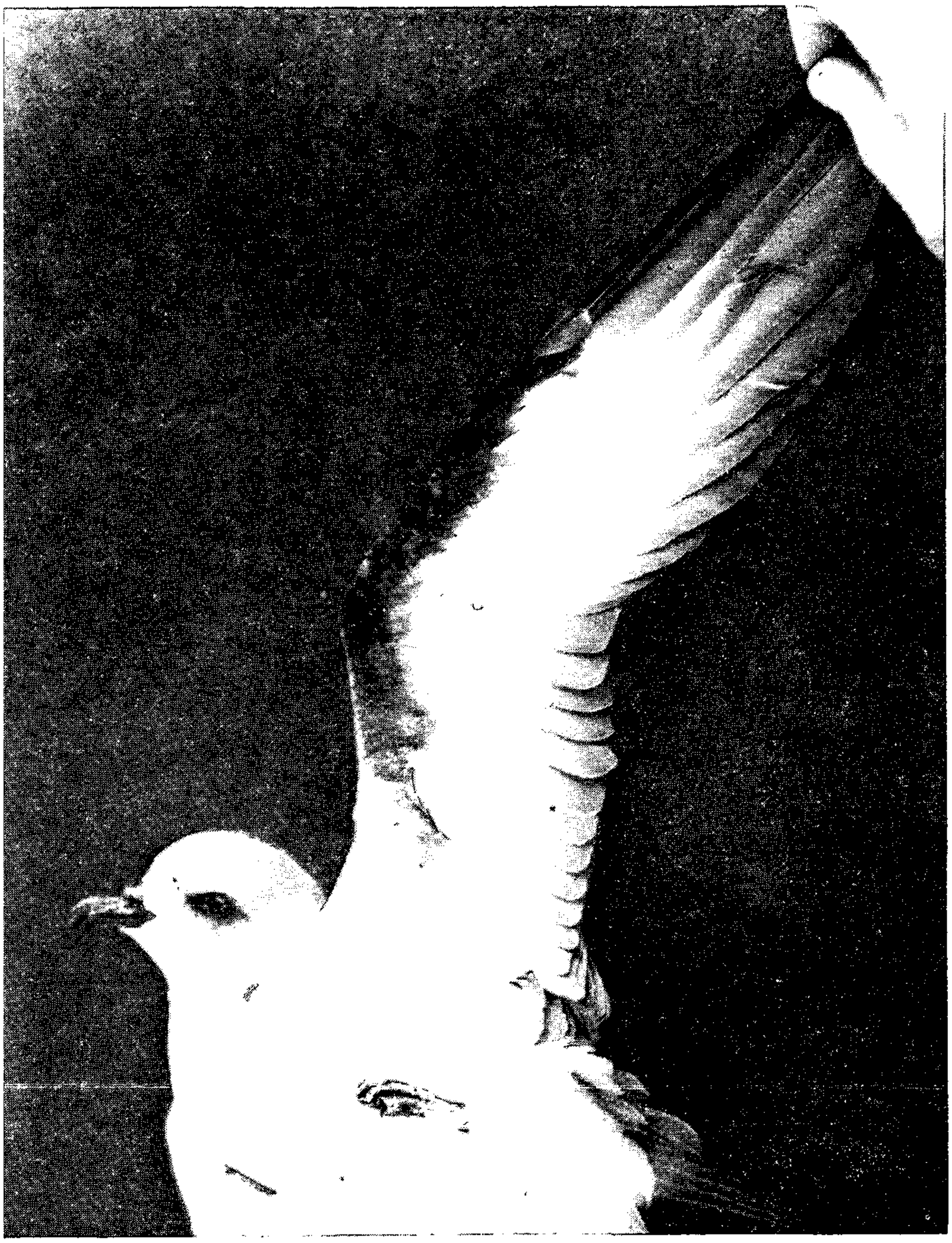


FIGURE 2 — Black-winged Petrel, Portland Island.

One burrow entrance was enlarged to allow a weekly check to be made. One adult bird was in the nest chamber with a single egg. This was the case until 9 March, when an estimated five-day-old chick was alone in the nest. The nearest burrow, 1 metre away, contained two adults but no egg or chick. On 6 May, the chick seemed to be doing well.

During February and March, birds were sometimes seen by day over the island, but none flew or called in the conspicuous way described elsewhere, except occasionally at dusk.

MURRAY EAGLE, *Portland Island Lighthouse, Private Bag, Nuhaka, Hawkes Bay.*

FIGURE 3 — Black-winged Petrel, Portland Island.

FIGURE 4 — Burrow and chick of Black-winged Petrel, Portland Island.

SOME THOUGHTS UPON AN EARLY RECORD OF WHITE NELLY IN THE TASMAN SEA

Captain Cook and his naturalists on the First Voyage (1768-71) got to know the Giant Petrel or Nelly *Macronectes giganteus* in its darker forms and coined for it the name Mother Carey's Goose. But for several decades after this discovery white Nellies seem to have escaped the notice of the early explorers of the southern oceans. Then in 1838, during his voyage to Australia, John Gould noted " the circumstance of an albino variety having followed the vessel for three weeks while we were running down our longitude between Cape of Good Hope and Van Diemen's Land."

In 1860, when Richard Laishley and his family emigrated, he kept a diary of the voyage from Gravesend to Auckland and such was his interest in natural history that his diary is now a valuable sea-bird log. Of course, like all prudent observers who are seeing the birds of the southern oceans for the first time, he had problems of identification. But there can be no doubt about the identity of the great white bird so vividly described in the following extract.

" 1 October 1860. Yesterday we passed Van Diemen's Land, sailing about 90 miles to the south of it. The day was calm and fair; and the numerous sea birds singularly familiar, which last circumstance probably induced some of the young men to fish for these with their lines. As I sat at my cabin window reading, my attention was attracted upon looking up by a bird of unusual size and apparently of the purest white. At first I thought it was a magnificent Albatross, but when it came near to the ship, which on more than one occasion it afterwards did, I could perceive that its size was about that of a fine Mulimuk (perhaps 2/3 of the size of the Gt. Albatross, or rather less); that it was neither in wing, neck, head nor beak quite of the same lengthened proportion as the Albatross and above all that the underparts of the body and wings and some parts of the upper surface of the bird (I am not clear how much) were distinctly marked with small dark spots, probably dark grey or black, looking a little, as Charley expressed it, like a plum-pudding dog i.e. a spotted coach-dog; but the spots on the bird were not large and only distinguishable when it came nearest the vessel. I have never seen the bird represented or read of it and our observant captain is as greatly at a loss respecting it as myself. He had never seen a bird of the kind before. This bird mingled and settled with the other sea birds in our neighbourhood. The grey and brown shearwater, Cape Pigeon, Storm Petrel, Mulimuk, Black Albatross and Great Albatross were all about us in greater or less numbers."

It would appear that before Laishley, the only naturalist who observed and commented upon a white Nelly was Gould. Since the history of the discovery and evaluation of the white form is rather elusive, I have gathered together such early records as I can find. Coues (1866) remarked upon the variation in colour and recorded the

possession of a pure white specimen, which he concluded " is the first note of such a variety." Are the date and provenance of this specimen known ? Potts (1873) obtained the first specimen in New Zealand and, believing he had a new species, named it *Ossifraga alba.* It had been feeding on refuse among common Nellies off Centre Island, Foveaux Strait, on 3 January 1873. Its white plumage was " mottled very sparingly throughout with single brownish grey feathers." Shortly afterwards on 15 January he saw another in Cook Strait. " It had been blowing a furious gale on the day before."

Edward Wilson became familiar with the white phase at Macquarie Island in November 1901 and sketched one standing on snow with wings raised. Later he did a fine portrait of the head of a white male taken at Cape Adare. In view of more recent findings, his observation that all the nellies seen at the Auckland Islands in March 1904 were of the darker variety is significant.

By the time Buller published his Supplement in 1905, he was able to record specimens or sightings from Kaikoura, Milford Sound, The Snares and the Bounty Islands. He also added two very relevant comments: (a) " The late Captain Fairchild assured me he had more than once observed several white ones in the air together," and (b) " Mr. Jennings informed me that on his last visit to Macquarie Island he observed more white Nellies than dark ones. They were breeding at that time and he specially noticed that the young of the white Nellies were likewise white."

As recently as 1910 Godman could still write that the Giant Petrel has " occasionally but very rarely a pure white phase of plumage." A propos of which assertion, is the feathering ever pure white without the random scattering of a few small dark spots ? Mathews (1912), discussing the scarcity of specimens, has a plate by the famous bird-artist, J. G. Keulemans, with the comment " The bird figured and described is a male albino collected on the Snares."

It was left to Falla (1937) to confirm Jennings's report and to show that it was not necessary to go all the way to Antarctica to find white Nellies in some abundance. At Macquarie Island he noted a high percentage of white birds. " In one party of two hundred birds, twenty white ones were seen." Falla's text is accompanied by a photograph of a white Nelly incubating. From studies subsequently made by Warham (1962), we now know that there is a high frequency of white-phase birds in the breeding colonies on Macquarie, nearly 7% on the west side of the island and more than 15% on the east.

Nevertheless, despite the comparative proximity of Macquarie Island and an increase in sea-going observers, few white examples are reported among the hundreds of plain Nellies which annually visit our coastal waters. Half a century's beachcombing in northern New Zealand yielded only four white specimens (Sibson 1969), and it is

noteworthy that when another white Nelly came ashore alive in the Hauraki Gulf (McKenzie 1971), the band on its leg proved that it had come from the far distant South Orkneys.

Another white Nelly, also banded in the South Orkneys, came to hand off our northern coast in mid-December 1978. It was captured and nursed before release by Mr D. Allen, a fisherman of Whangamata (Taylor 1979). At first it was thought to be a Snow Goose ! Shades and echoes of the name bestowed by Captain Cook and his fellow sailors ! Indeed, banding recoveries seem to show that many, if not most, of the Nellies which reach northern New Zealand are young birds of the southern type. Where then do the numerous white Nellies of Macquarie Island go outside the breeding season ?

A few white Nellies may be expected around New Zealand every year. They appear mainly between mid-winter and early summer. Laishley's date was typical. Evidently there are years of exceptional abundance. Cheshire (1977) has shown that 1976 was such a year, a veritable *annus mirabilis.* On 1 October — by a curious coincidence the same date as Laishley's sighting — he had the unique distinction of seeing three together off Whangarei Heads. They were present for a whole day feeding off galley scraps and could be " attracted to the ship's side with slices of bread." Nellies are Nellies anywhere, whether brown or white, northern or southern.

REFERENCES

BULLER, W. L. 1905. Supplement. p. 120.
CHESHIRE, N. G. 1975. White form of the Southern Giant Petrel. Notornis 22: 347.
CHESHIRE, N. G. 1977. Exceptional Numbers of White Giant Petrels. Aust, Seabird Group 8: 10-11.
COUES, E. 1866. Proc. Acad. Nat. Sci. Philad. p. 32.
FALLA, R. A. 1937. BANZARE Reports. Series B. Vol. 2.
GODMAN, F. du C. 1907-10. Monograph of the Petrels.
LAISHLEY, R. 1860. Notes of a voyage to New Zealand.
MATHEWS, G. M. 1912. Birds of Australia. Vol. 2.
McKENZIE, H. R. 1971. White Nelly ashore in Hauraki Gulf. Notornis 18: 60.
POTTS, T. H. 1873. Trans. NZ Inst. 6: 152.
ROBERTS, B. 1967. Edward Wilson's Birds of the Antarctic.
SHAUGHNESSY, P. D. 1971. Frequency of the White Phase of the Southern Giant Petrel. Aust. J. Zoo. 19: 71-83.
SIBSON, R. B. 1969. Giant Petrels as migrants to northern N.Z. Notornis 16: 45-50.
TAYLOR, A. B. 1979. Tara 15: 8.
WARHAM, J. 1962. Biology of Giant Petrel. Auk 79: 139-160.

R. B. SIBSON, *26 Entrican Avenue, Remuera, Auckland.*

OBITUARY

ROBERT ALEXANDER FALLA
KBE, CMG, MA, DSc, FRSNZ (1901-1979)

Sir Robert's high standing in world ornithology and his considerable influence on ornithology and conservation in New Zealand and on OSNZ affairs are well known to members and do not need to be spelt out here. Since his death was announced to members, many appreciations and biographies, some of them detailed, have appeared elsewhere (see especially C. A. Fleming, 1980, *Emu* 80 (1): 41-44). We are grateful to the staff of the Nature Conservation Council and to the *Evening Post* for photographs.

Bob Falla throughout his life characteristically instilled an interest in birds and New Zealand bird study in all with whom he came into contact — many will probably remember him first when as an established museum man he always dispensed a liberal measure of advice and information to any inquirer with the most random bird question. As a schoolboy in the late 1920s I was fortunate in living near the Falla family and it was as Mr R. A. Falla — still a primary school teacher — that I met him first. His study was typically crammed with bird books and photographs; there would be mounted birds, a

bird skin or two and a storm-killed petrel (not necessarily fresh !) about to be transmuted into a study skin. He was, of course, already a noted ornithologist. "Discovery of a Breeding Place of Buller's Shearwater, Poor Knights Islands, N.Z." *Emu* 24: 37-43 (1924) had already been published, and he was extending his field work to cover the full range of petrels of the northern region. He was an active supporter of the Auckland Museum and a lecturer and writer on bird life. I was one of many who listened fascinated while he lectured and showed slides of excursions with the late Bernard Sladden and others to the Poor Knights, Kawera and other petrel islands of the north and Bay of Plenty.

Others will record his distinguished career in successive museum posts and his further career in conservation after retirement. He left teaching to lecture in nature study at the Auckland Training College, simultaneously helping with the establishment of the displays and research collections for the new Auckland War Memorial Museum, to which on its opening in 1929 he was Honorary Ornithologist. Two seasons as ornithologist to Mawson's British, Australian and New Zealand Antarctic Research Expedition (B.A.N.Z.A.R.E. 1929-31) followed and during his second year away he was appointed to be the Museum's first Ornithologist.

My personal experience as one whose interests and life's work owed much to an early meeting with Bob Falla will be typical of many of today's ornithologists. His pleasure in looking at birds — linked always with the discipline of a highly critical scientific mind — was in the Gilbert White tradition: and was similarly contagious ! His papers and popular contributions are to a high degree significant, but it was his personal contribution to meetings, and to day-to-day contact and discussion, that made him such a force in ornithology and conservation.

E. G. TURBOTT

When I first met R. A. Falla he was Director of the Canterbury Museum and an acknowledged authority on the birds of the southern oceans. His was a name to compare with, a name to be mentioned in the same breath as Alexander and Murphy. The invitation to join Sir Douglas Mawson's Antarctic Expedition had come at exactly the right moment to stimulate and strengthen his love of the sea, ships and seabirds. He passed on his enthusiasm to others and I cherish the memory of the welcome which he and Molly used to extend to me on my visits to Christchurch.

His zestful study of birds dated from his schooldays. When he could not be out at sea, how he loved to walk along the shore to see what the tide had brought in. He liked to tell how once he found what he was certain was a Buller's Shearwater on one of the Waitemata beaches. At that time this was a seabird of legendary rarity, and

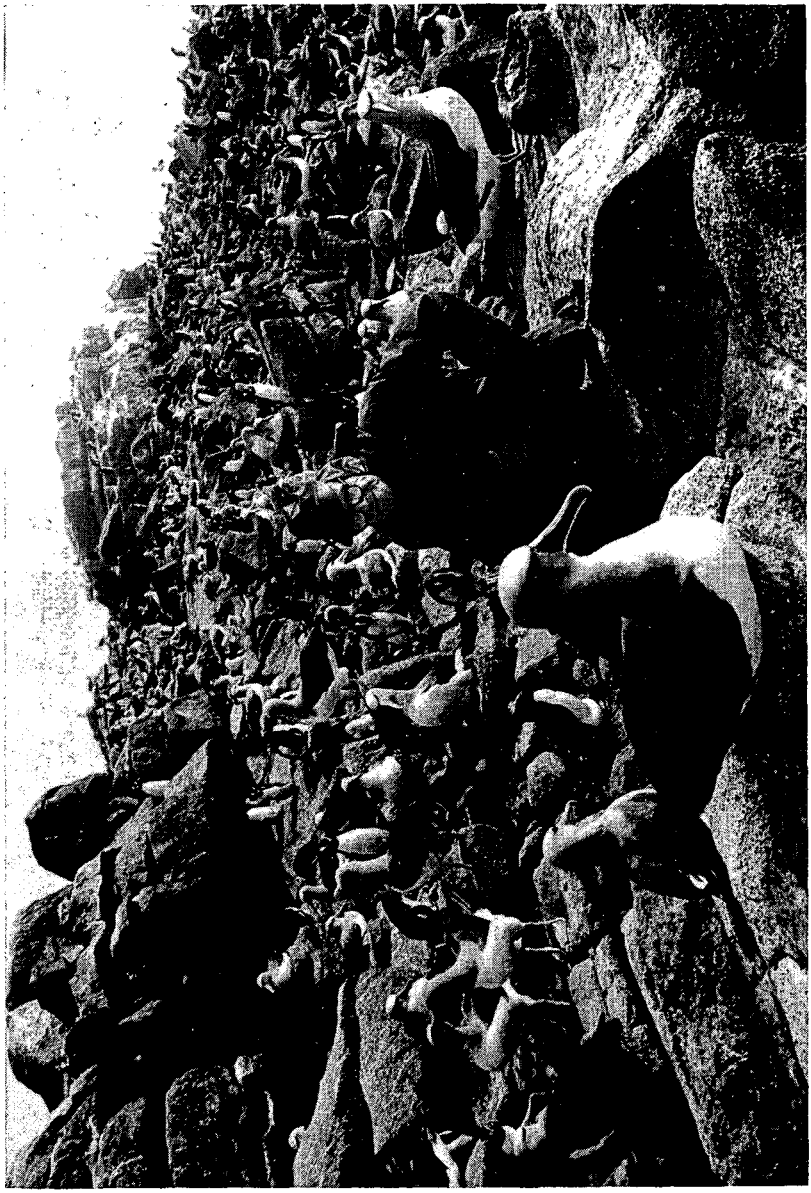
when he took the bedraggled specimen to the Auckland Museum for verification, the redoubtable Cheeseman, no mean ornithologist himself, looked at him and simply said, " Schoolboys don't find Buller's Shearwaters." Some years later, RAF was to have a hand in putting the mighty Poor Knights colony of Buller's Shearwaters on the map.

Fifty years ago, the road to Muriwai was rough and tortuous. RAF was the pioneer of beachcombing along that 30 mile strand which nets such a variety of storm-tossed seabirds. Perhaps I may here recount how one hot January day, RAF and I, confidently armed with a sack, took the tram to New Brighton and walked many miles picking up bits and pieces of penguins and prions. As we boarded the tram in the evening, we quietly deposited the loaded sack at the rear and with some amusement tried to pretend we knew nothing of the source of the strong scent which from time to time bore down upon the nostrils of our fellow-passengers. RAF was a wit, loving a good pun or play upon words. It is said of him that once at Muriwai, as he studied a far-gone tern, he remarked not " Alas ! poor Yorick ! " but " Even a tern will worm." Much more recently, after a wardroom dinner where Bacchus was duly honoured, he retired with the bon mot " Discretion is the better part of Falla."

During his years at the Auckland and Canterbury Museums, RAF profitably used beach-cast specimens as he gathered material for papers on penguins, shags, albatrosses and tubenoses of all kinds. At the same time he made enlightening studies of our puzzling oystercatchers and of the migratory arctic waders. But his interest was not confined to the birds of sea and coast. Under the auspices of Captain E. V. Sanderson and the Forest and Bird Protection Society, he was one of the contributors to the text which accompanied Lily Daff's paintings of forest-haunting birds; and the paintings for the second volume which dealt with birds of sea and shore were made under his guidance at the Auckland Museum. By now his thoughts were very much directed towards conservation, and his voice was heard in the councils of those who framed the legislation which protected such mindlessly persecuted species as Pied and Spotted Shags. A few years later he was a strong advocate of the legislation which prohibited the shooting of godwits and other shorebirds. Now, forty years on, the value of this legislation is manifest, not only, for example, in the great inlets of the Auckland isthmus, but also in estuaries throughout the country.

In 1939 he was one of that small band of visionaries who founded the OSNZ; and with Professor B. J. Marples, he was an early editor of *N.Z. Bird Notes;* before in Volume 4 they were dignified with the title of *Notornis,* by way of celebrating the rediscovery of that resplendent but heavy-footed gallinule.

During a long and active life, birds were his first and lasting love. From his travels and experiences both in New Zealand and across the world, he acquired an enviable wealth of knowledge. But administrative duties and service on numerous national councils left



Sir Robert among friends, Salvin's Mollymawks and Erect-crested Penguins. Bounty Islands, January 1979.
Photo: Ross Giblin, courtesy of **Evening Post**

him regrettably little inclination for writing. Yet for the first field guide he found time to make a most valuable contribution, based on his unrivalled knowledge of our many oceanic birds. Examining the plates for the new guide gave him much pleasure. His eye was quick to notice errors in plumage or colour, and his suggestions for improvements were most helpful.

In partial retirement, it was fitting that he should become Chairman of the Nature Conservation Council, even if his views on measures to be taken to ensure the survival of rare and endangered species of offshore islands were not always palatable. In the filming of native birds for education and television, his advice was eagerly sought. He was happiest when out in the field or bobbing about in boats. Who can blame him ? We " shall not look upon his like again."

R. B. SIBSON

It is not easy to single out the attributes of one who was so closely involved in so many aspects of the natural sciences in New Zealand during the past 50 years. In the history of New Zealand science, at least in natural history, there have been a number of dominant practitioners whose names and works are known to the merest student — of such are the Four Great H's, Hochstetter, Haast, Hutton and Hector, later Cotton, Oliver, Archey, and so on. Of equal rank is the name Falla.

It would be difficult, if not impossible, to exaggerate the place that Sir Robert Falla has occupied in the pursuit and development of New Zealand science, particularly in diverse fields of natural history. Behind almost every endeavour has been some direct or indirect influence brought about by Falla's example, advice or well-considered criticism.

As Assistant Zoologist with Sir Douglas Mawson's expedition of 1928/29 he provided a continuing link between New Zealand science and the traditional Northern Hemisphere input into Antarctic exploration. His advice and experience were consequently sought when New Zealand became involved in the new phase of Antarctic exploration in the International Geophysical year and beyond. Indeed, the long history of VUWAE expeditions to the Antarctic owes its inception to Falla's early lead.

The wartime " Cape Expedition," the secret coastwatching parties at the Auckland and Campbell Islands, was organised and led by Falla. This expedition laid the foundation of renewed and vigorous subantarctic research programmes of world interest.

His lead in the field of museum education is also notable and all the more remarkable because he never had the good fortune to have a well-funded institution to develop.

As foundation Chairman of the Nature Conservation Council, he helped to lay a round baseline of policy and investigational technique which guided New Zealand or New Zealanders through the formative years of environmental concern and appreciation. His well-founded opinions and judgments have mellowed the public's initial emotionalism to a more solidly based understanding of the problems of environmental management.

He was also more recently closely involved in public education through the television medium by way of films conceived and guided by him in conjunction with the natural history unit of the National Film Unit. These films have won world acclaim and have the stamp of informed science, contrasting with more sensational conservation campaigns on film.

In essence, Falla's role over the past 50 years has been as an unofficial scientific adviser to the Government in the field of natural history research and education and especially in conservation and environmental appreciation.

Falla's stimulus, friendship and guidance of many young scientists has, on an individual basis, helped greatly with the personal education and achievement of at least two generations of New Zealand investigators.

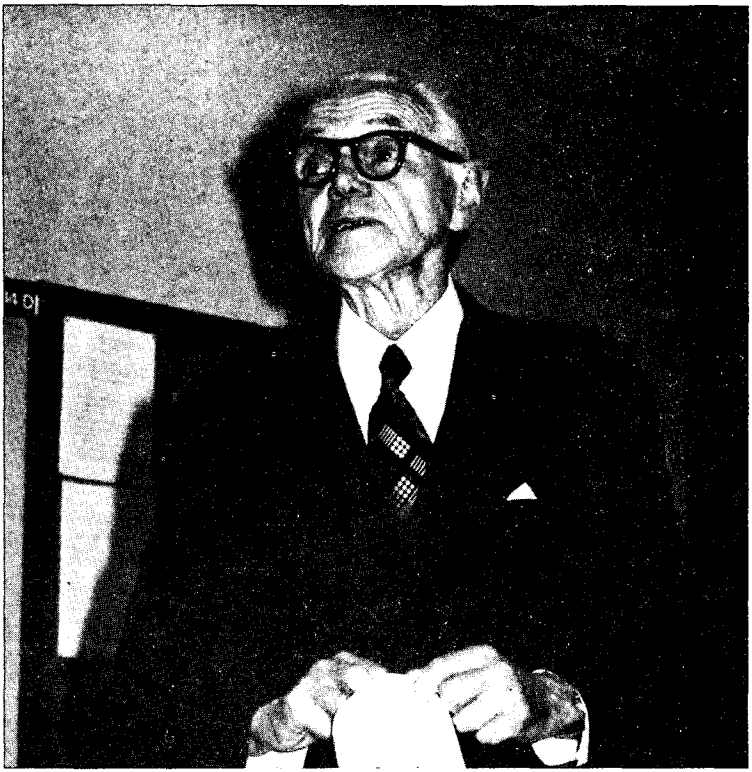
E. W. DAWSON

On 23 February 1979 Sir Robert Falla collapsed and died at his home in Eastbourne. He was 77. His sudden death came as a great shock to his multitude of friends and colleagues, many of whom were still sharing with Sir Robert a deep sense of loss at the death on 31 May 1978, shortly after the couple's golden wedding anniversary, of his charming wife Molly.

To have known Robert and Molly Falla for 23 years has been for me both an intellectual joy and a profound privilege. To have lost them both, so suddenly, and within a few months of each other, leaves a sense of emptiness that I find difficult to put into words.

Robert Falla was an extraordinary man in every way. He had the rare combination of scholastic brilliance, keen perception, and profound knowledge coupled with a dedication, wit, and great personal charm that endeared him to generations of New Zealanders. He was, undoubtedly, one of New Zealand's greatest sons of science: a scholarly and gifted naturalist. To him everything about nature was deeply interesting and beautiful; every lone feather or shell on the tide-line was a book on its owner. He knew, and he cared.

In 1956, as a teenager with a budding interest in seabirds, I first met Dr Falla across the Director's desk in the Dominion Museum. I had filled an ancient brown bag with the carcasses of storm-wrecked seabirds, whose gentle odour undoubtedly presaged my entry into the



room. I wondered whether this slim, grey-suited man could identify them for me. He could indeed. As the sand-encrusted corpses were spread over the carpet, each one's name and biological background were explained to me in a simple, lively, and thoroughly entertaining way. I was entranced, and was converted at once to the cause I have followed since.

Robert Falla had a talent for explanation of knowledge that I have never seen equalled. On ships and seabirds he knew it all. In Washington, D.C., in 1969 Robert Cushman Murphy said to me of Robert Falla: " He knows more about seabirds than anybody, including me." The two were great friends and longstanding companions in ornithology. I dare not make any distinctions between them; both were superb ornithologists, and both true gentlemen. They were the best.

Robert Falla's capacity for knowledge was as amazing as his memory. He spoke to young and old on many subjects with clarity, wit, and accuracy. His memory for dates, facts, and the whereabouts of articles and papers written 50 years previously was nothing short

of baffling. An elegant, succinct, and commanding knowledge of fact and words is reflected in most of what he wrote, whether a hand-written note or a cerebral discourse on taxonomy. He wrote a Christmas card to me on the Poor Knights Islands as ' from one poor knight to another ' — he had just received his knighthood (1973). In addition to sharing with me his delightfully sharp sense of humour, he taught me most of what I know about seabirds. For this he received large numbers of my mother's 'peanut brownies' and the rapt attention of his willing pupil.

Many have written of Robert Falla's contributions to natural science, and particularly to ornithology. They are so numerous and substantial I will not attempt it here. To me Robert Falla became over 23 years more than just a friend: more of a father figure. He was a great scientist; and a great human being.

(Reprinted, with permission, from New Zealand Journal of Zoology 6 (2), 1979.)

PETER C. HARPER

BIBLIOGRAPHY OF R. A. FALLA (1901-1979)

Compiled by C. A. FLEMING

The late Sir Robert Falla wrote numerous scientific papers, lectures, reviews, and articles on ornithology and other branches of natural history, on ships, the Antarctic and the Subantarctic Islands, on wildlife management, conservation and the environment, on history and on the lives of former colleagues and friends. He was a conscientious publicist for science, writing many popular articles for periodicals that were never circulated to his scientific correspondents as reprints. To compile a complete bibliography is therefore a difficult task, unlikely to be successful on the first attempt. For example, some journalists' interviews have been included but probably not all. Additions to the list will be welcomed by the editor.

The draft bibliography that follows was compiled by adding to an initial list drawn up by C. A. Fleming a considerable number of titles supplied first by Dr R. H. Balham (Zoology Department, Victoria University of Wellington) and by Mr J. M. Cunningham (Kotari Road, Days Bay). Mr J. A. Bartle (National Museum, Wellington) and Mr E. G. Turbott (Auckland Institute and Museum) then each added a number of titles.

Mrs E. McGregor (NZ Geological Survey, Lower Hutt) kindly typed the bibliography from rough handwritten cards.

1922

Notes on petrels washed ashore, West Coast, Auckland Province, NZ. Emu 21 (3): 206-7.

1924

Discovery of a breeding place of Buller's Shearwater, Poor Knights Island, New Zealand. Emu 24 (1): 37-43.

1925

Seabird homes of Hauraki Gulf. Brett's Christmas Annual, 1st Dec. (Auckland).

1928

(with B. Sladden) Alderman Islands. A general description, with notes on the flora and fauna. NZ Jl. Sci. Tech. 9 (4-5): 193-205 and 282-290.

1929

Bird life. Municipal Record, official organ of the Auckland City Corporation, New Zealand, 3 (3): 9-12.

1930

Notes on birds observed between Melbourne and Durban. Emu 29 (3): 175-180.

The Arctic Tern (**Sterna paradisea** Brunnich): An occurrence in New Zealand. NZ Jl. Sci. Tech. 12 (1): 27.

1932

New Zealand cormorants in the collection of the Auckland Museum, with notes on field observations. Rec. Auckland Inst. Mus. 1 (3): 139-154.

1933

Notes on New Zealand petrels; with descriptions of new forms and some new records. Rec. Auckland Inst. Mus. 1 (4): 173-180.

The King Shag of Queen Charlotte Sound. **Phalacrocorax carunculatus** (Gmelin). Emu 33 (1): 44-48.

1934

" Where the long green seas go tramping in." Rugged outposts of the Northern Coast, where religious tracts await the ship-wrecked mariner, and a naturalist's paradise is fast becoming a vast goat-paddock. [Will Watch Expedition], NZ Observer, March 15, 1934: 6-7 (illustr.).

Antarctica. pp. 23-26 **in** Educational Broadcasting to Schools. New Zealand Broadcasting Board, 1YA, Auckland, September-November, 1934.

The distribution and breeding habits of petrels in northern New Zealand. Rec. Auckland Inst. Mus. 1 (5): 245-260.

The native birds of New Zealand. Auckland Weekly News, Christmas Number, 15th October, 1934.

1935

The Tuatara. Bull. Auckland Zool. Soc. 2: 3-4.

Notes on penguins of the genera **Megadyptes** and **Eudyptes** in southern New Zealand. Rec. Auckland Inst. Mus. 1 (6): 319-326.

1936

Progress report on waterfowl research and future plans. Auckland Acclimatisation Society, Annual Report for year ending March 31, 1936: 6-7.

Arctic birds as migrants in New Zealand. Rec. Auckland Inst. Mus. 2 (1): 3-14.

1937

The museum and the community. 18 pp. Canterbury University College Commemoration Day Address, 1937.

Birds. Brit. Aust. NZ Antarctic Research Exped. Reports B 2: 1-304, pl. 1-4, fig. 1-216.

1938

Crested Penguins in Western Australia. Emu 37 (3): 197-200.

The Shoveller **(Spatula rhynchotis.** Forest and Bird 51: 2.

Distribution of the Royal Albatross in the New Zealand region. Rec. Canterbury Mus. 4 (4): 213-217.

(with E. F. Stead) The plumages of **Nesonetta aucklandica.** Trans. Roy. Soc. NZ 68 (1): 37-39.

1939

The Pied Stilt **(Himantopus leucocephalus).** Forest and Bird 54: 15.

Wild life in New Zealand. Bull. Brit. Ornithol. Club 59: 149-151.

New Zealand oystercatchers. Rec. Canterbury Mus. 4 (5): 259-266.

1940

New Zealand birds. Twenty-four coloured illustrations of birds of coast and ocean with descriptive letter press. Forest and Bird Protection Society of NZ.

Occurrences of the McCormick Skua on the coast of New Zealand. Emu 40 (2): 119-120.

The Genus **Pachyptila** Illiger. Emu 40 (3): 218-236.

1941

Blue Heron or Reef Heron **(Demigretta sacra)**. Forest and Bird 61: 3.

(with R. S. Allan, E. Percival, R. S. Duff) Preliminary report on excavations at Pyramid Valley Swamp. ("General Introduction" and "The Avian Remains" by R.A.F.) Rec. Canterbury Mus. 4 (7): 325-353.

1942

White Herons in the Okarito district. Bull. Ornithol. Soc. NZ II: 3-4.

Winter distribution of three species of subantarctic penguins. Trans. Roy. Soc. NZ 72 (Abstr.): xxxv.

The Blue Penguin **(Eudyptula minor)**. Forest and Bird 63: 4.

Review of the smaller Pacific forms of **Pterodroma** and **Cookilaria**. Emu 42 (2): 111.

Bird remains from moa-hunter camps. Rec. Canterbury Mus. 5 (1): 43-49.

1943

Caspian Tern **(Sterna caspia)**. Forest and Bird 67: 10.

New Zealand Dotterel **(Charadrius obscurus)**. Forest and Bird 68: 4.

1944

The Rough-faced Shag **(Phalacrocorax carunculatus)**. Forest and Bird 71: 9.

The Wandering Albatross **(Diomedea exulans)**. Forest and Bird 72: 11.

The Red-billed Gull. Forest and Bird 73: 8.

The Brown Kaka **(Nestor occidentalis)**. Forest and Bird 74: 4.

1945

(with G. Stokell) Investigation of the stomach contents of New Zealand fresh-water shags. Trans. Roy. Soc. NZ 74 (4): 320-331.

The Gannet **(Moris serrator)**. Forest and Bird 75: 6.

The White-fronted Tern **(Sterna striata)**. Forest and Bird 78: 12.

1946

An undescribed form of the Black Petrel. Rec. Canterbury Mus. 5 (2): 111-113.

Wild life and ways. NZ Listener 14 (354): 20.

A day among the migrants. NZ Listener 14 (355): 30-31.

Rangitoto revisited. NZ Listener 14 (357): 18-19.

About kiwis. NZ Listener 14 (359): 7.

The Bellbird: Korimako **(Anthornis melanura)**. Forest and Bird 79: 6.

Saddleback: Tieke. Forest and Bird 82: 26.

Parakeets (Red-fronted and Yellow-fronted) (Kakariki). Forest and Bird 81: 2.

1947

Review: Letters from Skockholm by R. M. Lockley (J. M. Dent & Sons). NZ Bird Notes 2 (6): 148.

1948

The rediscovery of the Takahe. NZ Science Review 6 (6): 123-124.
Breeding of Red-capped Dotterel in N.Z. NZ Bird Notes 2 (8): 194.
Birds of the Solanders. NZ Bird Notes 3 (2): 52-55.
Biology in New Zealand museums. Tuatara 1 (3): 4-5.
A new **Anthornis** from Three Kings Islands. Rec. Auckland Inst. Mus. 3 (4-5): 337-338.
Notes on skins of Bronze Cuckoos submitted by Dr. Baraclough Fell. NZ Science Review 6 (3): 61.
The outlying islands of New Zealand. NZ Geographer 4 (2): 127-154.
Recent exploration in the Antarctic. NZ Geog. Rec. 5: 18-19.
Island sanctuaries. Forest and Bird 89: 3.

1949

Only four found in 100 years. NZ Listener 20 (194): 7.
Identification of New Zealand mainland shags. Tuatara 2: 116-120.
Ancient bird life in New Zealand. NZ Geog. Rec. 7: 14-15.
Ornithologist visits **Notornis**. NZ Listener 20 (501): 7.
South Island record of Allied Shearwater. NZ Bird Notes 3 (7): 200.
Notornis rediscovered. Emu 48 (4): 316-322, pl. 40-42.
Birds; illustrated by E. Mervyn Taylor. School Publications Branch, NZ Education Dept. 40pp. illust.
The Notornis has chicks (reported). NZ Listener 20 (512): 6-7.
The egg came after the chick. NZ Listener 20 (513): 6-7.

1950

Are museums quite dead ? Education 3: 41-42.
Straight through from London. (Interview on visit to Antipodes Island). NZ Listener 23 (597): 6.
Scientists and conservation. Proc. Roy. Soc. NZ 78 (1): xxv-xxxiii.
The Chatham Islands. NZ Geographer 6 (1): 1-2.

1951

A perfect sanctuary. (Interview on Bounty Islands) NZ Listener 24 (602): 9.
The nesting season of **Notornis**. Notornis 4 (5): 97-100.
New Zealand and international relations in science . Proc. Roy. Soc. NZ 79 (1): xxxiv-xxxix.
The proper function of the Royal Society. Proc. Roy. Soc. NZ 79 (1): lxxi-lxxxv.
Observations on birds. (With P. C. Bull) New Zealand-American Fiordland Expedition. DSIR Bull. 103: 76-92.
Address of welcome given by the President. Proc. 7th Pacific Science Congress 1: 45-47.
White Heron sanctuary. Forest and Bird 100: 11.
Management of bird resources. Proceedings of the U.N. conference on conservation and utilization of resources, 1949, Lake Success, New York, Vol. 7 (Wildlife and fish resources): 233-235.

1952

Foreword. Pp. 5-6 **in** F. A. Simpson (ed.) The Antarctic today. NZ Antarctic Society and A. H. & A. W. Reed.

Antarctic birds. Pp. 216-288 **in** F. A. Simpson (ed.). The Antarctic today. NZ Antarctic Society and A. H. & A. W. Reed.

The Notornis expedition 1950. Medical & Biological Illustrated 2 (2): 88-90.

1953

Change and adjustment in plant and animal communities. NZ Ecol. Soc., Rep. 2nd Ann. Meeting: 3-4 [= Proc. I].

Responsibility of scientists to the public. NZ Sci. Rev. 11 (10): 141-142.

Description of a new form of New Zealand wren. Notornis 5 (5): 142-143.

Southern Seals: Population studies and conservation problems. Proc. 7th Pacific Science Congress IV (Zoology): 706.

(with W. H. Dawbin). A contribution to the study of the Humpback Whale based on observations at New Zealand shore stations. Proc. 7th Pacific Science Congress IV (Zoology): 373-381.

The Australian element in the avifauna of New Zealand. Emu 53 (1): 36-46.

1954

Review. Ashton, E. H. Third progress report, bird ringing. (The Ostrich 25 (1): 2-12). Notornis 6 (2): 55.

A new rail from cave deposits in the North Island of New Zealand. Rec. Auck. Inst. Mus. 4 (4): 241-243, pl. 40-42.

Flying mammals and birds without wings. Pacific Discovery 7 (4).

1955

Antarctic adventure and research (Fifth Hudson Lecture). NZ Science Review 13 (9-10): 107-116.

New Zealand bird life past and present. Cawthron Lecture Series 29, 14 pp. (*Cawthron Institute, Nelson*).

1956

Some reflections on the training of an ecologist. Proc. NZ Ecological Soc. 3: 1-6.

White Herons in New Zealand. Education 5 (3): 31-36.

Birds. Roy. Soc. NZ Antarctic Res. Cttee. Spec. Rep. 13 (cyclostyled).

Notes on the scientific importance of birds and forests. Forest and Bird 121: 12-13.

1957

Presidential address: Ecological aspects of Antarctic biology. Proc. NZ Ecol. Soc. IV: 1-5.

Antarctic birds. Australian Museum Mag. 12 (8): 261.

The habits, distribution and ecology of the Moa and contemporary bird fauna (reported). Pp. 272-273 **in** J. Golson, "New Zealand Archaeology, 1957." Jl. Polynesian Soc. 66 (3): 271-290.

Natural areas in the distribution of birds. Proc. NZ Ecol. Soc. IV: 16.

Conservation in New Zealand. Ninth Pacific Sci. Congr. Proc. 7: 208-9.

Birds of the sand country. Proc. NZ Ecol. Soc. 5: 4-5.

1958

(with T. Riney). Australian Barn Owl in Westland. Notornis 7 (7): 208-209.

Obituary: Philip Crosbie Morrison. Forest and Bird 128: 7.

Some records of Australian birds in New Zealand, 1957. Notornis 8 (2): 1-4.

1959

Pratincole records in New Zealand. Notornis 8 (5): 126.

Notes on some bones collected by Dr. Watters and Mr. Lindsay at Chatham Islands. Notornis 8 (7): 226.

1960

The fauna of New Zealand, Pp. 25-27 **in** A. H. McLintock (ed.), A descriptive atlas of New Zealand. Wellington: Government Printer.

Some New Zealand birds, illustrated by E. Mervyn Taylor, with notes by R. A. Falla. Wellington: Price Milburn. 40 pp.

Oceanic birds as dispersal agents. Proc. Roy. Soc. B 152: 655-659.

Identification of New Zealand gulls and terns. Tuatara 8: 72-76.

1962

A Wedge-tailed Shearwater in New Zealand. Notornis 9 (8): 278-279.

New Zealand records of **Pterodroma longirostris** (Stejneger) and a new record of **Pterodroma leucoptera** (Gould). Notornis 9 (8): 275-277.

The Moa, zoological and archaeological. NZ Archaeological Assoc. Newsletter 5 (3): 189-191.

Exploitation of seals, whales and penguins in New Zealand. Proc. NZ Ecol. Soc. 9: 34-38.

Distribution patterns of birds in the Antarctic and high-latitude Subantarctic. Symposium on Antarctic Biology, S.C.A.R., Paris, pp. 367-376.

1963

Report of the delegate to the International Ornithological Congress. Notornis 10 (4): 191-192.

The Oriental Pratincole, another record. Notornis 10 (7): 355.

1964

Note on the Little Bittern. Notornis 10 (8): 412.

The Porirua Yellowlegs. Notornis 11 (2): 104-106.

Kiwi. Pp. 415-416 **in** A. L. Thomson (ed.), A new dictionary of birds. London, Nelson.

Moa. Pp. 477-479 **in** A. L. Thomson (e.), A new dictionary of birds. London, Nelson.

Ships of the Southern Ocean. Antarctic 3: 517-520.

Obituary — Major R. A. Wilson. Notornis 11 (3): 195-196.

The Kakapo. NZ Wild Life 6: 15-16.

The Great Crested Grebe. NZ Wild Life 9: 14-15.

1965

Ships of the Southern Ocean. NZ Marine News 16: 70-75 and 16: 102-105.

Distribution of Hutton's Shearwater in New Zealand. Notornis 12 (2): 66-70.

Field identification of stints (Letter). Notornis 12 (4): 250-251.

Birds and mammals of the Subantarctic Islands. Proc. NZ Ecol. Soc. 12: 63-68.

1966

The better life (guest editorial). East Harbour Sun 6 (10): 2, Nov. 23, 1966.

(with R. B. Sibson and E. G. Turbott). Field guide to the birds of New Zealand and outlying islands. London: Collins. 254 pp. (2nd Edit. 1970).

The Rifleman. NZ Wild Life 15: 8-9.

1967

Conservation. NZ Countryside in 1980: Points of View Papers.

Guide to museum careers and prospects. AGMANZ Newsletter 32: 6-7.

An Auckland Island Rail. Notornis 14 (3): 107-113.

1970

Retrospect. NZ Marine News 21 (3): 66-67.

Grey Ternlets in the Bay of Plenty. Notornis 17 (2): 83-86.

Guardian of nature. NZ Jl. Agriculture, July 1970, 6 pp.

Some notes on general observations on the seasonal cycle of the Southern Spider Crab. NZ Marine Dept. Fisheries Tech. Rept. 52: 66-67.

1971

Giant birds striding. New Zealand's Heritage 1 (1): 7-11.

A land of birds. New Zealand's Heritage 1 (4): 102-106.

Letter [Royal Penguin: with Fleming and Kinsky]. Notornis 18 (1): 64-66.

The holiday naturalist in New Zealand. Collins, Auckland. 63 pp., illust.

1972

Mammals, birds and habitat. NZ Wild Life 36: 2-5.

Obituary. Arthur Thomas Pycroft. Notornis 19 (2): 191.

(with R. K. Dell) The Kaikoura moa egg. Dom. Mus. Rec. in Ethnol. 2: 97-104.

Foreword, in Marshall, Kinsky & Robertson. The Fiat book of common birds in New Zealand. A. H. & A. W. Reed.

Review: Joseph Banks in Newfoundland and Labrador, 1786, by A. M. Lysaght. Notornis 19 (2): 193.

The Enderby settlement. New Zealand's Heritage 2 (22): 612-616.

The wreck of the General Grant. New Zealand's Heritage 3 (34): 937-942.

Mammals, birds and habitat. Leader. NZ Wildlife, Issue No. 36: 2-5.

1973

Review: Birds in Bass Strait, by Ken Simpson. Notornis 20 (1): 80.

Review: Birds of the Antarctic and Subantarctic, by G. W. Watson **et al.** American Geographical Society, New York. Notornis 20 (1): 80-81.

Birds along the way [No. 1]. NZ Motor World (Dec. 1972-Jan. 1973) 37 (5): 73.

Birds along the way [No. 2]. North Auckland. NZ Motor World (Feb-Mar.) 37 (6): 57.

Birds along the way [No. 3]. Southland. NZ Motor World (April-May) 38 (1): 74.

Birds along the way [No. 4]. Taranaki. NZ Motor World (June-July) 38 (2): 71.

Birds along the way [No. 5]. Eglinton. NZ Motor World (Aug.-Sept.) 38 (3): 74.

Birds along the way [No. 6]. Hawkes Bay. NZ Motor World (Oct.Nov) 38 (4): 8.

1974

Rare birds and conservation. Pp. 21-34 **in** C. J. R. Robertson, Birds in New Zealand. Wellington: A. H. & A. W. Reed.

The Moa. New Zealand's Nature Heritage 1 (3): 69-74.

Penguins. New Zealand's Nature Heritage 4 (48): 1135-1142.

Birds along the way [No. 7]. South Auckland. NZ Motor World (Dec. Jan. 1974) 38 (5): 64.

Birds along the way [No. 8]. Wellington. NZ Motor World (Feb-Mar.) 38 (6): 58.

Birds along the way [No. 9]. Kapiti Island. NZ Motor World (April-May) 39 (1): 16.

Birds along the way [No. 10]. Bay of Plenty. NZ Motor World (June-July) 39 (2): 56.

Obituary: G. M. Turner. Notornis 21 (3): 271-272.

1975

Birds along the way [No. 11]. A large family of shags. NZ Motor World (Dec.-Jan. 1975) 39 (5): 74.

Sir Gilbert Archey, C.B.E., M.A., D.Sc., F.Z.S., F.R.S.N.Z., F.M.A.N.Z. Proc. Roy. Soc. NZ 103: 89-94.

The bird fauna. Chap. 23, pp. 319-331 **in** V. H. Jolly & J. M. A. Brown (editors), New Zealand lakes. Auckland University Press/Oxford University Press. 388 pp.

Birds: Herons, Egrets, Bitterns. New Zealand's Nature Heritage 5 (66): 1847-1852.

Birds: Kaka and Kea. New Zealand's Nature Heritage 6 (78): 2183-2188.

Birds along the way [No. 12]. The Weka — a flightless woodhen. NZ Motor World (June-July) 40 (2): 58.

Birds along the way [No. 13]. Karoro. The Black-backed Gull. NZ Motor World (Aug.-Sept.) 40 (3): 66.

Edgar Stead (1881-1949). New Zealand's Nature Heritage 7 (92): back cover.

Gilbert Archey (1890-1974). New Zealand's Nature Heritage 7 (96): back cover.

Habitat: Campbell Island. New Zealand's Nature Heritage 7 (102): 2856-2860.

Notes by R. A. Falla on A. R. Thorpe's report on historic sites and inscriptions. Pp. 278-281 **in** Yaldwyn, J. C. (ed.), Preliminary results of the Auckland Islands Expedition 1972-1973. Dept. of Lands & Survey, Wellington.

Report on the D.S.I.R. Expedition to the Auckland Islands in H.M.N.Z.S. Tui, November 1954. Pp. 336-338 **in** Yaldwyn, J. C. (ed.), Preliminary results of the Auckland Islands Expedition 1972-73. Dept. of Lands & Survey, Wellington.

Report on the 1962-63 Auckland Islands Expedition. Pp. 339-341 **in** Yaldwyn, J. C. (ed.), Preliminary results of the Auckland Islands Expedition 1972-73. Dept. of Lands & Survey, Wellington.

Report on the 1966 Auckland Islands Expedition. Pp. 364-369 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Royal Albatross on Enderby Island (extracts from letter to the Banding Officer, Wildlife Service, 13th November, 1972). P. 369 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

General observations on the seasonal cycle of the southern spider crab **(Jacquinotia edwardsii)** and its significance in the food cycle of Hooker's Sea Lion. Pp. 381-383 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Extracts from a letter from Sir Robert Falla to Director-General of Lands, 17th April, 1975. p. 383 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Extracts from a report on "an Auckland Island rail." Pp. 385-388 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

A vanished township: "Hardwicke" on the Enderby Settlement. Pp. 389-394 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Comments on the Enderby Settlement and the cemetery at Port Ross, Auckland Islands. Pp. 395-399 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Further comments on the cemetery at Erebus Cove, Port Ross, from letter to A. R. Thorpe dated 22nd November, 1972. Pp. 399-400 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Details of two inscriptions at Erebus Cove cemetery. p. 401 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Notes on historical sites and relics on the Auckland Islands. Pp. 402-404 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

Memorandum on the field research programme proposed for the Auckland Islands Expedition 1972-73 (incl. two appendices). Pp. 405-410 **in** Yaldwyn, J. C. (ed.), Preliminary results . . . .

1976

Notes on the Gadfly Petrels **Pterodroma externa** and **P. e. cervicalis.** Notornis 23 (4): 320-322.

Fauna. Pp. 114-117 **in** I. McL. Wards (ed.), New Zealand atlas. Wellington: Govt. Printer.

(with F. C. Kinsky). A subspecific revision of the Australasian Blue Penguin **(Eudyptula minor)** in the New Zealand area. Nat. Mus. NZ Records 1 (7): 105.

Epilogue. New Zealand's Nature Heritage 7 (105): front cover.

1978

Banded Dotterel at the Auckland Islands: Description of a new sub-species. Notornis 25 (2): 101-108.

1979

Some aspects of New Zealand birdlife. Sanderson Memorial Lecture. Forest and Bird 211: 18-25.

(with R. B. Sibson & E. G. Turbott). The new guide to the birds of New Zealand. Illustrated by Elaine Power. Collins: Auckland & London. [3rd edition, rewritten, of Falla, Sibson & Turbott, 1966.] 247 pp.

(with R. H. Taylor & Colleen Black). Survey of Dundas Island, Auckland Islands, with particular reference to Hooker's Sea-lion **(Phocarctos hookeri).** NZ Jl. Zool. 6 (2): 347-355.

Preface, p. 7 **in** Geoff Moon, The birds around us. Heinemann: Auckland.

(with J. L. Mougin). Order Sphenisciformes. Pp. 121-134 **in** Birds of the World I. (2nd edit.) (E. Mayr & G. W. Cottrell, eds.). Museum of Comparative Zoology, Cambridge, Mass.

1980

Campbell Island. Pp. 51-55 **in** Offshore and outlying islands of New Zealand. Collins Nature Heritage Series. Collins and Hamlyn: Auckland. (Given on title page as 1979 but released in 1980).

REVIEWS

Handbook of the birds of Europe, the Middle East, and North Africa: the birds of the Western Palearctic, by Stanely Cramp (Chief Editor), K. E. L. Simmons, I. J. Ferguson-Lees, R. Gillmor, P. A. D. Hollom, R. Hudson, E. M. Nicholson, M. A. Ogilvie, P. J. S. Olney, K. H. Voous, J. Wattel. Volume 1: Ostrich to Ducks. 722 pp. 108 col. pl. Many figs and maps. Oxford University Press 1977. £25.00; now $31.00.

The importance of this work to ornithologists is likely to be so great that, even though a review copy has not been received, several reviewers have been asked to comment on thir own copies from the New Zealand point of view in their particular fields of interest. Volumes 2 and 3 (the last one being on waders) are due out in 1980. Seven volumes are planned.

GENERAL COMMENT, by the late R. H. D. STIDOLPH

The *vade-mecum* for ornithologists and bird students for the past 40 years has been Witherby's *Handbook of British Birds* of 5 volumes, in which was amassed all the information available on the species admitted to the British list. This invaluable work is now being augmented by a much more ambitious project, a 7-volume handbook on the birds of the whole Western Palearctic, the first volume of which includes divers and grebes, petrels, gannets, cormorants, bitterns and herons, geese and ducks as the main groups. The interim between these two publications has seen a significant increase in ornithological research and observation, and it is timely that the results of the past 40 years in these fields are being assembled in readily accessible form.

This first volume gives a firm impression of the magnitude of the completed work, due to be finished before 1990. A glance through the 12 pages of closely printed references from which information has been derived for only this first volume leaves no doubt about the complete coverage given under the various sections of each species — field characters, habitat, distribution, population, movements, food, social patterns and behaviour, voice, breeding, plumage, bare parts, moults, measurements, weights, structure, and geographical variations.

Coloured illustrations of each species show birds in various phases of plumage, including nestlings or downy young. These are on a much larger scale than those in the British Handbook and so are a decided improvement. Among the artists are Sir Peter Scott and Robert Gillmor. In addition, there are many text drawings of bird behaviour, voice sonagrams and melograms, and annual cycles, and each breeding species has a full distribution map.

When completed, this will be the standard reference work for many years to come.

PROCELLARIIFORMES, by J. WARHAM

Useful summaries are given of the field characters and biology of 11 petrels on the New Zealand list, namely, Black-browed Albatross, Wandering Albatross, Southern Giant Petrel, Soft-plumaged Petrel, Cory's Shearwater, Sooty Shearwater, Manx Shearwater, Little Shearwater, Wilson's Storm Petrel, White-faced Storm Petrel and Leach's Storm Petrel.

As many are accidentals from the Southern Hemisphere, much of the information comes from work done on the breeding grounds and will be quite familiar to New Zealand procellariiformists. Nevertheless the accounts provide detailed, succinct, and up-to-date summaries with references as late as 1974. The data are generally accurate, the sections on voice extensive and often supported by audio-spectrographs. The general accounts of the three families — Diomedeidae, Procellariidae and Hydrobatidae — are also short but packed with information.

The plates are less satisfactory. Generally the "jizz" of the birds is good but the colours in my copy are defective. Thus in the plate of the albatrosses, the bills and feet of the Wanderers are a dull greenish grey, there's not a trace of reddish or orange on the Blackbrow's beak, the "Snowy" Albatross is extraordinarily white, the Northern Giant Petrel has a peculiar head with a frowning aspect, the close-up of the Southern Giant Petrel lacks the diagnostic greenish tip (though referred to in the text), and the Little Shearwaters figured reveal not a trace of blue on their legs.

Other petrels of dubious occurrence in the Western Palearctic are referred to briefly, e.g. the Cape Pigeon *Daption capense* (sic!), and it is noted (correctly) that the subspecific identity of the Wandering Albatross populations in the NZ region is not fully clear.

WATERFOWL, by M. J. WILLIAMS

If only the recent attempts to monograph the waterfowl of the world, with their combination of glossy photographs and superficial text, contained but a fraction of the scholarship evident in the waterfowl section of *Birds of the Western Palearctic!* Here we are, almost 25 years after Delacour's initial effort, and there is still no single work available which provides an updated and detailed account of the ecology, behaviour, and numerical and taxonomic status of the world's ducks, geese and swans.

This book at least helps, for it provides a most comprehensive account on 56 species, about 40% of the world's total, and on this point alone its contribution to ornithological literature is invaluable. But it's the sheer quantity and quality of the text on each species that is so immediately impressive. How have the editors managed it? Cleverly and simply it seems, by obtaining the bulk of their information direct from those people currently working on the species. The editors are clearly aware that all researchers collect far more information than they ever publish, and they have managed to extract a large amount of it. The result is a combination of the published, the nearly-published, and the never-likely-to-be-published, giving the most comprehensive account of species biology that I know of. This approach is surely a lesson for all future monographers.

The editors have also been clever in maintaining an even standard throughout the text. Instead of the usual approach of giving a group of species to one editor, each editor has been responsible for a section of the text on every species. For example, Peter Olney has researched the food and feeding habits, Ken Simmonds has collated the behavioural information and Stanley Cramp had the task of determining distributions. It's a good approach, although not entirely without its problems.

I looked very closely at the text on the Shelduck, *Tadorna tadorna* because it was the only species with which I am reasonably familiar. There I found that the co-operative approach to compiling the text encouraged repetition. For example, the spectacular gatherings of moulting shelducks in the Waddensee is given full treatment under both the 'moult' and 'migration' sections, and the creching of broods is mentioned in three sections, each with slightly different details about who the guardians of the creches are. I also have a quibble about the way some research hypotheses are presented as fact. The conclusion that adult shelducks abandon their young because of the need to undertake the moult migration is highly questionable, as were the conclusions of a Scottish study about the way a population was regulated. I don't mind these hypotheses being presented, so long as they are seen to be just hypotheses. After all, there is no requirement to take everything in science seriously. Perhaps a heavier overall editing of each species' text could have removed some of the repetition (which occurred in most species texts) and exercised a little quality control on the references. These are, however, minor points and the text on the Shelduck is brilliantly thorough. I have no reason to believe it's not similarly thorough on all other waterfowl.

All 56 species are well and clearly illustrated by paintings — the swans and geese by Sir Peter Scott (who else!) and the shelducks, dabbling ducks and diving ducks by N. W. Cusa. Scott's are certainly the better, for he has illustrated his birds in a variety of postures viewed from both the front and side. With but one exception, all of Cusa's paintings show lateral views and the diving ducks are all illustrated on water. Unfortunately this means that breast patterns are not visible and foot colour in the few that are shown are confused by the compensation necessary for the (dirty?) water. The flight illustrations don't help either — the swans, geese and shelducks show flying birds from above and below (but on a sadly tiny scale), but the dabbling and diving ducks are viewed only from above.

I doubt that many New Zealand ornithologists will buy this book at the price, but certainly many will want to use it as a reference source. They couldn't do better, and I commend the book's editors on including references up to 1975, less than two years prior to its publication. Three species of waterfowl occurring in New Zealand are described — the Mute Swan, Canada Goose and Mallard. The distribution map for the Mute Swan shows it to be present in Australia and New Zealand (Canterbury and Hawkes Bay — well done!) and the text mentions its introduction here. The Mallard's presence is illustrated on the distribution map but not mentioned in the text, while the Canada Goose misses out on both. The text on all three species refers to the bird's biology only in its native range.

I did the usual reviewer's trick of checking to see that all papers cited in the text were contained in full in the references at the back — I found one omission — and it's one of *my* papers! Perhaps the editors have exercised a little quality control on the references after all. My pride is hurt, but I still consider this book the best referenced and most detailed account of 56 species of waterfowl that I know of.

EGRETS, by B. D. HEATHER

Any work that sets out to replace Witherby *et al.* faces a tough task. Volume 1 of Cramp & Simmons, as it will doubtless be called, succeeds admirably. The standard of research is high and the quality of presentation is impressive.

I don't regret the £25 ($50+) I struggled to pay for it. I find I am constantly dipping into it, reading about species and topics I had largely ignored. It applies to New Zealand ornithology more than may be thought, providing a reference standard and showing the kinds of information lacking for the equivalent New Zealand birds. Its references provide a means of entry to the major literature, all available from OSNZ's library. Students of the Black Shag, the Dabchick and the Little and Crested Grebes, for example, should not ignore this volume's texts and illustrations as a standard against which to measure their observations and opinions.

I have taken the Cattle Egret as my sample species, for I know it and the literature for it well. The Witherby *et al.* text was very thin, reflecting how little was known up to 1938-41. Since then, a sizeable literature has appeared, much of it daunting to the amateur, recording detailed work in Africa and the Americas. This literature is splendidly condensed to fill out the rest of the text on distribution and movements within the Western Palearctic. The coverage is therefore clear and thorough, the best we could have for comparing with the New Zealand birds, the eastern race, which has not been studied anywhere in detail.

The colour plate shows a good range from nestling to breeding adult, supplementing well the text descriptions. I rather miss the meticulous detail of Witherby's plumage descriptions and will be interested to see how waders are dealt with in this respect, but I am relieved the basic-alternate system of plumage groupings has not been adopted.

We are resigned to world maps where New Zealand is an afterthought, and a projection centred on the Western Palearctic naturally squeezes us on to a remote edge. Using a magnifying glass, I discovered that the Cattle Egret visits Waikato-Bay of Plenty and West Coast-Canterbury, a reasonable generalisation for the mid-1970s, I suppose.

Users of this work in *Notornis* papers please note the citation form recommended on p. 36 (adapted to *Notornis* style): Cramp, S.; Simmons, K. E. L. (eds). 1977. The birds of the Western Palearctic, Vol. 1.

★

Some ornithological results of Cook's third voyage, by David G. Medway.. 1979. J. Soc. Biblphy. Nat. Hist. 9 (3): 315-351.

The author extends Stresemann's papers on the birds collected during the third voyage by examining two catalogues in the British Museum (Natural History) with lists by Dryander of the specimens that went to Banks and the paintings of them by Ellis and Webber. The paper works through the 159 species listed in the main (Solander) catalogue, untangling their identity and the cross references to them in the second catalogue, in Latham's, Pennant's and William Anderson's early descriptions, and in Stresemann's and Lysaght's commentaries. Several New Zealand specimens are included. The ultimate fate of Bank's collection is discussed. Review copy deposited in OSNZ library.

B. D. HEATHER

Seabirds of New Zealand, by Elaine Power. 1979. Auckland: Collins. 44 pp. $9.95.

Those who liked Elaine Power's three previous books will also like this one. Like them, *Seabirds* continues to reflect the enthusiasm of an amateur field-naturalist. The paintings and sketches seem to aim at conveying the impression of birds, yet with care for detail; they are fresh, bright, and alive. As usual, some succeed (e.g. Black-backed Gull, Caspian Tern, White-faced Storm Petrel), others do not (e.g. a fault in perspective produces an apparently battleship-sized Flesh-footed Shearwater). Personally, I prefer on the whole the often charming monochrome sketches, although I don't like the kingfisher-like Caspian or the faulty tail-shape of the Black-fronted Tern. The text is brief and informative.

It would be unfair to analyse the paintings in severe ornithological criticism. The book is surely aimed mainly at public enjoyment and to be a general guide to, mostly, major species. As such it will deservedly enjoy the same popularity as the three previous books in the series. Review copy deposited in OSNZ library.

B. D. HEATHER

A field guide to the seabirds of Britain and the world, by G. S. Tuck & H. Heinzel. 1978. 292 pages; 48 plates in colour, 313 maps, 138 line drawings. Collins, London. £5.25.

It has become fashionable in recent years for some authors of bird books to take on the world. This ambitious book on the seabirds of the world is an example. Both the author, Captain Gerald Tuck, and the illustrator, Hermann Heinzel, are to be congratulated for attempting the daunting task of describing and illustrating some 303 species of seafowl, about 88 of which are albatrosses and petrels (Procellariiformes), the rest including penguins, cormorants, phalaropes and gulls.

At first sight, the reader is impressed with the book's scope, layout, binding, and production. The line drawings throughout the text are attractive, and the 16 pages devoted to world distribution maps appear useful. Closer examination of the text, however, reveals the author's difficulty with words, and many errors and inconsistencies of fact. Because of these, the book quickly becomes fogbound. On pages 14 and 15, for example, the bills of albatrosses are illustrated and described. We are told that for the Royal Albatross the cutting edges of both mandibles are black; not so, only the tomium of the upper mandible (maxilla) is black. The bill of the "Shy Albatross" is described as follows, "Bill grey, with distinct orange tip; bluish lateral plates run up in front of eye; dark horseshoe stripe behind nostril." This description is perplexing at best and wrong at worst. The bill is a pale greenish grey with a yellow (not orange) tip to both mandibles. The skin between the bill plates is dark blue, and the transverse fleshy stripe at the gape is orange. What the "bluish lateral plates" in front of the eyes are, I cannot imagine. For the Buller's Albatross, we read, "Bill greyish black, with a yellow stripe, along the upper *(sic)* and mandible." One needs a translator (or a good editor) to decipher this code. The remaining descriptions of albatrosses' beaks on page

15 are similarly flawed in their description, and *Diomedea nigripes* on the same page is misspelt.

While I am delighted that the author has got the bill colour of the Broad-billed Prion correct (too often it is incorrectly described as blue), the prion bills illustrated on page 27 are a disaster. We are told "All prions have the same head pattern" despite literature to the contrary — indeed, the head patterns of the 6 species of *Pachyptila* are a valuable aid in their identification. The sketch of the Thin-billed Prion beak bears little resemblance to the species being described; the closest I found to the Thin-billed Prion is the lateral view of the Fairy Prion. In short, the prion bills illustrated on page 27 should be carefully avoided by observers wishing to identify prions with any measure of success.

Running into distressing problems of this sort, I was hesitant to investigate the book's contents further. I noted in passing that *Pagodroma* is consistently misspelt throughout, and many distributional notes and listed breeding localities are clearly incomplete or out of date.

Considering the patchy quality of the text, the illustrator, Hermann Heinzel, has done a commendable task. Some of his illustrations are superb; others, such as the Mottled Petrel's underparts, perpetuate the myth that this species has a black anterior border to the wing lining in addition to its diagonal underwing bar. Such is not the case. Clearly, however, errors of this kind are not necessarily the fault of the illustrator, who must often rely upon the author and existing literature for assistance.

This book highlights the basic problem of authors who attempt a guide on birds, some or many of which they have never seen. It is all too often an unsuccessful recipe for a practical and useful publication.

That an up-to-date book on the seabirds of the world is needed is beyond doubt. In my opinion, however, the sort of publication desired requires the talents of several authors who are prepared to do their homework throughout the literature and the skill of an editor to oversee and polish the final production. In the meantime, however, seabird observers will have to wait: the present regional guides have a lot in their favour.

PETER C. HARPER

Les oiseaux de Chine, de Mongolie, et de Coree, by R. D. Etchecopar and Francois Hue. 1978. Volume I. Non passereaux. 586 pp. 22 col. pl. by Paul Barruel and Francis Berille. Many line drawings and 275 maps. Papeete, Tahiti: les Editions du Pacifique. French text, English species names and index. £44 or £48, depending on source.

The authors planned this work to complete their coverage of the great desert belt from the Canary Islands to Mongolia, two-thirds done in their two well-known works on the birds of North Africa and of the Near and Middle East. With the death of F. Hue in an automobile accident in 1972, this first of two volumes on the birds of China, Mongolia, and Korea has been done largely by Etchecopar alone. It covers an area of enormous size and variety of habitat zones, from the high mountains of the Tibetan plateau, the deserts

of Mongolia, and the harsh winters of the continental interior and the near-Siberian north to the varied conditions of the long Chinese coastline and the tropical areas of the south. Some 1100 bird species are involved, hence the two volumes, of which this is the first, on non-passerines.

For New Zealanders, apart from its value as a general coverage of the birds of China, Mongolia, Korea, Taiwan and Hainan, this book covers the breeding area of some and the migratory routes of many of our migrants and stragglers — waders, terns, swifts, and cuckoos. Not knowing the two previous books, I turned to this one hoping to find in it a miraculous extension of J. D. D. La Touche's work (*A handbook of the birds of eastern China,* London 1931-1934), giving ranges of measurements, original plumage descriptions including stages of moult and of intermediate plumages encountered in the region, times and routes of migration, flock sizes, a clue to the movements of our mystery migrant, the Knot, the stragglers from North America, and so on. Naive hope.

Given the political barriers to research by outsiders and the lack of ornithologists, past or present, in the region, the available information is limited and often vague. The authors could not study all the birds at first hand, although they had studied most of them in neighbouring lands. The format and content are little different from a field guide. Each species receives ½-1½ pages of text, divided into identification, including field characteristics; behaviour, mainly general habitat, food and manner of feeding; nesting; distribution and subspecies; and a brief note on world distribution.

On waders and egrets, there is little new to learn; there may be more in other groups, but I am not competent to judge. The notes on world distribution gives New Zealand very mixed credit as a wintering centre: many species are mentioned, but not Mongolian or Sand Dotterels, stints, Sharp-tailed Sandpiper, White-winged Black Tern, and, most incredible of all, the Knot. The annual influx of Common Terns to Australia is not mentioned, and the Whiskered Tern is said to " reach Australia and New Zealand," a bad misinterpretation of the Australian breeding species and the NZ Black-fronted Tern. I wonder what sources were used for Australasia; certainly not the NZ *Checklist,* but with no bibliography I cannot tell.

Is this book worth having ? In theory, yes indeed. Despite the admitted and unavoidable imperfect depth of treatment, it summarises all that in general is *known* of the region, incorporating the early writings of Pere David, Oustalet and others, the more recent publications of La Touche and Cheng, and of authors such as Dementiev & Gladkov, Hachisuka, Vaurie, and Gore & Won dealing with neighbouring lands, and the authors' own experiences and their examination of museum collections, especially the large collections in the Museum of Natural History in Paris. For New Zealanders, it is the *only* available reference to fill an important gap in understanding Pacific birds and to provide a guide to the rich non-passerine fauna of China.

At $20 or $30, I'd buy it instantly; I'd be strongly tempted at $40. But at $90-100, it's ludicrous. However, the review copy is now in the OSNZ library.

B. D. HEATHER

LETTER

The Editor, 28 April 1980
Sir,

CHATHAM ISLAND TAIKO v. SOFT-PLUMAGED PETREL AT SEA

In his paper on " Seabirds observed between Sydney and Buenos Aires," A. E. F. Rogers (*Notornis* 27: 69-78, 1980) discusses at some length a presumed sighting of a Magenta Petrel = Chatham Island Taiko *(Pterodroma magentae)*, in square 46°S 172°W on 28 November 1970. At first he considered the bird to be a Soft-plumaged Petrel *P. mollis,* which identification I support. I wish to relate a similar, but converse, experience which draws attention to the considerable similarity between these two petrels.

On 6 December 1978, while returning to Auckland from Antipodes Islands on HMNZS *Waikato*, we spent the afternoon passing at about 22 knots through a sea fog which reduced visibility to about 100 metres. There was little visible birdlife but regular Grey-faced *(P. macroptera)*, White-headed *(P. lessonii)* and Mottled *(P. inexpectata)* Petrels. At 1630 hours I went on deck without binoculars to see whether our environment had altered. This had not, but as I looked about a medium-sized *Pterodroma* swept in near the stern, canted and disappeared aft. It was dark above, on the underwings and on the foreneck-upper breast region; the rest of the underparts, including undertail coverts, was white.

We were then in square 46°S 178°E, over the Bounty Trough and heading for the Chatham Rise, a shallow seabed feature between Banks Peninsula and Chatham Islands, which we would cross that night. I had thought that any chance we would have on this voyage of seeing a Taiko would come late this day, and so this sighting was quickly construed as possibly my first view of the quarry. A telegram via Chathams Radio to the 6th Taiko Expedition, then in the Tuku Valley, was already forming in my mind when I returned on deck with binoculars about one hour later in square 45°S 178°E. I soon had a clear sighting of a Soft-plumaged Petrel, followed by another less definite due to the fog. There was now little doubt that my first sighting had also been of *P. mollis.*

In the good sighting with binoculars I was able to see that the dark foreneck was really a band with a whitish throat above it, and I was able to get a better impression of size, there being Mottled Petrels still about for comparison. In fact, these are really the only distinguishing features at sea between *magentae* and *mollis.* Weight comparisons are c.450 g against c.300 g respectively. The Taiko has more uniformly dark upperparts, but seeing this depends on a favourable sighting.

John Jenkins and I then reconsidered tentative sightings of *mollis* on our southward voyage, and we concluded that these now seemed more definite. They included about five birds flushed from the sea with a resting group of Grey-faced Petrels, and all were made in square 46°S 173°E. Thus all our sightings, tentative or confirmed, of *mollis* were made between 45° and 47° S and north-west to north of Antipodes Island. None was seen nearer that island where, at night, we observed much activity in the bourgeoning little colony. It would not be surprising if their range at sea extends further east, and this would encompass the position of Rogers' sighting.

Although the subject is clearly debatable, Rogers at first thought he had seen *mollis,* and I believe that is what he saw. The sighting was made about 400 km from Chathams and 800 km from Antipodes. However, I do not think that it is generally realised how very rare *magentae* is. If there are 20 alive now I would be very surprised to learn so. On the other hand, the colony of *mollis* at Antipodes I. must already number several hundreds. There were possibly not significantly less in 1970.

The sighting of an unusual petrel near Chatham Islands by P. E. Roberts (*Notornis* 24: 280-283, 1977) was, however, of a Taiko in my opinion. It was too dark on the foreneck and, by Roberts' account, too large for *mollis.* The lowering sun played tricks with the underwing pattern by causing reflections off the dark plumage. Kermadec Petrel *(P. neglecta)* and Herald Petrel *(P. arminjoniana)* would have been far, far out of their normal range.

M. J. IMBER

Wildlife Service, Department of Internal Affairs, Private Bag, Wellington.