THE LESSER PETRELS OF ANTIPODES ISLANDS, WITH NOTES FROM PRINCE EDWARD AND GOUGH ISLANDS

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ABSTRACT

In 1978 at Antipodes Islands, breeding was confirmed and distribution of breeding sites was investigated for Snares Cape Pigeons *(Daption capense australe)*, Subantarctic Fairy Prions *(Pachyptila turtur subantarctica)*, Soft-plumaged Petrels *(Pterodroma mollis mollis)*, Subantarctic Little Shearwaters *(Puffinus assimilis elegans)* and Grey-backed Storm Petrels *(Garrodia nereis)*. Breeding seasons, habits and habitats at Antipodes Islands of petrels not exceeding White-chinned Petrels *(Procellaria aequinoctialis)* in size are described. Notes are included from Prince Edward and Gough Islands on some of these species studied in 1979.

INTRODUCTION

The Bounty - Antipodes - Auckland - Snares Islands (BAAS) Expedition of 1 November to 8 December 1978 was sponsored by the New Zealand Department of Lands and Survey and the New Zealand Wildlife Service, and supported and serviced by the Royal New Zealand Navy through its frigate HMNZS *Waikato*. From 20 November to 6 December I was on Antipodes Islands (49°41'S, 178°48'E), studying the breeding Hydrobatidae, Pelecanoididae and Procellariidae, except Northern Giant Petrels *(Macronectes halli)*. Whereas the University of Canterbury Expedition had worked only on the main island from 28 January to 12 March 1969 (Warham & Bell 1979), the BAAS Expedition took place earlier in the breeding season of many species, had two boats for visiting neighbouring islets and for coastal surveys, and undertook more subterranean investigations.

In 1979, I took part in the expeditions to Prince Edward Island, from 12 to 16 September, and to Gough Island, from 30 October to 12 November, by the Percy Fitzpatrick Institute of African Ornithology, University of Cape Town. Some results of these expeditions are in press (Berruti *et al.*, Williams & Imber). Information that I present here relates to matters particularly relevant to observations on Antipodes Islands.

Of the three islands Prince Edward is the coldest, Gough the wettest and Antipodes probably the driest because of its low altitude. Vegetation is influenced accordingly: Prince Edward has sparse oceanic tundra vegetation; ferns predominate on the lowlands of Gough and

NOTORNIS 30: 283-298 (1983)

tussock grassland on Antipodes. Antipodes and Gough have a shrub each: *Coprosma* on Antipodes grows to 2-3 m, *Phylica* on Gough grows to 4-5 m and is a prominent feature of the lowlands. Tundra vegetation occurs on Antipodes above about 300 m and on Gough above 500 m. The avifaunas of the three islands are likely to vary according to their different oceanographic and geographic positions and geological ages (Table 1).

METHODS

As most of the breeding petrels of Antipodes Islands are nocturnal in their visits to land (except Cape Pigeons, Northern Giant Petrels, Fairy Prions, and some White-chinned and Grey Petrels), our daytime observations concentrated on skua-killed remains and on burrow and nest surveys. We used hand-held spotlights at night to identify and bring down petrels flying overhead. Many were also brought down by outside lights at our base camp. On Antipodes Island I prepared

TABLE 1 — A comparison of geographic, oceanographic and geological features of Antipodes, Prince Edward and Gough Islands

Islands	Antipodes	Prince Edward	Gough
Ocean	South Pacific	Indian	South Atlantic
Co-ordinates	49° 41'S, 178° 48'E	46° 38'S, 38°E	40° 20'S, 9° 55'W
Area (ha)	2025	4400	6500
Altitude (m)	404	672	910
Islets[a]	7[b]	nil	c. 13
Distance south of STC[c] (km)	600	c. 500	0-300
Distance north of AC[d]	1000	c. 200	1000
Origin	volcanic	volcanic	volcanic
Approx. age (my) [e]	less than 1	up to 0.3	almost 5

a Large enough to have potential for nesting by birds

b Bollons Island covers about 57 ha

c Subtropical convergence

d Antarctic convergence

e million years

study burrows for observing breeding habits of Soft-plumaged and White-chinned Petrels by digging a shaft to the side of the nest chamber and fitting a peat lid. No desertions were noted.

A clinker-built boat was used at Antipodes Islands for surveying petrels nesting in the coastal cliffs, and the main island was circumnavigated on 29 November 1978. An inflatable boat was also used to visit the lesser islands. We visited Bollons, Archway and inner Windward Islands. Leeward, Orde Lees and the outer pair of Windward Islands are inaccessible, except by helicopter and, perhaps, to experienced rock-climbers.

RESULTS AND DISCUSSION

SNARES CAPE PIGEON *Daption capense australe*

Oliver's (1955) report that Cape Pigeons breed " in large numbers on Leeward Island " is not supported by a reference and seems to have been conjectural and exaggerated. Though suspected, breeding was not confirmed by Warham & Bell (1979). First, R. Wahrlich found an isolated nest, with an egg being incubated in late November, on a ledge behind the Anchorage Bay penguin colony. The main breeding concentration was on the north side of Archway I., where we counted about 80 occupied sites on 29 November. On the same day, while circumnavigating the main island, we mapped breeding or prospecting sites (Fig. 1). The total breeding population was probably c.300 pairs, if breeding was taking place at most sites occupied. Most sites were in niches in cliffs but some were in sheltered spots near the top of islets and stacks. Birds were regularly seen in groups on the sea where, as they were often pecking at the surface, they were probably feeding on zooplankton.

SUBANTARCTIC FAIRY PRION *Pachyptila turtur subantarctica*

I agree on ecological grounds (1981) with Harper (1980) in recognising the validity of this subspecies, described by Oliver (1955) from these islands. Breeding at Antipodes Islands, presumed by Oliver, required confirmation (Warham & Bell).

We saw Fairy Prions commonly flying around the coasts of Antipodes Island at any time of day. They were concentrating around suitable nesting habitat (rock falls and caves eroded by the sea), which we mapped during the Cape Pigeon survey (Fig. 1). Incubating birds were seen in a cliff-base rock pile in Anchorage Bay and in a cave at the head of an inlet on the west coast just south of North Cape. During our circumnavigation I landed and entered this cave. Its floor comprised large sea-worn boulders, and the prions were nesting among these, at risk of flooding by an exceptionally high tide. I withdrew one bird and its egg, precariously placed on a little debris lodged between two boulders. Its chattering protests evoked responses from several neighbours, by which I estimated there were up to 20 nests in the cave.

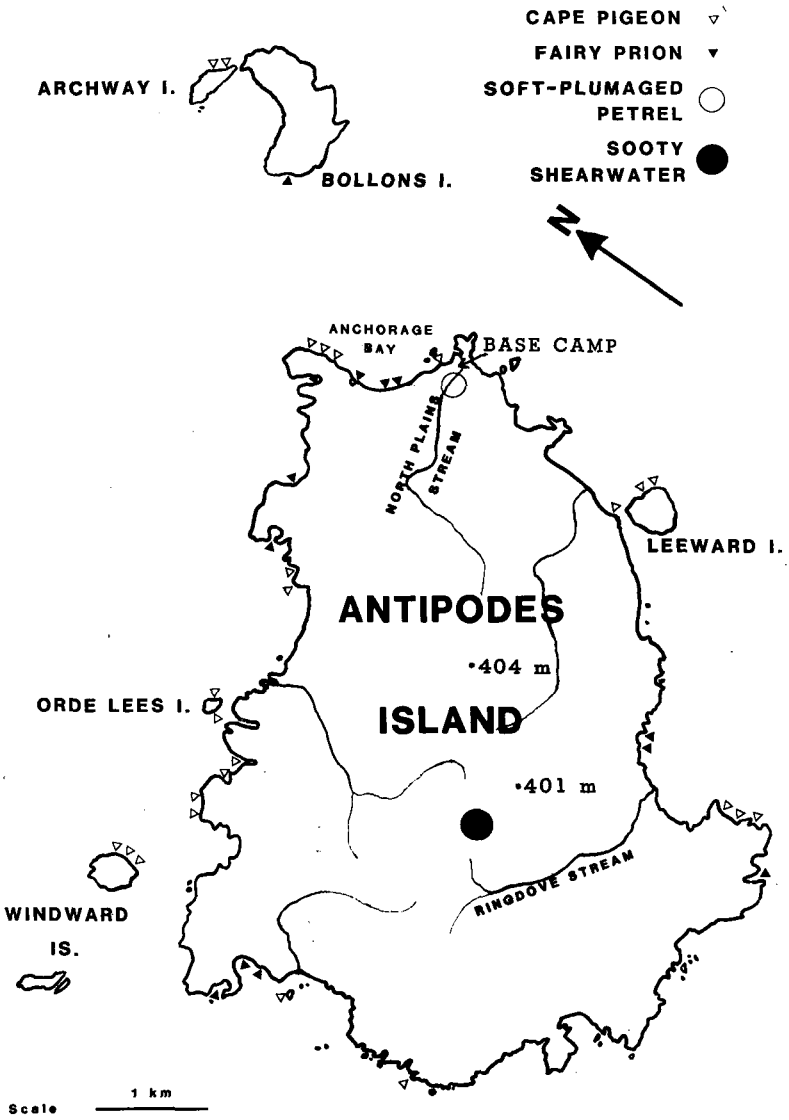

FIGURE 1 — Antipodes Islands and the breeding sites of some less abundant petrels

Prions flying around these nesting sites by day seemed to be non-breeders, as only rarely was one seen to land and scramble quickly for cover. One pair of Southern Skuas *(Stercorarius skua lonnbergi)* had their territory near the colony in Anchorage Bay and were taking some but most prion colonies seemed secure from skuas. Prions were not important in the diet of skuas here, mainly because prions were scarce and inaccessible, and this partly explains the low breeding success of skuas and their attacks on larger petrels (Moors 1980).

Prions were captured by light at night at base camp and in Ringdove Valley, two being collected for the National Museum. These and about 20 skulls discarded or regurgitated by skuas I identified as Subantarctic Fairy Prions by their small bills with moderate unguis set well forward of the nostrils, and their pale faces. One regurgitated two Pteropoda and two small fish, *Maurolicus muelleri.*

At Prince Edward Island on 16 September a few prions were seen flying around the mouth of a coastal cave. One came close enough for the small bill and wide dark tail-tip to be seen, but they might have been either *P. turtur* or *P. crassirostris.* However, only the Subantarctic Fairy Prion is known from nearby Marion Island, where it breeds in the coastal zone in much greater numbers than previously realised (Berruti 1981). As elsewhere, its strictly coastal nesting and rather brief period of diurnal activity inshore (September-December) have disguised its status.

WHITE-HEADED PETREL *Pterodroma lessonii*

This is one of the most abundant breeding petrels at Antipodes Islands, but our surveys showed that very few breed on the lesser islands visited (Bollons, Archway, inner Windward). It is the main prey of Southern Skuas on the main island (Moors 1980). The expedition took place largely during the prelaying absence of breeders, and so I did not prepare any study burrows. Burrows examined casually, by probing from the entrance or accidentally broken into, had prepared nests but no eggs and usually no birds. Cephalopods and mysids were food items I recorded.

SOFT-PLUMAGED PETREL *Pterodroma mollis mollis*

This species was first discovered in the South Pacific Ocean during the previous expedition (Warham & Bell). Breeding was not then confirmed, and so this was one of my main objectives. Brooke *et al.* (1981) have separated the southern populations of this species into two subspecies, the typical one breeding only at Gough I. and in the Tristan da Cunha group, and *P. m. dubia* reportedly breeding at Marion, Prince Edward, Crozet and Antipodes Islands. However, the Antipodes birds are the pale-mantled *mollis,* not the darker form *dubia.* This is evident in the photograph in Warham & Bell and I found no variation in plumage of the 22 I handled, of which I banded 20.

The burrows were at the head of the small valley in which base camp is situated (Fig. 1). There the vegetation attains 2 m height in places, comprising mainly *Polystichum* fern and *Poa* tussocks with patches of *Coprosma antipoda*. Burrows were dug into peat so porous that I could dig observation holes merely by forcing my hand through it, and they were mainly 1-1.5 m long, curving and quite dry. Soft-plumaged Petrels were the main species breeding in this area, although there were some White-headed Petrels, few Grey Petrels and some White-chinned Petrels on the periphery. This is where the previous expedition caught these petrels but did not find their burrows (J. Warham, pers. comm.).

Because of the density of the vegetation there I was unable to census the burrows but, comparing the area in which I worked (which held 14 burrows) with the total area over which Soft-plumaged Petrels were active at night, I estimated a maximum of 50-100 burrows in the colony. All burrows seen were in use and one of my 11 study burrows was being newly dug. Two of the nine prebreeders caught on the night of 4 December had earth on their bills, showing that they had been digging. All these signs gave me the impression that, although small, the colony was expanding.

Because the colony is in tall vegetation, these petrels are almost immune from Southern Skuas. However, three recent corpses were found in a skua territory on North Plains immediately adjacent to this valley. Warham & Bell found no corpses. Either skuas had gained access along our track from base camp to North Plains, or the colony was expanding and some prebreeders were prospecting beyond the safety of the valley. We found no evidence of Soft-plumaged Petrels anywhere else, through remains of skua kills, calls heard at night, or burrows of appropriate size.

I inspected study burrows daily between 22 November and 5 December, except on the 26th, 29th, 2nd and 3rd. All but two had recently made copious nests of fern fragments and grass. I covered entrances with fern twigs and found that five nests were not visited during the period of study, two were visited by the apparent male for two and three consecutive days, and pairs visited the other two nests. Each pair spent at least two consecutive days in the burrow. The last inspection, on 5 December, revealed no eggs. These observations indicate that most pairs were on their prelaying absence and that laying might have begun soon after our departure. I have observed (1976) a similar pattern of behaviour in Grey-faced Petrels *(P. macroptera gouldi)* where, after mating, both depart but the male returns alone for a few days before both are continuously absent until laying. As Soft-plumaged Petrels are smaller, and summer breeders, their prelaying absence is likely to be shorter than the 7-9 weeks of Grey-faced Petrels but probably as long as the 4-5 weeks of Cook's Petrels *(P. cookii)* (pers. obs.). Thus some females, such as the one I observed on the nest with her mate on 1 December,

probably do not lay until early January. Main laying in December was also implied by Despin *et al.* (1972) for Soft-plumaged Petrels on East I., Crozet Islands.

All petrels handled were in the final stages of moult. Most had to complete moult of the upper wing-coverts and had the outermost primary not fully grown. One showed tail moult and another still had the old outermost primary. Thus, moult takes place just before rather than just after the breeding season, as it does also in White-headed Petrels (Warham 1967; pers. obs.). All had downy incubation patches, which is consistent with absence of eggs in the study nests.

Most birds found in burrows, all presumed to be breeders, were weighed and found to be heavier than those weighed by Warham & Bell, which I think were mainly prebreeders. Thus three presumed males weighed 288, 322 and 327 g and a presumed female 305 g, sexed by the criteria I established for Grey-faced Petrels (1971).

At Prince Edward Island in mid-September Soft-plumaged Petrels had just begun re-occupying burrows after their winter absence. Courtship activity was in full progress at Gough Island in early November.

GREY PETREL *Procellaria cinerea*

The breeding season of this winter breeder was nearly finished when I arrived on Antipodes Island. Many large burrows were empty but infested with fleas, and so Grey Petrel fledglings had presumably vacated them recently. We last saw an incoming adult flying among the White-chinned Petrels on the evening of 21 November. A fully fledged chick was found in a burrow on top of Bollons Island on 29 November. A freshly killed chick with downy tips to many of its wing coverts, which was found in Ringdove Valley on 1 December, probably would not have departed until about 10 December. Most chicks leave in late October and early November (Warham & Bell).

At Gough Island, where the breeding population is sparsely scattered about the uplands above 400 m, I saw no live Grey Petrels during early November, but remains of a few skua-killed fledglings showed that departures were in progress. Swales (1965) reported a similar chronology of breeding activities at Gough Island to that at Antipodes Islands, including a late fledgling on 10 December.

At Prince Edward Island on 14 September, we saw a pair of skuas molesting a fully fledged Grey Petrel which presumably had been preparing to leave by day. We intervened and, when launched, the chick flew strongly out to sea. Adults were still arriving at dusk to feed younger chicks during our visit.

At Tristan da Cunha, Elliott (1957) noted that laying extended from early in April to well into June. He saw a fully fledged chick on 15 September which had hatched before 6 June. At Kerguelen, Paulian

Little Shearwaters were very common between Bounty Islands and Antipodes Islands on 20 November (Jenkins 1981). Although it seemed that a considerable breeding colony awaited discovery, we found no evidence of breeding on Antipodes Island. By a pond on North Plains, frequented by non-breeding skuas, I found regurgitated skulls, but nowhere else on the main island did we see remains. Their occurrence over base camp at night was inconsistent, and only on our last night ashore, when thick mist descended, were many seen. However, we found that Bollons, Archway and inner Windward Islands were almost monopolised by dense colonies of this shearwater. There were few other burrowing petrels, except Grey Petrels on top of Bollons Island. An indication of the extent to which Little Shearwaters predominated is given by skua-killed remains: 94% of 202 recent petrel remains from islets were this species, the others being Grey Petrels and a Black-bellied Storm Petrel.

On Bollons Island on 29 November I could reach many nests from the entrance, burrows being often 0.5-1.0 m long, rarely up to about 2 m. All were quite dry, largely because the island is steep. I found chicks in about half the burrows explored and withdrew eight for examination. The youngest, about 3 days old, was still guarded by a parent. Most were much larger and downy without sign of feathers. The oldest showed growing wing quills. Thus, hatching had occurred between 20 October and 26 November. I assumed a fledging period of 70-75 days and an incubation period of about 52 days for this species (Glauert 1946) in deducing that laying had occurred between the end of August and early October, probably with a peak around 10-15 September, and that departures would take place between the end of December and mid-February.

I examined the five specimens in the National Museum collected on the night of 27 February 1969 by the previous expedition (Warham & Bell). They are neither recently fledged young nor adults that had just reared young (which would have been in worn plumage or in moult) but are recently moulted adults (one with short outer primary) and their fine bills indicate youthfulness. Glauert (1946) and Jouanin (1964) observed the return of birds to the breeding grounds within one to two months of the departure of fledglings, which explains the captures reported by Warham & Bell. It appears that prebreeders and possibly failed breeders return to Antipodes Islands within one month of departure of the last of the young, in what Jouanin (1964) has termed protogamic behaviour.

The breeding population at Antipodes Islands must amount to some multiple of 10^5 pairs and is therefore the largest population of this species in the New Zealand region. At Auckland Islands, Little Shearwaters frequent the sheltered fjords during winter months (the late R. A. Falla, pers. comm.). As they were thought to be winter breeders these occurrences were considered to indicate local breeding (Falla 1965) but, despite considerable biological research

at Auckland Islands in the last decade, no such evidence has been found. These winter sightings are more likely to have been of visitors from Antipodes Islands, possibly exploiting a temporary food such as sprats *(Sprattus antipodum)*, which occur off Auckland Islands and spawn mainly in winter (Baker 1973).

Jehl (1973) compared specimens of Subantarctic Little Shearwaters collected in the eastern South Pacific off Chile in June 1970 (the first reported from near the west coast of South America) with specimens of known origin. He considered them most like specimens collected near Antipodes Islands. Although there may be breeding colonies off the Chilean coast, there may also be a partial migration of Antipodes birds across the South Pacific. Solander's unpublished *Procellaria munda* was a Little Shearwater collected on Cook's first voyage further west of Chile near 48°S, 93°W (Bourne 1959).

Little Shearwaters have not been seen ashore alive at Marion or Prince Edward Islands, but a flock of over 100 was close to the latter in November 1977 and a skua-killed corpse was found ashore (Williams & Burger 1978).

At Gough Island the breeding season of this species had not been determined, although Swales (1965) considered it to be in the winter. The only evidence I found of Little Shearwaters around the Base at Transvaal Bay was a few skua-killed corpses. As Swales reported them abundant in the Glen, over 3 km to the north-west, an opportunity to search for burrows came when W. R. P. Bourne and I spent 8-11 November there. I examined burrows in a fern-clad slope opposite the old Base, in wet peaty soil. After hours of delving I had checked about 12 burrows of Broad-billed Prions *(Pachyptila vittata)*, all empty but for remains of eggs and three small dead chicks; four of Diving Petrels *(Pelecanoides urinatrix)*, whose nests I did not try to reach; two of Soft-plumaged Petrels, empty with nests; and four of Atlantic Petrels *(Pterodroma incerta)*, one with a live chick, one with a dead chick and two empty. Later, however, I found three Little Shearwater burrows. As at Antipodes Islands, they were quite short (0.4-1.0 m long) and in dry situations, one beside a volcanic dyke and two under *Spartina arundinacea* (which grows 2-3 m high in the form of bamboo-like tussocks). All contained incubating birds and one egg was pipped; so hatching would have occurred from 10 November. Thus, the breeding season is in spring at both Antipodes and Gough Islands, and it was possibly later at Gough in 1979 than at Antipodes in 1978. I did not measure the eggs.

It is difficult to understand the reported absence of Little Shearwaters at the Glen in November-December 1955 (Swales 1965) in view of their breeding season and conspicuousness at night in early November 1979. The increasing frequency of sightings reported by Swales from 10 January was almost certainly caused by departing fledglings and, especially in early April, by protogamic behaviour.

The stomach contents of a chick from Bollons I. comprised euphausiids and small squids (juveniles of *Nototodarus* sp.). An adult's stomach from Gough Island also contained remains of juveniles of the common local ommastrephid squid (*Todarodes* sp.).

GREY-BACKED STORM PETREL *Garrodia nereis*

As breeding at Antipodes Islands had not been confirmed, I spent several hours on 24 November searching for nests in tall coastal tussock near base camp but found only three then: one with a bird incubating (egg 31.6 x 23.3 mm, 9.0 g) was against a rock outcrop overhung by grass, and the other two were among the mostly dead stalks of *Poa litorosa* tussock bases and were empty. On the night of 25 November a female about to lay, weighing 41 g, was caught. P. J. Moors found shell of an egg eaten by mice *(Mus musculus)*. These storm petrels were common at night around base camp but less numerous than Black-bellied Storm Petrels in Ringdove Valley. We found a corpse on Bollons I. I heard calling (a monotonous regularly repeated chirping) from a few nest sites, one such bird having a nest 0.5 m above the ground against a *Polystichum* fern trunk in a pile of vegetation cleared from the site of the new hut. The one stomach I examined contained remains of young barnacles.

Breeding is likely on Prince Edward Island because we observed a bird calling by a *Carex* tussock. At Gough Island possibly these storm petrels breed on the cliffs or on islets and stacks, about 13 of which seem sufficiently vegetated. Clancey (1981) recorded a female about to lay taken at Gough Base on 28 October. The long wings and tails he reported for five females are due entirely to sexual dimorphism in wing and tail dimensions (my unpubl. data).

BLACK-BELLIED STORM PETREL *Fregetta tropica*

Breeding at Antipodes Islands had not been confirmed (Warham & Bell). We saw these petrels regularly at base camp at night but found no evidence of breeding in its vicinity. However, in Ringdove Valley on 1-2 December I found them to be numerous and discovered burrows in stream banks and in hummocky peaty ground. Some adults had been killed there by skuas. On 1 December one landed near me soon after dusk and entered a burrow going deep into a bank. To judge by the abundant filoplumes on its head and neck it was a male, and its incubation patch was partly bare. I heard no calls. On reflection I regret not having determined the contents of nests in the burrows in Ringdove Valley. We found remains of one bird on Bollons Island.

Black-bellied Storm Petrels had been rarely seen at Marion and Prince Edward Islands until 1974-1977, when several visits were made to the latter (Williams & Burger 1978), and evidence of breeding was not found until our visit to Prince Edward Island (Berruti *et al.* 1981). On our first night ashore, 12 September, several were

seen and heard near our camp at Cave Bay. The call was a far-carrying whistle (Beck & Brown 1971) uttered from the burrow entrance or nest. The whistle of one bird, sitting at the entrance to a burrow running into a bank, was of such power and pitch that it was physically painful to my ears 5 m away. On 15 September, while surveying burrows on the south-east slope, I heard a repeated whistle at midday coming from among jumbled rocks of a sparsely vegetated, geologically recent lava flow. This flow, spreading south-east from Wolkberg Peak, covers several hundred hectares, providing an extensive area of nesting habitat for this petrel. Although we could not find the ventriloquist, we found a mummified fledgling in an old nest and several nests newly prepared. These were under basalt blocks and in rock piles. Mosses had been plucked to make the nests. That nests were common in the small area searched suggests a very large breeding population there.

It appears that these storm petrels returned to Prince Edward Island at the beginning of September. Beck & Brown (1971) found that about 5 weeks elapsed between the return and the beginning of laying at Signy Island, and such an interval seems typical for storm petrels (pers. obs.). Thus, laying should begin on Prince Edward Island about mid-October, two months earlier than recorded for this species.

Little is known of the breeding season. Beck & Brown studied a small population (c.200 pairs) south of the Antarctic convergence where laying began after mid-December. At colonies in the sub-antarctic zone (Prince Edward, Crozet, Auckland and Antipodes Islands) breeding might be earlier but the information amounts to two eggs found on 1 February at Auckland Islands and considered recently laid (Oliver 1955). Perhaps these were late layings because the span of laying dates in storm petrels, other than those breeding at high latitudes, is usually protracted: about 2 months in White-faced Storm Petrels *(Pelagodroma marina)* (Richdale 1943, pers. obs.) and over 3 months in Grey-backed Storm Petrels (pers. obs.). Possibly laying extends from mid-October to mid-January at Black-bellied Storm Petrel colonies in the subantarctic zone. This needs to be investigated.

The absence of whistling on Antipodes Island in late November and early December may be significant. The whistle had been heard in early November 1950 (Warham & Bell). The call of the Grey-backed Storm Petrel is analogous to that of the Black-bellied Storm Petrel in being an advertisement of availability for mating (pers. obs.). Furthermore, in the former, calling seems restricted to the courtship period of pairs the females of which lay that season (pers. obs.). If Black-bellied Storm Petrels behave similarly, absence of whistling could indicate that the courtship period of breeders had finished by the end of November.

Bourne (1962), Watson (1975) and Jouanin & Mougin (1979) recorded Gough Island as the breeding place of a white-bellied race,

F. t. melanoleuca, of the Black-bellied Storm Petrel. No nest of *Fregetta* has been found there, but Swales (1965) reported an egg laid in captivity by what he identified as a White-bellied Storm Petrel *(F. grallaria).*

At Gough Island I saw no *Fregetta,* dead or alive, until we ascended to Gony Dale (500 m a.s.l.) to survey the Procellariiformes breeding high up. On 6 November, in little more than an hour of darkness between dusk and moon-rise, we heard at least five storm petrels whistling near our camp in upper Gony Dale. The whistle was similar to that heard on Prince Edward Island and the ventriloquism foiled our attempts to catch more than one bird. It had an entirely white abdomen, prominent white edgings to the mantle feathers, showed no moult, and had a downy incubation patch. Measurements were bill 14.4 mm, wing 163, tail 78, tarsus 39.8, and mid-toe plus claw 24.5. Next day I searched the slopes for nest sites but found none. Most of the terrain was waterlogged peat, and the most likely places for storm petrels' nests were isolated rock piles, but I found no evidence of nest-making at those I inspected. The storm petrel we caught, and another seen, were both on marshy ground far from potential nesting habitat. On the night of 7 November, which was cool and windy, none was heard in Gony Dale and we spent no further nights up there.

Probably these storm petrels were just returning to breed. Clancey (1981) reported one returning on 31 October, and Swales (1965) reported an egg laid on 12 January. The breeding season may thus be much later than that of indisputable Black-bellied Storm Petrels in the subantarctic zone.

The measurements of the bird we caught correspond closely with those reported by Clancey (1981) (1 bird) and by Murphy (1936) (7 birds from the Tristan da Cunha group). All seem correctly identified as White-bellied Storm Petrels. The key used by Oliver (1955) to separate *F. tropica* and *F. grallaria* was based on mid-toe length: mid-toe longer than outer toes in *tropica;* toes subequal in *grallaria.* In this respect also, our Gough Island bird seems identifiable as *grallaria.* Those 24 measured by Swales had slightly longer mid-toes plus claws (mean of 27.2 mm) but most of his may have been non-breeders with unworn claws.

SUBANTARCTIC DIVING PETREL *Pelecanoides urinatrix exsul*

This breeds on Antipodes Island but we found no evidence that it nests on the lesser islands. The burrows are concentrated along the coast and especially above sea cliffs. In this zone I found a bird incubating a soiled egg on 21 November.

Scattered burrows also occur far inland, and I removed a lone bird from one of these and confirmed its identity. On both Prince Edward and Gough Islands it was breeding commonly near the coast. Clancey (1981) considered that this is the subspecies breeding on Gough Island and that *dacunhae* cannot be maintained.

ACKNOWLEDGEMENTS

I thank the Royal New Zealand Navy and the crew of HMNZS *Waikato* for transport to Antipodes Islands; the South African Department of Transport and crew of SA *Agulhas* for transport to Prince Edward and Gough Islands; the Council for Scientific and Industrial Research, Pretoria, for financial help; and Prof. W. R. Siegfried and A. Berruti for arranging my visits to the latter islands.

For their companionship and supporting observations I am very grateful to the Antipodes Island party (B. D. Bell, Andy Cox, Cameron Hay, Don Horning, P. J. Moors, J. Newton, C. J. R. Robertson, R. H. Taylor, and Rohan Wahrlich), the Prince Edward Island party (Aldo Berruti, Andy Griffiths, Pam Laycock, M. Schramm and J. C. Sinclair), and the Gough Island party (Aldo Berruti, W. R. P. Bourne, Andy Griffiths, J. C. Sinclair and A. J. Williams). B. D. Heather, M. C. Crawley, P. J. Moors and J. Warham commented most helpfully on the text.

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SHORT NOTE

DUCK REMOVING EGG FROM NEST

On 28 September at 9 a.m., as I was driving along Benmorven Road, a country road 4½ km from Blenheim, I saw a Mallard *(Anas platyrhynchos)* walk across the road in front of the car carrying an egg. Its lower mandible was pushed into a hole in the side of the egg, enabling the duck to carry it. The duck dropped the egg in the long grass at the roadside, pecking at it before walking back around the front of the car and settling under a small open gorse bush in long grass on the other side of the road. The bird flushed into a narrow open drain close by, revealing a nest with 10 unhatched eggs.

Inspecting the still warm egg removed by the duck, I found that part of the shell had broken away and part of the inner membrane was stained, suggesting that a piece of eggshell had been missing for some time. A tear on the inner lining revealed an actively moving duckling. The duckling was fully formed but still a few days away from hatching, judging by the size of the yolk sac, and the egg tooth was not fully formed.

Perhaps the Mallard hen had removed the egg because the collapsed portion of the egg was irritating her while incubating or made the eggs hard to roll.

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