SEABIRDS FOUND DEAD ON NEW ZEALAND BEACHES IN 1983 AND A REVIEW OF ALBATROSS RECOVERIES SINCE 1960

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ABSTRACT

In 1983, 4559 kilometres of coast were patrolled and 5991 dead seabirds were found. A new record for the Beach Patrol Scheme was a Pomarine Skua (*Stercorarius pomarinus*). Unusual finds were Yellow-nosed Mollymawk (*Diomedea chlororhynchos*), Stejneger's Petrel (*Pterodroma longirostris*), White-tailed Tropicbird (*Phaethon lepturus*), Lesser Frigate Bird (*Fregata ariel*) and Grey Ternlet (*Procelsterna cerulea*). A wreck of Long-tailed Skuas (*Stercorarius longicaudus*) occurred mainly on Auckland West beaches in January and February.

A summary is given of the coastal and monthly distribution for each species and subspecies of the 2401 albatrosses found during the 1960-1983 period. Of the various coastal regions, albatrosses were found most frequently (number of birds per 100 km covered) on Southland beaches. The most frequently found albatross was the Grey-headed Mollymawk (*Diomedea chrysostoma*).

INTRODUCTION

This paper records the results of the Ornithological Society of New Zealand's Beach Patrol Scheme for 1983. Patrols were carried out on all sections of coast, except Fiordland. Some beaches on the Chatham Islands were patrolled and the results are given under the heading Outlying Islands. In all, 570 Beach Patrol Cards and 16 Specimen Record Cards were submitted. Conventions used are the same as in previous papers (see Powlesland 1983).

RESULTS AND DISCUSSION

In 1983, the total distance of coast travelled was 4559 km and 5991 seabirds were found dead by 316 members of the Ornithological Society of New Zealand and their friends. The average number of birds found per kilometre of coast covered monthly was 1.49 (Table 1). The total distance travelled in 1983 was much longer than the average of 3618 km for the previous 13 years (1970-1983). However, the averages of 9023 birds per year and 2.97 birds per kilometre covered for the previous 13 years are much greater than the values for 1983. During the previous 13 years, only in 1972 (1.47) have fewer birds per kilometre been found than in 1983. Table 1 also gives the kilometres covered and the number of seabirds found per month and in total for the various coasts, plus the number of birds picked up per kilometre covered for each coast. Table 2 gives the coastal and monthly distributions of the less commonly found seabirds (1-15 in 1983) and Tables 3 and 4 give these of the more commonly found seabirds.

TABLE 1 — Numbers of dead seabirds recovered and kilometres covered on each coast in 1983

COAST	CODE		MONTH												TOTAL		BIRDS/KM /COAST
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	KM	BIRDS	
AUCKLAND WEST	AW	KM	215	188	164	178	187	187	186	190	181	193	171	191	2231		
		BIRDS	715	451	274	142	160	163	227	76	111	123	204	648		3294	1.48
TARANAKI	TA	KM	14	8	16	23	22	1	29	4	12	10	23	15	177		
		BIRDS	74	35	28	14	32	12	49	4	5	4	23	44		324	1.83
WELLINGTON WEST	WW	KM	11	39	10	8	50	23	32	29	45	30	53	28	358		
		BIRDS	80	388	16	9	52	21	33	40	125	16	84	88		952	2.66
AUCKLAND EAST	AE	KM	95	24	54	40	49	60	52	35	53	67	24	107	660		
		BIRDS	102	37	121	58	23	28	25	7	12	44	34	291		782	1.19
BAY OF PLENTY	BP	KM	-	-	-	-	-	19	90	-	-	44	30	11	194		
		BIRDS	-	-	-	-	-	1	34	-	-	49	34	20		138	0.71
EAST COAST NI	EC	KM	8	5	6	1	12	8	-	9	8	25	8	8	98		
		BIRDS	1	1	10	1	14	0	-	1	2	7	11	17		65	0.66
WAIRARAPA	WA	KM	-	-	-	10	-	4	-	5	-	-	-	-	19		
		BIRDS	-	-	-	1	-	3	-	0	-	-	-	-		4	0.21
WELLINGTON SOUTH	WS	KM	-	-	1	-	3	3	1	-	-	2	8	6	24		
		BIRDS	-	-	1	-	4	6	2	-	-	0	4	13		30	1.25
NORTH COAST SI	NC	KM	3	-	-	2	-	-	1	-	-	-	2	-	8		
		BIRDS	25	-	-	3	-	-	0	-	-	-	0	-		28	3.50
WESTLAND	WD	KM	-	2	-	2	2	-	-	2	6	2	5	3	24		
		BIRDS	-	0	-	0	0	-	-	0	2	0	0	4		6	0.25
CANTERBURY NORTH	CN	KM	-	13	12	10	26	6	10	8	19	7	7	11	129		
		BIRDS	-	24	8	10	28	3	8	8	9	4	28	17		147	1.14
CANTERBURY SOUTH	CS	KM	6	1	1	9	9	10	9	10	6	7	2	2	72		
		BIRDS	22	26	1	14	11	9	18	10	6	1	1	5		124	1.72
OTAGO	OT	KM	5	9	21	12	5	6	9	5	5	7	5	5	94		
		BIRDS	1	7	35	20	0	4	4	0	0	0	0	0		71	0.75
SOUTHLAND	SD	KM	-	-	-	2	-	-	-	-	-	-	-	-	2		
		BIRDS	-	-	-	1	-	-	-	-	-	-	-	-		1	0.50
OUTLYING ISLANDS	OI	KM	15	10	6	-	15	-	-	-	-	-	-	-	46		
		BIRDS	14	4	0	-	7	-	-	-	-	-	-	-		25	0.54
TOTAL KILOMETRES TRAVELLED			403	339	305	303	403	347	456	313	355	450	370	515	4559		
TOTAL KILOMETRES COVERED			372	299	291	297	380	327	419	297	335	394	338	387	4136		
TOTAL SEABIRDS RECOVERED			1034	973	494	273	331	250	400	146	272	248	423	1147		5991	
BIRDS/KM COVERED/MONTH			2.78	3.25	1.70	0.92	0.87	0.76	0.95	0.49	0.81	0.63	1.25	2.97			1.49

Unusual finds

A new record for the Beach Patrol Scheme is the Pomarine Skua, a specimen of which was found on Omamari Beach, Northland (AW), in January (Table 2). Oliver (1955) recorded a specimen having been shot at the Bay of Islands in December 1933. Although rarely seen about New Zealand coasts, it may be a regular visitor. After breeding, mainly within the Arctic Circle, it migrates to the Southern Hemisphere during our summer. In the Pacific region its main wintering area seems to be off the eastern and south-eastern coasts of Australia, where it is commonly seen from October to May (Falla *et al.* 1979, Barton 1982). Thus, some birds are likely to be blown off course to New Zealand.

A Yellow-nosed Mollymawk that came ashore on Mount Maunganui Beach (BP) in July (Table 2) is the sixth for the Beach Patrol Scheme. The five previous birds were found on Auckland West beaches: two in May and August 1980, and three in April, June and November 1981.

Two subspecies of this mollymawk are known, having different nesting distributions and breeding times. *D. c. chlororhynchos* nests on the Tristan da Cunha group and Gough Island in the southern Atlantic, and it is presumed to lay in early September (Watson 1975). In contrast, *D. c. bassi* breeds on St Paul, Prince Edward, Amsterdam and the Crozet Islands in the southern Indian Ocean, where it lays in early October (C. J. R. Robertson, pers. comm.) Banded young from Tristan da Cunha have moved north-eastwards to the southwest coast of Africa. However, those that have ranged eastwards to the southern Australian coast from May to October are mainly *bassi*. Both subspecies have been recorded about New Zealand (C. J. R. Robertson, pers. comm.)

Up to 1975, only 11 records of sightings were recorded from New Zealand. However, since then Yellow-nosed Mollymawks have been seen frequently in the outer waters of the Hauraki Gulf, near the Three Kings Islands and off the Bay of Plenty coast, especially in 1980 (Booth 1982). Therefore, it was to be expected that a few beach-wrecked Yellow-nosed Mollymawks would be recorded from New Zealand during the last few years.

Three Stejneger's Petrels were picked up on Ninety Mile Beach (AW) in December (Table 2). Previously, three specimens had been found by patrollers: 1961, WS, December; and 1962 (2), BP (2), January (2) (Falla 1962). This petrel is known to breed only on Mas Afuera Island in the Juan Fernandez group off the coast of Chile (Falla *et al.* 1979). During the non-breeding season it migrates to the northern Pacific Ocean, where birds in moult regularly occur off Japan. All six specimens were picked up from New Zealand beaches during the petrel's breeding season, November to March (Harrison 1983), and so they were presumably non-breeders.

Three White-tailed Tropicbirds were found on Auckland West beaches in 1983. Two were on Ninety Mile Beach in March and May, and the other was on Omamari Beach in April. Only four specimens of this tropicbird have been previously recovered: 1973, BP, January; 1979 (3), TA and AW (2), February (2) and June. White-tailed Tropicbirds breed on many islands in the tropical Pacific from the Hawaiian Islands to New Caledonia (Harrison 1983). It is

TABLE 2 — Seabirds of which 1 to 15 specimens were found in 1983

SPECIES OR SUBSPECIES	NUMBER FOUND	COAST(S)	MONTH(S)
Megadyptes antipodes	9	WW, CS(3), OT(5).	JAN, FEB, MAR(2), APR(3), JUL, AUG.
Eudyptes pachyrhynchus	2	AW, OT.	JAN, MAR.
sclateri	1	OT.	MAR.
Diomedea exulans	9	AW(6), TA, CN, OI.	JAN, FEB(2), MAR, MAY, JUN(2), SEP, DEC.
epomophora	2	AW, WS.	JAN, JUL.
melanophrys	5	AW(4), WW.	JAN(3), MAR, SEP.
chlororhynchus	1	BP.	JUL.
bulleri	7	AW(7).	MAR, JUN(3), JUL, AUG, OCT.
cauta salvini	5	WW(2), BP, WS, CN.	MAR, MAY, NOV(2), DEC.
Fulmarus glacialoides	2	AW(2).	JAN, OCT.
Pterodroma spp.*	3	AW, TA, AE.	JAN, JUL, DEC.
brevirostris	12	AW(7), TA, WW(4).	JAN, AUG, SEP(7), OCT(2), NOV.
longirostris	3	AW(3).	DEC(3).
pycrofti	3	AW(2), AE.	MAR, DEC(2).
leucoptera	2	AW(2).	JAN, DEC.
Halobaena caerulea	15	AW(7), TA(3), WW(5).	JUL(3), AUG(4), SEP(4), OCT(3), DEC.
Pachyptila crassirostris	1	TA.	JUL.
Procellaria cinerea	6	AW(6).	JAN, MAY, SEP, DEC(3).
parkinsoni	9	AW(2), AE(7).	JAN(2), FEB(3), APR(3), DEC.
westlandica	7	AW(7).	JAN(6), JUN.
aequinoctialis	14	AW(13), EC.	JAN(11), SEP, NOV, DEC.
Puffinus pacificus	3	AW(2), TA.	JAN, SEP, DEC.
Phaethon lepturus	3	AW(3).	MAR, APR, MAY.
Phalacrocorax spp.*	1	EC.	NOV.
sulcirostris	1	BP.	OCT.
melanoleucos	6	AW, TA(2), BP, CS(2).	JAN, MAY, JUN(2), OCT, DEC.
Leucocarbo carunculatus chalconotus	5	OT(5).	FEB, MAR(4).
Fregata ariel	1	AW.	NOV.
Stercorarius spp.*	1	AW.	DEC.
pomarinus	1	AW.	JAN.
Larus spp.*	2	OT(2).	FEB, MAR.
bulleri	13	WW(3), EC(2), CS(6), OT(2).	MAR(5), APR, MAY, JUN(3), SEP(3).
Hydroprogne caspia	14	AW(12), AE, CN.	JAN(3), FEB(3), MAR, APR(2), MAY, JUN, JULY, AUG, DEC.
Sterna spp.*	1	CS.	APR.
albostriata	1	NC.	JAN.
fuscata	1	WW.	MAY.
Proscelsterna cerulea	1	AE.	DEC.
TOTAL	173		

* Species could not be identified by the patroller.

a regular though rare visitor to the coasts of eastern Australia, with the stragglers that reach New Zealand possibly being swept south by tropical cyclones (Falla *et al.* 1979).

A Lesser Frigate Bird picked up on Ninety Mile Beach (AW) in November (Table 2) is the second to be recorded in the Beach Patrol Scheme. The previous bird was found in January 1971, also from Ninety Mile Beach. This species straggles to New Zealand from the tropical Pacific, where it breeds on New Caledonia, Fiji, and off the Queensland coast. Between 1907 and 1970 at least 13 sightings were made of Lesser Frigate Birds from the shore of the New Zealand mainland (Kinsky 1970), mostly about the northern North Island coasts during or after tropical storms.

The Grey Ternlet found on Ocean Beach (AE) in December is the fifth specimen of this species to be recovered. Previous records are: 1974, AE, January; 1976, AW, April; 1977, AE, February; and 1980, AW, March. This tern inhabits the coastal waters of the central and southern Pacific Ocean, breeding on islands throughout its range, including the Kermadec, Norfolk and Lord Howe Islands. Flocks have occasionally been seen in northern coastal waters of New Zealand, the sightings becoming more frequent in recent years. In 1970 flocks of several hundred birds were seen roosting on and feeding about Volkner Rocks near White Island and Sugarloaf Rock near the Alderman Islands (Falla 1970). At the Kermadecs the birds nest from August to January and feed in flocks close to shore on small fish and crustaceans picked up from the surface (Soper 1969).

Three species were found in greater numbers in 1983 than in previous years. Thirty-eight White-capped Mollymawks *(Diomedea cauta cauta)* were found, mainly on Auckland West beaches (Table 3), in January and February (Table 4). The previous highest annual total was 34 in 1975. Fourteen White-chinned Petrels *(Procellaria aequinoctialis)* were picked up in 1983, whereas the previous highest annual total was nine in 1982. Most of the 1983 birds were on Auckland West beaches in January (Table 2).

Of interest is the recovery of 30 Black-winged Petrels *(Pterodroma nigripennis)* in 1983, mainly from Auckland West beaches in summer (Tables 3 and 4). Increasing numbers of this petrel have been beach wrecked since 1977. Two, one or no birds were found in each of the years 1960 to 1977, followed by eight in both 1978 and 1979, seven in 1980, 13 in 1981 and 10 in 1982. Over the past 38 years, since being found breeding on the Three Kings Islands in 1945, the Black-winged Petrel has expanded its breeding range about New Zealand. Colonies have been established or birds found prospecting on several of the islands of the Chathams group, on Aorangi Island of the Poor Knights, East Island off East Cape and Portland Island (EC) in the 1970s (Jenkins & Cheshire 1982, M. J. Imber, pers. comm.) Therefore, the incidence of beach-wrecked Black-winged Petrels would be expected to increase over the same period.

Many of this petrel's breeding islands are to the east and north of New Zealand and most sightings of it at sea have been made to the north-east of the North Island, although birds have regularly been seen over the Tasman Sea (Jenkins & Cheshire 1982). Nevertheless, 86% of the 90 Black-

TABLE 3 — Coastal distribution of the seabirds more commonly found dead in 1983

SPECIES OR SUBSPECIES	COAST														TOTAL
	AW	TA	WW	AE	BP	EC	WA	WS	NC	WD	CN	CS	OT	SD	OI	BIRDS
Eudyptula minor subspp.*	674	62	34	259	15	4	–	2	5	–	3	–	2	–	2	1062
albosignata	1	–	–	–	–	–	–	–	–	–	6	9	–	–	–	16
Diomedea spp.*	13	–	1	–	–	–	–	–	–	–	–	1	–	–	2	17
chrysostoma	16	–	8	1	–	–	–	–	–	–	–	–	–	–	–	25
*cauta subspp.**	13	–	6	–	–	–	–	–	–	–	1	–	–	–	–	20
cauta cauta	27	2	5	–	1	–	1	–	–	–	1	–	–	–	1	38
Phoebetria palpebrata	17	–	–	–	1	–	–	–	–	–	–	–	–	–	–	18
Macronectes spp.*	15	–	3	–	–	–	–	3	–	–	–	–	–	–	1	22
Daption capense	8	2	1	1	–	–	–	–	–	–	4	3	1	–	–	20
Pterodroma macroptera	44	2	3	9	2	–	–	–	–	–	–	–	–	–	–	60
lessonii	57	–	7	2	–	–	–	–	–	–	–	–	–	–	–	66
inexpectata	40	2	1	–	–	–	–	–	–	–	–	–	–	–	1	44
cookii	11	2	–	6	–	–	–	–	–	–	–	–	–	–	–	19
nigripennis	18	3	–	–	–	5	–	3	–	–	1	–	–	–	–	30
Pachyptila spp.*	111	21	306	5	–	2	–	–	11	3	–	–	–	–	2	461
vittata	15	3	13	–	–	–	–	–	–	1	2	1	–	–	–	35
salvini	18	2	4	–	–	–	–	–	–	–	–	1	–	–	–	25
desolata	39	4	2	–	–	–	–	–	–	–	1	–	–	–	–	46
belcheri	39	2	3	2	–	–	–	–	–	–	–	1	–	–	–	47
turtur	219	30	255	8	9	–	–	1	3	–	3	–	–	–	–	528
Puffinus spp.*	2	7	6	4	–	–	–	–	2	1	–	–	1	–	–	23
carneipes	38	1	2	59	2	–	–	–	–	–	–	–	–	–	–	102
bulleri	155	13	18	57	11	–	1	–	–	–	–	–	–	–	–	255
griseus	536	44	64	49	19	22	1	7	1	–	6	3	5	–	10	767
tenuirostris	150	15	38	35	1	–	–	–	–	–	1	2	–	–	2	244
gavia	248	29	27	88	24	1	–	1	–	–	1	1	–	–	–	420
huttoni	15	–	11	1	–	–	–	–	2	–	12	–	–	–	–	41
assimilis	24	1	1	7	2	–	–	–	–	–	–	–	–	–	–	35
Pelagodroma marina	15	–	–	3	–	–	–	–	–	–	–	5	–	–	–	23
Pelecanoides urinatrix	109	9	11	50	17	–	–	1	–	–	1	–	–	–	–	198
Sula bassana	217	10	6	24	11	3	–	–	–	–	1	–	–	–	–	272
Phalacrocorax carbo	2	1	4	–	–	8	–	–	–	–	–	–	1	–	–	16
varius	5	–	–	15	4	–	–	–	–	–	1	–	–	–	–	25
Stictocarbo punctatus	–	–	–	–	–	–	–	1	1	–	16	57	24	–	–	99
Stercorarius longicaudus	33	–	3	–	–	–	–	–	–	–	–	–	–	–	–	36
Larus dominicanus	168	28	77	46	8	13	1	8	1	1	30	18	13	–	2	414
novaehollandiae	33	10	9	27	7	–	–	1	1	–	50	5	6	–	–	149
Sterna striata	57	9	6	13	–	3	–	–	–	–	3	5	2	1	1	100
TOTALS	3202	314	935	771	134	61	4	28	27	6	144	112	55	1	24	5818

** Species or subspecies could not be identified by the patroller.*

winged Petrels found since 1960 have been on western North Island beaches. Presumably, this is a result of currents and winds that drive weak or dead birds ashore off the west coast more readily than off the east coast.

From observations at sea, Jenkins & Cheshire (1982) reported that Black-winged Petrels were absent from the Tasman Sea and the Pacific south of Tonga from July to late October, returned to the breeding sites in the New Zealand region during November, and were in highest numbers at sea about New Zealand in December and January. The same trend of numbers is apparent from the Beach Patrol Scheme data. During 1960-1983, 80% of the 90 petrels found were collected in December to March, and only 3% in June to October.

Wreck

Thirty-six Long-tailed Skuas were found in 1983. Only two had been found previously: 1981, AE, September; and 1982, AW, January. Of the birds in 1983, 33 were recovered from Auckland West beaches and the rest from Wellington West beaches during January (29) and February (7). This skua is a northern circumpolar breeder that makes a transequatorial migration to winter in the Southern Hemisphere. Most overwinter off the coasts of South America, but very occasionally the species is sighted in the south-west Pacific. However, because the Long-tailed Skua was so rarely seen or found along New Zealand's coast before 1980, it is worth speculating on why so many were beach wrecked in 1983.

A likely contributing factor was the occurrence in the central and eastern Pacific during the second half of 1982 of a warm-water event, commonly referred to as "El Nino" conditions. The unusual oceanographic and climatological conditions included an abrupt increase in sea-surface temperatures and changes in wind patterns, salinity, currents and sea levels (Schreiber & Schreiber 1983). Associated with these conditions, the same authors found that, at Christmas Island in November 1982, almost all of the petrels, shearwaters, tropicbirds, boobies, frigate birds and terns that normally nest there failed to breed.

Most of the birds abandoned the island, including an estimated 14 million Sooty Terns (*Sterna fuscata*), leaving many dead and starving nestlings. Schreiber & Schreiber (1983) speculated that the birds had left the island because the El Nino conditions had resulted in their prey being in very short supply. Similarly, Boekelheide *et al.* (1983) reported that the breeding success of seabirds, particularly alcids and cormorants, on Farallon Island off the California coast was very poor during the El Nino period and that important prey were absent from the diets at the time. Thus, like the birds from these islands, the Long-tailed Skua, which pirates some of its food from several other seabirds, may have been forced to search further afield for food.

December 1982 was very windy, particularly in the Tasman Sea, with predominantly northerly and westerly winds blowing on to the Auckland West coast (P. Bruce, Meteorological Service, pers. comm.) Any skuas wandering south of the central Pacific Ocean in search of food may have been forced by these winds into the Tasman Sea and towards New Zealand. During early January 1983, moderate to strong northerly and westerly winds continued to blow on to Northland, culminating in several periods of gale-force westerly winds during 13-19 January. A few days later, beach patrollers found most

TABLE 4 — Monthly distribution of the seabirds more commonly found dead in 1983

SPECIES OR SUBSPECIES	MONTH JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL BIRDS
Eudyptula minor subspp.*	159	115	119	60	45	32	55	32	25	32	35	353	1062
albosignata	1	7	-	2	2	-	2	-	1	-	-	1	16
Diomedea spp.*	3	3	6	-	-	-	-	-	1	3	-	1	17
chrysostoma	3	-	1	1	-	3	4	3	10	-	-	-	25
cauta subspp.*	1	6	1	-	1	1	7	2	-	-	-	1	20
cauta cauta	9	10	1	1	3	3	4	1	2	3	-	1	38
Phoebetria palpebrata	9	2	-	-	2	-	1	-	1	3	-	-	18
Macronectes spp.*	1	-	1	-	2	4	5	2	4	1	1	1	22
Daption capense	4	2	1	2	-	-	2	1	5	1	1	1	20
Pterodroma macroptera	22	2	2	-	1	4	5	3	5	9	2	5	60
lessonii	26	11	2	1	-	1	4	1	3	4	6	7	66
inexpectata	23	12	2	1	-	-	-	-	1	-	-	5	44
cookii	1	4	3	5	1	-	-	-	-	-	-	5	19
nigripennis	8	3	5	1	1	-	-	-	-	-	-	12	30
Pachyptila spp.*	33	255	24	4	13	18	19	10	43	6	14	22	461
vittata	2	-	-	-	5	-	4	1	1	-	-	22	35
salvini	1	1	-	-	5	5	8	2	2	1	-	-	25
desolata	1	-	-	-	17	10	10	6	-	2	-	-	46
belcheri	1	6	-	-	4	2	23	6	2	2	-	1	47
turtur	38	172	3	3	12	18	82	18	45	16	73	48	528
Puffinus spp.*	5	5	1	-	1	2	2	-	1	-	1	5	23
carneipes	14	14	31	15	6	1	-	-	-	5	8	8	102
bulleri	60	20	25	22	18	5	5	1	3	28	27	41	255
griseus	257	93	41	9	45	37	8	7	-	16	77	177	767
tenuirostris	53	6	2	7	41	3	-	2	-	-	7	123	244
gavia	41	16	53	29	9	20	33	6	26	33	55	99	420
huttoni	3	10	1	4	3	1	-	-	-	8	6	5	41
assimilis	9	6	3	1	2	3	3	-	1	1	3	3	35
Pelagodroma marina	3	-	2	-	1	2	1	1	2	1	5	5	23
Pelecanoides urinatrix	80	6	3	2	1	8	9	1	13	18	7	50	198
Sula bassana	32	64	20	8	10	10	28	5	13	18	15	49	272
Phalacrocorax carbo	1	1	3	1	2	-	-	2	3	1	2	-	16
varius	1	1	3	2	1	1	5	-	-	3	1	7	25
Stictocarbo punctatus	18	20	6	20	7	4	12	1	1	-	1	9	99
Stercorarius longicaudus	29	7	-	-	-	-	-	-	-	-	-	-	36
Larus dominicanus	23	47	83	39	49	28	34	14	26	15	29	27	414
novaehollandiae	14	24	10	6	12	5	12	8	8	4	31	15	149
Sterna striata	7	11	15	16	1	7	3	2	5	5	10	18	100
TOTAL	996	962	473	262	323	238	390	138	253	239	417	1127	5818

* Species or subspecies could not be identified by the patroller.

of the 36 Long-tailed Skuas, several of them emaciated, only recently washed or blown ashore. As well as these skuas, other seabirds from the central Pacific were also found about New Zealand in early 1983, including a Masked Booby (C. R. Veitch, pers. comm.), White-tailed Tropicbirds and a Lesser Frigate Bird.

Miscellaneous birds

Miscellaneous birds recovered in 1983, but not considered to be seabirds, totalled 216. There were 44 magpies, 21 Mallards, 20 Black Swans, 12 Rock Pigeons, 10 each of Song Thrushes and Starlings, eight each of Grey Ducks and Australasian Harriers, seven Pukekos, six each of duck species and South Island Pied Oystercatchers, five each of Paradise Shelducks, Pheasants and Goldfinches, four each of California Quail, passerine species and Blackbirds, three each of domestic geese, domestic fowl, Variable Oystercatchers, Silvereyes and Indian Mynas, two each of White-faced Herons, domestic turkeys, New Zealand Kingfishers and Skylarks, and one each of Cattle Egret, Canada Goose, Western Weka, Spur-winged Plover, New Zealand Dotterel, Eastern Bar-tailed Godwit, Knot, North Island Kaka, Eastern Rosella, Oriental Cuckoo, Long-tailed Cuckoo, Welcome Swallow, New Zealand Pipit and Chaffinch.

ALBATROSS RECOVERIES 1960-1983

The following is a summary of the coastal and monthly distributions of the various albatrosses found by patrollers during the past 24 years, except for those picked up about the Wellington coasts immediately after the "Wahine storm" of 1968 (Kinsky 1968). In total, 2401 albatrosses were found, of which 366 were not identified to species and 217 *Diomedea cauta* were not identified to subspecies. The remaining 1818 birds were made up of six *Diomedea* species, three subspecies of *D. cauta,* and *Phoebetria palpebrata* (Table 5).

Overall, a mean of 4.43 albatrosses was found for every 100 km of beach covered. Of the various coastal regions, albatrosses were found most often on Southland beaches (8.88 birds/100 km covered), followed by Auckland West (6.44), Wellington South (5.42) and Wellington West beaches (4.68). Fewer than three albatrosses were found for each 100 km of beach covered for the other mainland New Zealand coasts (Table 5).

A description is given of the coastal and monthly rate of recovery (number of birds per 100 km of beach covered) for each species and subspecies of albatross, except for the Yellow-nosed Mollymawk, which was discussed above.

The annual pattern of recovery for each species and subspecies depicted in Figure 1 was compared, by chi-squared test, with the theoretical situation whereby an equal number of birds were found each month. The chi-squared values, as shown in Figure 1, indicate that for each of the species and subspecies the monthly rate of recovery changed significantly through the year.

In some species of albatross, breeding pairs that fledge chicks do not nest in the following breeding season but remain at sea. In other species, the breeding pairs nest each year. The breeding cycle of all albatrosses, whether biennial or annual breeders, can be divided into five stages. During some

TABLE 5 — Rate of recovery (number of albatrosses found per 100 km of beach covered) of five *Diomedea* species, two subspecies of *D. cauta*, and *Phoebetria palpebrata* on each coast during 1960-1983

SPECIES SUBSPECIES	COAST AW	TA	WW	AE	BP	EC	WA	WS	NC	WD	CN	CS	OT	SD	OI
Diomedea exulans	0.61	0.18	0.16	0.08	0.19	0.38	-	0.43	-	-	0.47	0.91	-	0.35	0.46
D. epomophora	0.10	0.07	0.16	0.01	-	0.38	0.72	0.93	-	-	0.23	0.08	0.14	0.09	1.16
D. melanophrys	0.48	0.28	0.34	0.08	0.05	0.38	-	0.25	-	-	0.06	0	0.07	0.35	-
D. chrysostoma	2.04	0.14	1.20	0.09	0.10	0.19	-	0.46	-	-	0.06	0.08	-	0.44	0.46
D. bulleri	0.28	0.11	0.15	0.03	0.05	0.19	-	0.46	-	0.21	0.18	0.15	0.43	1.83	0.23
D. cauta cauta	0.91	0.78	0.95	0.04	0.14	-	0.36	0.78	0.36	0.41	0.29	0.23	0.64	1.31	0.23
D. c. salvini	0.12	-	0.11	0.06	0.24	-	-	0.78	-	-	0.35	0.15	0.28	0.09	0.23
Phoebetria palpebrata	0.66	0.07	0.09	0.11	0.10	-	-	0.18	0.18	-	0.29	0.23	-	0.09	0.23
Total*	6.44	2.46	4.68	0.72	1.01	2.30	1.80	5.42	1.62	0.82	3.05	2.57	2.34	8.88	4.64

* Includes D. spp (366), D. chlororhynchos (6), D. cauta (217) and D. cauta eremita (6)

stages birds other than the breeding adults are at the colony. The following categories (C. J. R. Robertson & the late L. E. Richdale, pers. comm.) are used in the discussion:

Breeding adults: Paired birds associated in the production of an egg
Bereaved breeders: Single birds that have bred in previous years but that have lost their mate and are not currently engaged in breeding
Birds keeping company: Adult birds that have formed pair bonds for one or more seasons before laying in a subsequent season; the pairs may consist of adults which have not previously bred, bereaved breeders, or a combination of the two.
Adolescents: Young birds that have not formed a pair bond

For the Royal Albatross (*Diomedea epomophora*), birds in each category have a slightly different time of arrival at and departure from the colony (Robertson & Richdale 1975). Breeders and birds keeping company return to the colony before and during laying. Unsuccessful breeders, bereaved breeders and birds keeping company begin leaving the colony during incubation and have all left by the end of the guard stage (when the young chicks are being guarded on the nest by parents). Adolescents, however, begin arriving during incubation, highest numbers being present just before hatching. The number of adolescents declines during the guard stage and they cease visiting the colony two and a half months after hatching occurs. For the rest of the breeding cycle until fledging, successful breeders are the only birds at the colony. Although the timing and length of the stages of the breeding cycle differ between species and subspecies, the presence of birds of the various categories at the colonies probably, for all albatrosses, follows a similar pattern to that described for the Royal Albatross.

WANDERING ALBATROSS (*Diomedea exulans*)

The taxonomic status of this species is at present under review (J. Warham & C. J. R. Robertson, pers. comm.) Although two forms are present about New Zealand (Falla *et al.* 1979), they were not distinguished by patrollers. The Wandering Albatross is a circumpolar species that nests on many subantarctic islands. It is fairly common over New Zealand seas, particularly around Stewart Island and further south (C. J. R. Robertson, pers. comm.) In the New Zealand region it nests on Antipodes, Auckland, Campbell and Macquarie Islands, but the timing of the breeding cycle differs between the islands. A successful nesting attempt lasts about a year, the adults returning to the colonies in November-December, depending on location, and their chicks fledging during December-February (C. J. R. Robertson, pers. comm.).

In total, 203 Wandering Albatrosses were found at a rate of 0.37 birds per 100 km of beach covered (Table 5). The highest rate of recovery was from Canterbury South beaches (0.91) and the lowest from Auckland East beaches (0.08). The monthly rate of recovery varied through the year ($p < 0.001$) from a low of 0.17 birds in September to a maximum of 0.66 in January (Fig. 1A). The period of high mortality in December-January coincides with the departure of local fledglings and so presumably results from the greater mortality of young birds learning to forage rather than an increased rate of mortality of adults. The increased mortality in June may be related to the

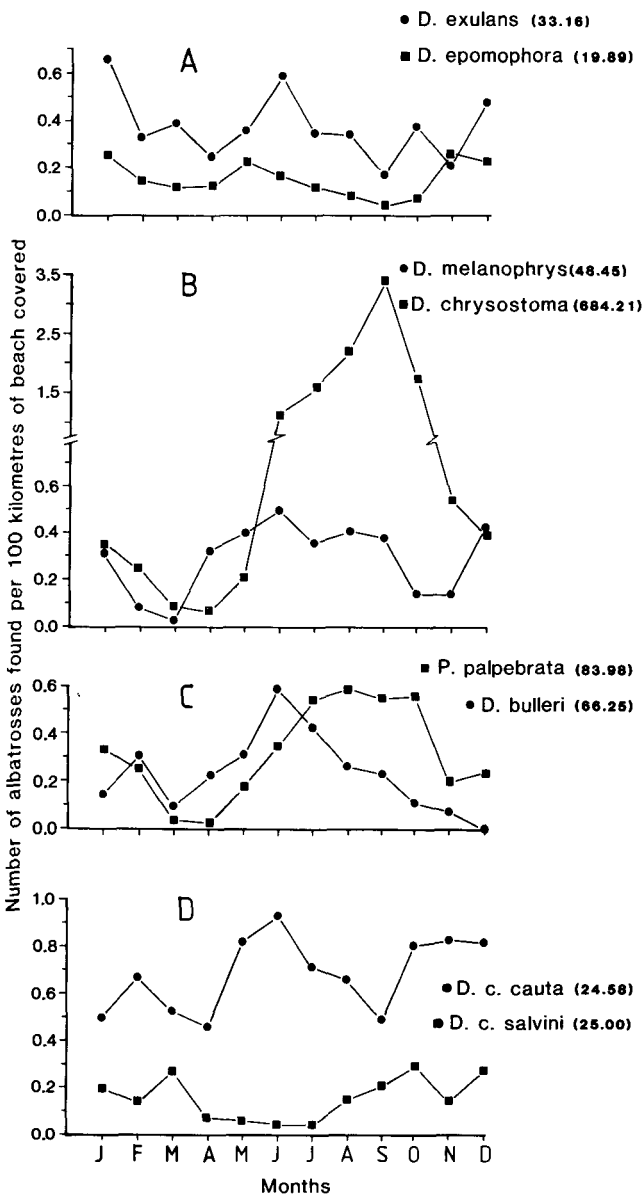

FIGURE 1 — Monthly rate of recovery (number of birds found dead per 100 km of beach covered) of five species of *Diomedea*, two subspecies of *D. cauta*, and *Phoebetria palpebrata* during 1960-1983. Figures in brackets are chi-squared values.

arrival of young birds (fledglings and adolescents) on migration from breeding colonies in the southern Atlantic Ocean.

ROYAL ALBATROSS (*D. epomophora*)

Beach patrollers usually did not distinguish between Royal Albatrosses of the northern race (*D. e. sanfordi*) and southern race (*D. e. epomophora*). The northern race breeds at Taiaroa Head in Otago and on the Sisters and Forty Fours Islands of the Chathams group, and the southern race breeds on Enderby Island of the Auckland Islands and on Campbell Island.

Eighty-one Royals were found from 1960 to 1983 at a rate of 0.15 birds per 100 km of beach covered. The highest rates of recovery were on the beaches of Outlying Islands (1.16), Wellington South (0.93) and Wairarapa (0.72) (Table 5). Although the monthly rate of recovery changed significantly during the year ($p < 0.05$), the chi-squared value is the smallest for the eight species under consideration (Fig. 1A). As for the Wandering Albatrosses, the period of greatest mortality of Royals was November to January (Fig. 1A), which coincides with laying and incubation by adults and the fledging of young of the southern race (Falla *et al.* 1979). This mortality may possibly be largely of recently fledged young, but birds in other categories probably contributed. Royal Albatrosses increase about our coasts during November-January because of adolescents moving to the colonies and bereaved breeders and those keeping company away from the colonies. Kinsky (1968) noted that both Royal and Wandering Albatrosses were more vulnerable to storm mortality when moulting. As both species have been found in heavy moult in April (Kinsky 1968), perhaps the high rate of recoveries of both species in May-June is related to moult.

BLACK-BROWED MOLLYMAWK (*D. melanophrys*)

There are two subspecies of this mollymawk. *D. m. melanophrys* is the most plentiful of all albatrosses, being a circumpolar breeder in the millions on many subantarctic islands. The main nesting islands are in the south-west Atlantic and about Cape Horn (C. J. R. Robertson, pers. comm.). In the New Zealand region, small colonies are on Macquarie and Antipodes Islands. The other subspecies, *D. m. impavida*, breeds only on Campbell Island and numbers about 75 000 pairs (Robertson 1980). The subspecific status of the 165 Black-browed Mollymawks picked up was not determined by patrollers. Overall, the average rate of recovery was 0.3 birds per 100 km of coast covered. Of the coastal regions, Auckland West had the greatest rate of recovery (0.48), followed by East Coast North Island (0.38), Southland (0.35) and Wellington West (0.34) (Table 5).

The monthly rate of recovery for the Black-browed Mollymawk changed markedly during the year ($p < 0.001$). Two periods of high mortality are evident (Fig. 1B), one from April to September and the other in December-January. At Campbell Island *D. m. impavida* starts returning in late August, most eggs being laid in late September-early October, and the young fledge in April (Bailey & Sorensen 1962, Robertson 1980). The fledglings move north to south-eastern Australian waters and equatorial Pacific regions (Robertson 1980).

Therefore, most of the Black-browed Mollymawks found on New Zealand beaches from April to June are likely to be *impavida* fledglings. The continued high mortality from July to September may be mainly of fledglings of the *melanophrys* subspecies, from colonies in the southern Indian Ocean that fledge slightly later than the *impavida* from Campbell Island.

The high rate of recovery in summer coincides with the period when successful breeders are feeding young nestlings. It is also when most non-breeding birds leave the colonies, and so more Black-browed Mollymawks than usual are likely to be moving past our northern coasts in summer than at other times of the year.

GREY-HEADED MOLLYMAWK (*D. chrysostoma*)

The Grey-headed Mollymawk was the *Diomedea* species most frequently found by patrollers and yet it is generally assumed to be a bird of the open oceans (Watson 1975). The species has a circumpolar breeding distribution and is the only mollymawk which is a biennial breeder. Almost all Grey-headed Mollymawks in the New Zealand region nest on Campbell Island (c. 11 500 pairs per annum), and only about 40 pairs nest on Macquarie Island (Robertson 1980). On Campbell Island, eggs are laid in late September to early October and the chicks depart in May (Bailey & Sorensen 1962, Robertson 1980). In total, 592 Grey-headed Mollymawks were found at a rate of one bird for every 100 km of beach covered. The highest rates of recovery were on Auckland West beaches (2.0 birds per 100 km covered) and Wellington West beaches (1.2) (Table 5).

The monthly rate of recovery changed markedly during the course of the year ($p < 0.001$). Fewest mollymawks were picked up in March-April (Fig. 1B), when only adults raising chicks are about the colonies. Presumably, the rate of recovery is high in winter largely because recent fledglings are moving through New Zealand coastal regions. In support of this suggestion, some banded as fledglings on Campbell Island have been recovered from eastern Australia (C. J. R. Robertson, pers. comm.). The continued high mortality from July to October suggests that many more Grey-headed Mollymawks than Black-browed Mollymawks spend the non-breeding season about our coasts. Adult Grey-headed Mollymawks return to Campbell Island in September (Bailey & Sorensen 1962), and so some of the beached birds found in August-September are probably adults returning to breed.

BULLER'S MOLLYMAWK (*D. bulleri*)

Two subspecies of Buller's Mollymawk are apparent (Peters 1979), which have separate breeding localities and different breeding seasons. About 26 000 pairs of the Northern Buller's Mollymawk (*D. b. platei*) breed on the Sisters and Forty Fours Islands of the Chathams group (Robertson 1974). Eggs are laid in October-November, and the young leave in June (C. J. R. Robertson, pers. comm.). The Southern Buller's Mollymawk (*D. b. bulleri*) consists of an estimated 7000 pairs nesting on Solander (2000) and the Snares Islands

(5000) (C. J. R. Robertson, pers. comm.). Eggs are laid at the Snares in January-February and the young fledge in September-October (Warham & Bennington 1983). Overall, 128 Buller's Mollymawks have been found at a rate of 0.24 birds per 100 km of beach covered. The highest rate of recovery was from Southland (1.8 birds), Wellington South (0.46) and Otago beaches (0.43) (Table 5). Southland beaches are the closest to the breeding islands of Solander Island and the Snares.

The monthly rate at which Buller's Mollymawks were found changed significantly during the year ($p < 0.001$), with a June peak in recoveries (Fig. 1C). All beach-wrecked specimens of Buller's Mollymawk that are in museums are the southern subspecies (C. J. R. Robertson, pers. comm.). As most Buller's Mollymawks found beach-wrecked are from Southland beaches (Table 5), presumably they are mainly birds from the Snares. If so, the peak in recoveries in June is possibly related to the movement of adolescents away from the colonies. In future, specimens of Buller's Mollymawk found, particularly on North Island beaches, in suitable condition for identification should be kept for critical examination as to subspecies.

WHITE-CAPPED MOLLYMAWK (*D. cauta cauta*)

The White-capped (Shy) Mollymawk has two forms that recent field studies suggest should be considered as different subspecies (C. J. R. Robertson, pers. comm.). The nearest colonies of this mollymawk to New Zealand are on Disappointment, Auckland and Adams Islands of the Auckland Island group, where about 64 000 pairs nest (Robertson 1975). Its breeding has not been studied in detail, but it is estimated that laying begins in late November and that the chicks fledge in August (C. J. R. Robertson, pers. comm.). The nominate form of this mollymawk, of which there are only about 5000 pairs, breeds on Albatross Rock in Bass Strait and on the Mewstone and Pedra Branca Islands south-west of Tasmania (C. J. R. Robertson, pers. comm.). At these colonies laying occurs in September (Robertson & van Tets 1982) and the chicks depart in April (C. J. R. Robertson, pers. comm.).

The White-capped Mollymawk was the second most beach-wrecked albatross after the Grey-headed; 372 were reported. As for Buller's, the rate of recovery was greatest for Southland (1.3), followed by the three western North Island regions (Table 5). This pattern is to be expected because most nest on the Auckland Islands to the south of Southland. For all coasts over the 1960-1983 period, this mollymawk was found at the rate of 0.7 birds per 100 km covered.

The monthly rate at which the mollymawk was beach-wrecked varied during the year ($p < 0.05$), with peaks of mortality in May-June and October-December (Fig. 1D). The departure of young from the Auckland Island colonies in August may account for the increased recoveries in October-December. If it does, however, the mortality is unexpectedly low in September, directly after the nestlings have fledged. As suggested for some of the other albatrosses, the October-December mortality, which coincides with laying and incubation by breeders, may be as a result of the movements of unsuccessful and bereaved

breeders from the colonies towards New Zealand and the opposite movement of adolescents.

During the peak of recoveries in May-June, only adults feeding large chicks may be present about the Auckland Islands. However, the location of non-breeding birds is as yet unknown. This May-June mortality may be high because *Diomedea* species are vulnerable to storms when moulting. All 45 White-capped Mollymawks found beach-wrecked in April 1968 after the "Wahine storm" were in full moult (Kinsky 1968).

SALVIN'S MOLLYMAWK (*D. c. salvini*)

Eighty-three Salvin's Mollymawks were found during 1960-1983 at a rate of recovery of 0.15 birds. Although the species breeds on the Western Chain Islets of the Snares (Miskelly 1984) and on the Bounty Islands (Robertson & van Tets 1982) to the south and east of New Zealand respectively, it has been found beach-wrecked mostly along the Wellington South Coast (0.78), not on Southland beaches (0.09) as might be expected (Table 5). Almost all of the approximately 77,000 breeding pairs of Salvin's Mollymawk nest at the Bounties (Robertson & van Tets 1982, Miskelly 1984).

The monthly rate of recovery of this mollymawk changed during the year ($p < 0.01$), with increased mortality in September-December and March (Fig. 1D). The spring mortality coincides with laying through to the raising of young chicks. At this time, adolescents are at the colonies, taking part in courtship activities. Thus, the increased mortality of Salvin's Mollymawk about the New Zealand coast in spring may be a result of the return and departure of these less experienced birds. Kinsky (1968) noted that all three specimens of this species picked up in February 1947 were in full moult. Therefore, the peak in mortality of Salvin's Mollymawk in March may result because it is moulting then and more vulnerable to storms. Unlike the other mollymawks, Salvin's Mollymawk does not show a higher mortality soon after the chicks leave in April (Oliver 1955), perhaps because it disperses widely away from New Zealand to the South Atlantic and South Pacific coasts of South America (C. J. R. Robertson, pers. comm.).

CHATHAM ISLAND MOLLYMAWK (*D. c. eremita*)

This mollymawk breeds only on Pyramid Rock of the Chatham Islands group, where about 4000 pairs nest (C. J. R. Robertson, pers. comm.). Its distribution at sea is probably into the southern Pacific Ocean because it is rarely seen in New Zealand coastal waters. Presumably because of its rarity in New Zealand coastal waters and its small population, only six Chatham Island Mollymawks have been found by patrollers, three of them on Chatham Island beaches in January 1979. The details for the other three are 1964, AW, August, and 1971 (2), WW and BP, September and December.

LIGHT-MANTLED SOOTY ALBATROSS (*Phoebetria palpebrata*)

This albatross has a circumpolar distribution, breeding on several subantarctic islands. In the New Zealand region, an estimated 5000-10 000 pairs breed on the Auckland, Antipodes, Campbell and Macquarie Islands

(C. J. R. Robertson, pers. comm.). In total, 182 Light-mantled Sooty Albatrosses were found during 1960-1983, the rate of recovery being 0.34 birds.

Instead of being found mainly on Southland beaches (0.09 birds), as would be expected from its southern breeding distribution, it was beach-wrecked most often on Auckland West beaches (0.66 birds) (Table 5). Perhaps Sooty Albatrosses from outside the New Zealand region are washed ashore on New Zealand beaches more often than those from our subantarctic islands. The rate at which Sooty Albatrosses were found each month changed markedly during the year ($p < 0.001$). The rate of recovery increases steadily from almost zero in March and April to about 0.55 birds during July-October, after which it declines (Fig. 1C). This species returns to Campbell Island to breed in early October, lays in late October-early November and the young leave in late May-early June (Bailey & Sorensen 1962).

The greater mortality of Sooty Albatrosses on our beaches from April to July is perhaps mainly of recently fledged young that, being poor foragers, die from starvation or in storms. It is not known whether the high mortality that continues from July to October is of Sooty Albatrosses from colonies outside the New Zealand region moving into our coastal waters or of birds from the colonies near New Zealand remaining about our coasts in winter.

The future

The discussion of the results shows that the movements and distribution at sea of most local albatrosses are poorly known. Beach patrollers can do a lot to help answer much of the speculation put forward. Whenever possible, it is important to state whether a beach-wrecked albatross is a juvenile or an adult and whether it is moulting primaries and secondaries or not. Whenever you find a fresh specimen of a species whose subspecific status is of interest, for example, *D. melanophrys* and the *D. cauta* group, the specimen should be frozen, if possible, and sent to a museum for such a determination.

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SHORT NOTE

Mouth-Spots in nestling Fernbirds

The relationships of the endemic Fernbird (*Bowdleria punctata*) are obscure, but this species is usually associated with either the Old World warblers (Sylviidae) or Australo-Papuan warblers (Acanthizidae). Plumage and morphology suggest a relationship with the grassbirds (*Megalurus*), a genus of sylviid warblers.

In a comparison of the mouth-spots of nestling Australian songbirds with those from other parts of the world, Boles & Longmore (in press) found that no Australo-Papuan warbler they examined had mouth-markings but that all Australian species of Old World warblers, including both species of *Megalurus*, had markings of the tongue.

A photograph by Moon (1979) clearly shows the inside mouth of a nestling Fernbird. There are two spots at the base of the tongue and one on the tip (Fig. 1). Reed warblers (*Acrocephalus*) and cisticolas (*Cisticola*) have only the two spots at the base of the tongue. A three-spot pattern like that of the Fernbird is found in the Little Grassbird (*M. gramineus*). The Tawny Grassbird (*M. timoriensis*) also has this pattern but with the addition of black edging to the internal nares (Boles & Longmore, in press: fig. 1e).

This supports the inclusion of *Bowdleria* in the Sylviidae and a relationship between this genus and *Megalurus*.

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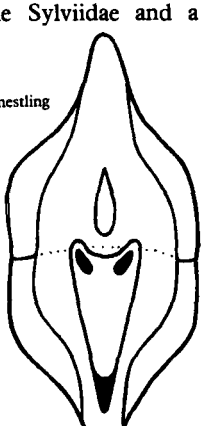

FIGURE 1 — Mouth-markings of nestling Fernbird and nestling Little Grassbird

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