OBSERVATIONS OF SEABIRDS IN THE TASMAN SEA AND IN NEW ZEALAND WATERS IN OCTOBER AND NOVEMBER, 1962

By Lieut. A. Y. NORRIS, R.N.

Between 1 October 30 November, 1962, I made observations of seabirds from a submarine, H.M.S. TABARD, in which I was serving as Navigating Officer. The submarine steamed from Sydney, N.S.W., to operate with units of the Royal New Zealand Navy in New Zealand waters before returning to Sydney through the Foveaux Strait and across the South Tasman Sea. The ship's track around the Dominion is shown in the map.

I have frequently watched birds from the bridges of submarines during the last 6½ years. Such a situation is in many ways, ideal. In "Tabard" the height of eye is about 24 feet — high enough to see over successive waves or a moderate swell, yet sufficiently low to see the undersides of seabirds, particularly *Procellariiformes* as they performed their tell-tale jinks while altering direction when too close to the boat. Furthermore, the bulk of the superstructure is relatively small and birds are not frightened away from the submarine until they are very close. The conning position is fairly stable because of the low centre of gravity of the ship: thus, the observer remains fairly steady. Finally, he is able to see all round without having to move from one position. Generally I have found it unsafe to attempt identification outside a range of 200 yards but fortunately most birds usually pass close to the boat. As species become more familiar to a watcher, the range at which the correct identification can be achieved increases.

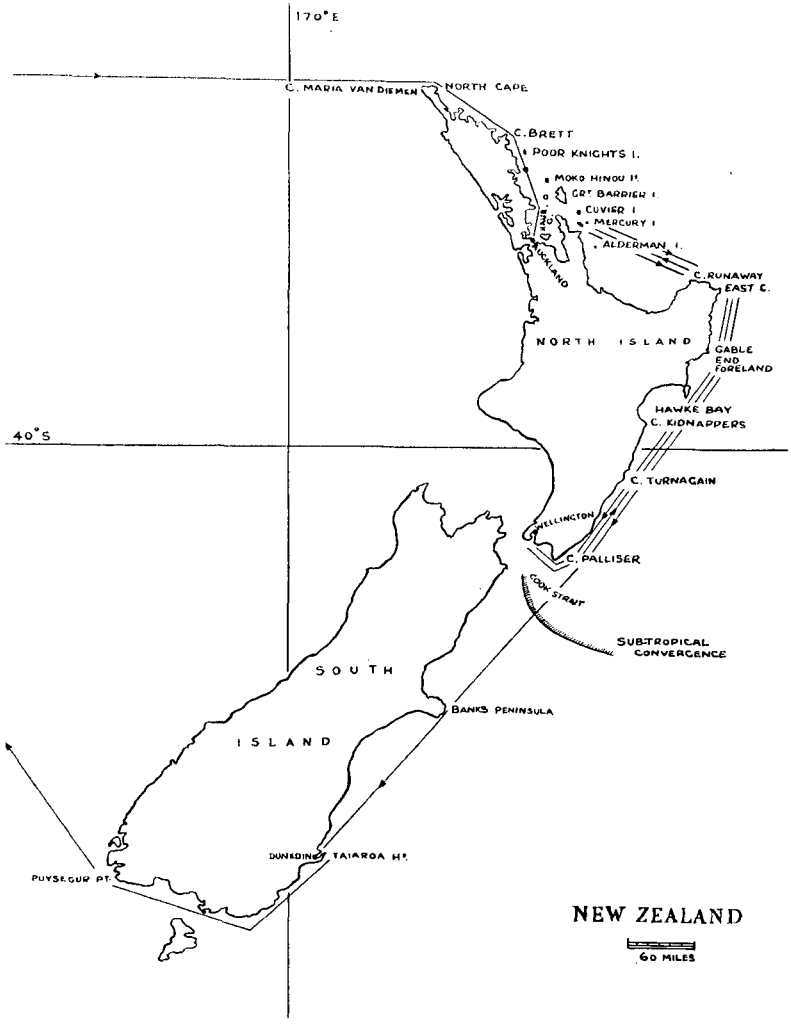
CONDITIONS

No prolonged periods of bad weather were experienced. Light conditions were generally good and the boat remained reasonably steady.

Information on currents in the South Tasman Sea and around New Zealand is scanty. However, it seems that there is an easterly water flow across the Tasman which becomes N.E. as it nears the West coasts of New Zealand, while there is a S.E. set away from the S.E. coasts of the Dominion. Off the N.E. coast of North Island to seaward of the Poor Knights, Moko Hinau, Great Barrier, Mercury and Alderman Islands the effect of the S.E. set was only noticeable outside the 100 fathom line, markedly so on several occasions when the submarine was dived.

Measurements of surface water temperatures taken during the east-bound crossing of the Tasman Sea and off the N.E. coast of North Island showed that temperatures differed very little from those off the E. coast of Australia. Off the E. coast of New Zealand the temperature decreased markedly as the submarine crossed the Subtropical Convergence in the approaches to the Cook Strait. In the Foveaux Strait and during the first half of the N.W. passage of the Tasman Sea the surface temperature was very cold until the convergence was crossed once more in an approximate position of 42°S. 161°E.

Apart from birds and fish, few animals were encountered except in the offshore approaches to the Hauraki Gulf where many dolphins



were observed. Unidentified whales were seen on six occasions during the period. In the Hauraki Gulf and its offshore approaches, visual and mechanical observations showed the region to be particularly rich in fish and plankton; this has been confirmed by Dr. A. Olssen of the Naval Research Laboratory, Auckland. At night I was especially impressed by the large areas of phosphorescence which occurred here: a phenomenon which I have rarely seen so marked elsewhere. Further evidence of the high concentration of plankton in this region was repeatedly obtained at night when the submarine surfaced; I always found large quantities of organisms trapped as the water drained out of the fin and casing. Once again, this was unprecedented in my experi-

ence. Thus there was ample evidence to demonstrate why this region can support a seabird population rich in variety and numbers.

The remains of cephalopods were found after surfacing in the fin and casing when the submarine was operating beyond the 100 fathom line. This may be significant in relation to the notes upon the distribution of albatrosses which follow.

OBSERVATIONS

Details of all observations made during the period under review are listed in a systematic order which follows Alexander (1955).

Where they have been found to be of value in identification at sea, notes of comparative differences between closely related species have been added. Such criteria must be used with great care for their successful use depends upon a good view of the individual. Observations on behaviour are included together with notes on the appearances of seabirds; descriptions occurring in many references have been taken from skins, and, often, salient points noticeable at sea, seem to have been missed.

In my experience, positive identification of seabirds during a watch is achieved with about half the total number seen. Range is often the most important limiting factor.

PENGUINS

Eudyptula minor. Little Penguin.

13/10/62 (1330) Sea area within 3 miles and E. of Oruawharo Pt., Great Barrier Island, N.I. Twelve birds.
(1640-1800) Sea area within 2 miles E. of Cape Barrier, Great Barrier Island, N.I. Eight birds.
20/10/62 (0900) S. Hauraki Gulf. 36°40'S. 174°49'E. One bird.

Eudyptula sps.

21/11/62 (1000) 44°04'S. 172°49'E. One bird.

Generally observations of penguins at sea were found to be impossible in sea states which were slightly worse than calms. Since such conditions were common few penguins were seen, despite a careful watch in the sea areas adjacent to known breeding areas. Under ideal conditions, penguins were only seen with great difficulty.

On 21 November one bird *Eudyptula* sp. was seen swimming under the surface near the submarine. Using a stop watch and estimates involving the ship's speed and relative positions, three observers estimated the penguin's speed to be approximately 15 ft./sec. This bird remained dived for 25 seconds and swam parallel to the ship's side for 12 seconds. It showed no concern for the submarine at any time.

ALBATROSSES

Specific identification of albatrosses at sea is usually possible provided the light conditions are good and provided the watcher takes care to note systematically every mannerism besides plumage details and shape. Although this may seem obvious, several persons in Australia and New Zealand have told me that because of the basic similarity of the smaller albatrosses, they cannot be told apart at sea. Thus many seemed unwilling to attempt specific identification when the opportunity occurred.

Diomedea epomorphora. Royal Albatross.

22/11/62 (0630) Off-shore approaches to Otago Harbour. 45°43'S. 170°50'E. One bird.

The Royal Albatross was identified with certainty only in the vicinity of Taiaroa Head near Dunedin. Great care was taken with the

identification of the Wandering Albatross *D. exulans* throughout the period. In order to be certain, only one characteristic was used to differentiate between these very similar species: the black line along the cutting edge of the bill of *epomorphora*. F. C. Kinsky, of the Dominion Museum, Wellington, suggested that an indication of the Northern race of the Royal Albatross in flight was the almost black dorsal surface of the wings with possible pale edging of the feathers of the greater wing coverts. When sighted such an individual always proved to be of this species subsequently. Under good light conditions the bill markings could be seen clearly out to a range of 40 yards. During two periods of observation in moderate light conditions from the headland at Taiaroa on 23 and 24 November this range was checked over land and was estimated to be 30 yards. Flight characteristics of Royals appeared to be the same as those of Wanderers, but another suggestion that the former have their wing tips turned back slightly could not be checked.

In company with Mr. S. Sharpe on the afternoon of 23 November, I saw an individual of the Southern race over the breeding area at Taiaroa Head where the bird remained for 15 minutes. The plumage of this bird seemed very similar to that of an adult Wandering Albatross, but the black cutting edge of the bill was seen on four occasions. A maximum of eleven individuals was seen at one time during a total of three hours actual observation from the land and at sea.

Diomedea exulans Wandering Albatross.

2/10/62 (0500-0800K) Tasman Sea 34°09'S. 158°35'E. to 34°09'S. 159°19'E. One adult.
(1430-1620K) Tasman Sea 34°09'S. 160°49'E. to 34°09'S. 161°12'E. One juv., 2 immatures.
3/10/62 (1030-1230L) Tasman Sea 34°20'S. 164°22'E. to 34°20'S. 164°48'E. Two adults, 1 juv.
4/10/62 (0830-1030L) Tasman Sea 34°29'S. 168°30'E. to 34°30'S. 169°03'E. Three adults, 3 immatures, 1 juv.
(1700-1800L) Tasman Sea 34°29'S. 171°29'E. to 34°29'S. 171°40'E. Two adults, 1 immature, 1 juv.
5/10/62 (0530-0630M) Off North Cape, North Island. Nil.
(1120-1335) Off-shore approaches to the Bay of Islands, 34°57'S. 174°02'E. to 35°16'S 174°25'E. Two adults, 1 immature.
9/10/62 1330-1800) S.W. Pacific 35°25'S. 175°45'E. to 35°40'S. 175°19'E. One adult.
11/10/62 1030-1230) S.W. Pacific 35°45'S. 175°14'E. to 37°00'S. 176°14'E. One immature.
12/10/62 (0530-0530) S.W. Pacific 35°29'S. 176°57'E. to 35°28'S. 176°43'E. Two adults, one immature.
26/10/62 (1000) S.W. Pacific 40°28'S. 176°51'E. Three immatures, 1 juv.
28/10/62 (0915) Sea area between Kapiti Island and the Mainland. One adult.
1/11/62 (1030-1230) Hawke Bay. Ten adults.
8/11/62 (0415-0530) S.W. Pacific 35°10'S. 177°00'E. One adult, 3 immatures.
(1100-1230) S.W. Pacific 35°08'S. 177°10'E. Two adults.
(1700-1830) S.W. Pacific 35°09'S. 177°08'E. Two adults, 3 immatures, 1 juv.
15/11/62 (0430-0530) S.W. Pacific 35°08'S. 175°55'E. One adult. 1 immature.
19/11/62 (0840-1035) S.W. Pacific 37°16'S. 177°47'E. to 37°26'S. 178°10'E. 1 adult. 2 immatures.
(1430-1630) S.W. Pacific 37°54'S. 178°35'E. to 38°20'S. 179°31'E. Nil.
20/11/62 (0430-0630) S.W. Pacific 40°10'S. 177°19'E. to 40°27'S. 177°01'E. Six adults, 1 immature.
(1430-1630) S.W. Pacific 41°30'S. 175°50'E. to 41°47'S. 175°32'E. 3 adults, 1 immature.
21/11/62 (0430-0530) S.W. Pacific 43°24'S. 173°42'E. to 43°38'S. 173°25'E. Two adults.
(0850-1000) S.W. Pacific 43°54'S. 172°59'E. to 44°04'S. 172°49'E. One adult.
(1400-1600) S.W. Pacific 44°34'S. 172°14'E. to 44°50'S. 171°55'E. Three adults.
22/11/62 (0630) Off-shore approaches to Otago Harbour 45°43'S. 170°50'E. One adult.
27/11/62 (1630-1830) Tasman Sea 45°54'S. 166°07'E. to 45°44'S. 165°53'E. 11 individuals. Seven plus adults, 2 immatures.
28/11/62 (0430-0630) Tasman Sea 44°25'S. 164°18'E. to 44°10'S. 163°58'E. Five adults, 1 juv.
(1640-1720L) Tasman Sea 42°52'S. 162°05'E. to 42°48'S. 161°59'E. Four adults, 2 immatures.
29/11/62 (0430-0530L) Tasman Sea 41°24'S. 160°05'E. to 41°10'S. 159°41'E. Three adults, 1 immature.
(1630-1900L) Tasman Sea 39°37'S. 157°48'E. to 39°15'S. 157°20'E. Ten adults, 2 immatures.
30/11/62 (1440-1630L) Tasman Sea 36°40'S. 154°16'E. to 36°23'S. 153°50'E. One adult.

This was the albatross most frequently observed during the entire period. It was seen on eleven out of twelve watches kept during

transits of the Tasman Sea; the higher the latitude, the greater the numbers seen. Off the N.E. coast of North Island, 19 watches, varying from 5 minutes to 5 hours, were kept during daylight hours. In twelve of these watches, kept while the submarine was operating within the 100 fathom line, this albatross was only seen in the offshore approaches to the Bay of Islands and approximately ten miles N. of Cape Runaway. The remaining watches were conducted while the ship was either in the vicinity of or to seaward of the 100 fathom line, out to some 80 miles E. of Great Barrier Island, and this species was observed during each watch.

East Coast Observations. From 25 October to 3 November, the ship travelled from East Cape to Cape Palliser and back. Unfortunately it was not possible to watch regularly but observations were made on two occasions. Brief observations were obtained at other times in this period but because of operational commitments, time did not allow me to record positions or times. These glimpses always showed at least 12 Wandering Albatrosses around the ship. This contrasted with the situation some $2\frac{1}{2}$ weeks later when the numbers of this magnificent bird in the same area were noticeably less. The ship's track followed the 100 fathom line on each of the three passages.

In the period 19 to 22 November, H.M.S. "Tabard" steamed from East Cape to Otago Harbour. Four observations were made in the latter half of this passage from the vicinity of Banks Peninsula to Taiaroa Head. A maximum of 3 individuals was seen at one time. This section of the trip was from 2 to 20 miles within the 100 fathom line.

South Coast Observations. None were made in two periods each of two hours in the approaches to the Foveaux Strait.

Diomedea melanophris. Black-browed Albatross.

1/10/62	(1630-1800K)	Tasman Sea. 34°04'S. 155°51'E. to 34°05'S. 156°11'E. Two adults.
2/10/62	(0300-0355K)	Tasman Sea. 34°09'S. 158°35'E. to 34°09'S. 159°19'E. One adult.
8/11/62	(1700-1830M)	S.W. Pacific. 35°09'S. 177°08'E. One adult.
15/11/62	(0430-0530M)	S.W. Pacific. 35°09'S. 175°55'E. One immature.
20/11/62	(1430-1630M)	S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E. One immature.
21/11/62	(1400-1600M)	S.W. Pacific. 44°34'S. 172°14'E. to 44°50'S. 171°55'E. One adult.
	(1930M)	S.W. Pacific. 45°03'S. 171°48'E. Four immatures.
22/11/62	(0530M)	Off-shore approaches to Otago Harbour. 45°43'S. 170°50'E. One immature.
26/11/62	(1430-1630)	S.W. Pacific. 46°19'S. 170°06'E. to 46°33'S. 169°45'E. One immature.
27/11/62	(0830-1030M)	W. approaches to Foveaux Strait. 45°26'S. 167°25'E. to 46°25'S. 167°03'E. One adult.
	(1630-1830M)	Tasman Sea. 45°54'S. 166°07'E. to 45°44'S. 165°53'E. Three adults.
28/11/62	(1640-1720L)	Tasman Sea. 42°52'S. 162°05'E. to 42°49'S. 161°59'E. One adult.
29/11/62	(0430-0610L)	Tasman Sea. 41°24'S. 160°05'E. to 41°10'S. 159°41'E. One adult.
	(1630-1900L)	Tasman Sea. 39°37'S. 157°49'E. to 39°15'S. 157°20'E. Four adults.
30/11/62	(1440-1630L)	Tasman Sea. 36°40'S. 154°16'E. to 36°23'S. 153°50'E. One immature.

Seven of fifteen watches during which this mollymawk was seen, were kept during the transits of the Tasman Sea. In 27 periods of observation off the coasts of North Island, it was seen on three occasions, always outside the 100 fathom line. It was encountered during five of seven watches when the boat was in coastal waters off South Island. While "Tabard" was in New Zealand waters 3 adults and 8 immatures were seen.

The Black-browed Albatross is perhaps the easiest of the dark-backed albatrosses or mollymawks to identify at sea. A long range characteristic which I have repeatedly used is the very short but thick neck of this species in proportion to the length of the body, compared to other albatrosses which I have encountered in the S.W. Pacific.

Diomedea bulleri. Buller's Albatross.

20/11/62 (1430-1630) S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E. One.
21/11/63 (0430-0630) S.W. Pacific. 43°24'S. 173°42'E. to 43°38'S. 173°25'E. Two.
(0850-1000) S.W. Pacific. 43°54'S. 172°59'E. to 44°04'S. 172°49'E. Five.
(1400-1600) S.W. Pacific. 44°34'S. 172°14'E. to 44°50'S. 171°55'E. Four.
(1930) S.W. Pacific. 45°03'S. 171°48'E. Three.
22/11/62 (0530) Off-shore approaches to Otago Harbour. 45°43'S. 170°50'E. Three.
26/11/62 (1430-1630) S.W. Pacific. 45°19'S. 170°06'E. to 46°33'S. 169°45'E. Four.
27/11/62 (0830-1030) W. Approaches to Foveaux Strait. 46°26'S. 167°26'E. to 46°26'S.167°03'E. Seven.
(1630-1830) Tasman Sea. 45°54'S. 166°07'E. to 45°44'S. 165°53'E. One.
28/11/62 (0430-0530) Tasman Sea. 44°25'S. 164°18'E. to 44°10'S. 163°58'E. Two.

While operating in high latitudes to the S. of Australia, I have seen *D. chysostoma,* the Grey-headed Albatross. With the prospect of operations in waters where "the rarest and least known member of the Albatross family (Alexander, 1955) could be found, I expected difficulty in identifying Buller's Albatross — another "Grey-head." In retrospect, particularly since the early morning of 28 November when *bul'eri* and *chrysostoma* were seen together, I think that this doubt was unjustified. My impressions of the comparative differences between these species are as follows:—

(a) Th head of *bulleri* appears proportionately larger out to 200 yards range.

(b) In *bulleri* the colour of the head in good light conditions (i.e. clear sun) is a delicate blue-grey whereas that of *chrysostoma* under similar conditions is a dusky grey.

(c) In wind conditions of Force 3 and less the flight of *bulleri* is much more laboured and the bird is usually very close to the surface of the water while in rougher conditions the flight of *bulleri* appeared much more powerful.

Buller's Albatross was seen during every period that I spent on the bridge off the E. and S. coasts of South Island from the E. approaches to Cook Strait to a position 176 miles N.W. of Puysegur Point. Generally it showed no marked disposition to follow the ship for any length of time. However, it frequently came to within 30 yards.

Diomedea cauta. Shy Albatross.

26/11/62 (1430-1630M) S.W. Pacific. 45°19'S. 170°05'E. to 45°33'S. 169°45'E. One bird.
28/11/62 (1640-1720L) Tasman Sea. 42°52'S. 162°05'E. to 42°48'S. 161°59'E. Two.
29/11/62 (0430-0510L) Tasman Sea. 41°24'S. 160°05'E. to 41°10'S. 159°41'E. One.
(1630-1900L) Tasman Sea. 39°37'S. 157°45'E. to 39°15'S. 157°20'E. Two.

All three races of the Shy Albatross occur in the region covered by these notes. In nearly 2½ years service in Austrlaian waters I have become familiar with the typical race in the Bass Strait and off the coast of N.S.W. *D. cauta* has a characteristic pattern on the ventral surfaces of the wings, and it is noticeably larger than other members of the 'mollymawk group' which occur in the Tasman Sea. Australian observers prefer to call this bird the "White-capped Albatross." At sea I have never found this cap at all distinctive although modern colour photography does appear to accentuate this feature in breeding birds on the nest. All the observations except the first refer to white-headed birds of the typical form. The head and nape of the bird seen off the S.E. of South Island on 26 November was tinged very pale grey. This was the first time that I saw this colouration and it is probable that this individual belonged to the race *salvini.* In the typical race and *salvini,* the colour of the bill is mid-grey. The race *eremita* has a dark grey head and yellow bill but appears to have a limited distribution near the Chatham Islands.

[It has now been recorded off Bank's Peninsula.—Ed.]

Diomedea chlororhynchos. Yellow-nosed Albatross.

1/10/62 (1630-1800K) Tasman Sea. 34°04'S. 155°51'E. to 34°05'S. 156°11'E. One adult, two immatures.
4/10/62 (0830-1030L) Tasman Sea. 34°29'S. 168°30'E. to 34°30'S. 169°03'E. One immature.
(1700-1800L) Tasman Sea. 34°29'S. 171°29'E. to 34°29'S. 171°40'E. One adult.
5/10/62 (1120-1335M) Off-shore approaches to the Bay of Islands, 34°57'S. 174°02'E. to 35°16'S. 174°25'E. One immature.
12/10/62 (0630M) S.W. Pacific. 36°29'S. 176°43'E. One adult.

It is my experience that this albatross is fairly frequently encountered in winter and early spring along the shipping routes from Fremantle to Sydney and in the Tasman Sea. It was no surprise therefore that it was seen in early October throughout the passage eastwards across the Tasman and off the N.E. coast of North Island. It was not observed during the return passage to Sydney. Since *D. chlororhynchos* does not normally occur as far E. as New Zealand a full description taken from my notes for both the adult and the immature birds is included, thus:—

A noticeably small and slim albatross which lacked the thick, neckless appearance of *D. melanophris*. Although most mollymawks tend to have this 'neckless' appearance, the slimness of *chlororhynchos* does lessen the effect considerably. This characteristic was used as an aid to identification for adults and immatures at ranges between 200 and 400 yards using binoculars, with final confirmation when and if the birds approached the ship. Head, neck, upper tail coverts, rump and underparts white. Tail short and brownish. Back sooty black, where in *melanophris* almost slate/black and in *chrysostoma* darkish grey. Upper surfaces of wings brownish black. The pattern on the under surfaces of the wings is quite distinctive in that the linings are white with a moderately thick and fairly well defined black edge on both the leading and trailing edges of the wings. Out to range of approximately 400 yards, this pattern contrasts with that of *melanophris* in which the forewing between the body and the carpel joint is thickly edged black while the rest of the edge of the forewing is moderately dark; the trailing edge sometimes has a thin black edging or is occasionally white with a few black marks. The wing linings are white. The bill colour of *chlororhynchos* is black with a bright yellow line down the ridge of the upper mandible to a bright orange tip which is only visible in excellent light conditions out to 25 yards. There is no suggestion of a dark brow. Length about 30 inches.

The immature differed from the adult in that (a) the bill is entirely dull black, (b) the underwing pattern while being similar, is not so distinct, and (c) at very close ranges and in excellent light conditions, the head has slight grey striations. I seldom saw the last characteristic and any immature which appeared to have an almost completely white head was of this species. The underwing pattern of the immature melanophris differs in that it is dark grey/black with a thin grey/white or sometimes dusky lining.

The adult was seen down to 20 yards on 12 October but an immature seen on 5 October only approached to 100 yards. On both occasions light conditions were good and the birds were observed for at least 5 minutes.

Diomedea chrysostoma. Grey-headed Albatross.

28/11/62 (0530M) Tasman Sea. 44°10'S. 163°58'E. One adult.

I have already discussed relative differences between *chrysostoma* and *bulleri*. The grey head differentiates between the former and

chlororhychos. In the Grey-headed Albatross the red tip to the upper mandible is visible out to 30 yards in good light conditions. The bill is grey/black and has a yellow line along the ridge of the upper mandible; there is also a yellow stripe on the ridge of the mandible but I have only seen this once at sea. There is a black mark through the eye.

I expected to see *chrysostoma* in the higher latitudes around the S. of the Dominion and was surprised not to meet it.

Phoebetria palpebrata. Light-mantled Sooty Albatross.

24/11/62 (1500M) Approaches to Otago Harbour. 45°45'S. 170°49'E. One.

Observed once during the period, the individual was first seen close inshore under Taiaroa Head but subsequently it meandered in a general E.N.E. direction until lost from sight.

I have seen individual Sooty Albatrosses *P. fusca* in spring in the shipping routes across the Great Australian Bight and in June, 1962, one was observed in a position 67 miles E.S.E. of Montagu Island, N.S.W. Therefore I took great care on the return passage to Australia to investigate every possible bird which presented itself but nothing eventuated. In general '*Phoebetria*' albatrosses are easily identified as such because of their dark colouration and the apparent length of the body behind the wings, an effect caused by the long, wedge-shaped tail. The dark colouration tends to make this group rather inconspicuous in indifferent weather and as a result I suspect that these albatrosses may be overlooked along recognised shipping routes within their ranges.

PETRELS AND SHEARWATERS

Macronectes giganteus. Giant Petrel.

5/10/62	(0530-0630M)	Sea area off North Cape, N.I. One bird.
	(1630-1835M)	N. approaches to Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. One bird.
9/10/62	(1330-1800M)	S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. Three birds.
14/10/62	(1115-1230M)	S.W. Pacific. 36°24'S. 175°33'E. to 36°24'S. 175°46'E. One bird.
20/10/62	(0700)	Hauraki Gulf. 36°20'S. 174° 59'E. Two birds.
26/10/62	(1000)	S.W. Pacific. 40°28'S. 176°51'E. Six birds.
28/10/62	(0930)	Sea area between Kapiti Island and the Mainland. One bird.
1/11/62	(1030-1230M)	Hawke Bay. Twelve birds.
6/11/62	(1430M)	Approaches to Auckland Harbour. Six birds.
8/11/62	(0415-0530M)	S.W. Pacific. 36°10'S. 177°00'E. One bird.
	(1700-1830M)	S.W. Pacific. 36°09'S. 177°08'E. One bird.
16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E. Five birds.
19/11/62	(0840-1035M)	S.W. Pacific. 37°16'S. 177°47'E. to 37°26'S. 178°10'E. Two birds.
	(1430-1630M)	S.W. Pacific. 37°54'S. 178°35'E. to 38°20'S. 178°31'E. Three birds.
20/11/62	(0430-0630M)	S.W. Pacific. 40°10'S. 177°19'E. to 40°27'S. 177°01'E. Two birds.
	(1430-1630M)	S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E. Three birds.
21/11/62	(0850-1000M)	S.W. Pacific. 43°54'S. 172°59'E. to 44°04'S. 172°49'E. One birds.
	(1400-1600M)	S.W. Pacific. 44°34'S. 172°14'E. to 44°50'S. 171°55'E. One bird.
26/11/62	(1430-1630M)	S.W. Pacific. 46°19'S. 170°06'E. to 46°33'S. 169°45'E. One bird.

The scavenging habits of the Giant Petrel are well known to those who have ventured into the higher latitudes of the Antarctic Ocean. I have witnessed large concentrations of this petrel off the sewerage outfall off Malabar, N.S.W. and by the outlet from the abattoir into the N. side of Wellington Harbour. It was not surprising, therefore, that it was more often encountered close to the shore, particularly where the proportion of effluence was high, than in areas well offshore.

Brief glimpses during the period 25 October to 3 November showed never less than 8 individuals around the ship. Some 2½ weeks later, the numbers of "Stinkers" seen were less. In the same period,

the numbers in Auckland Harbour and its approaches dropped steadily from 18 to one. Thus a departure from the coastal and offshore areas of the N.E. and E. coasts of North Island is indicated in early November.

Murphy (1936) states that black Giant Petrels are juveniles and that increasing amounts of pale feathers on the head and breast indicate aging. Using this criterion, it was found that adults usually frequented inshore waters while juveniles and immatures were found further out. This phenomenon was also noted in two years of observations off the coasts of central and southern N.S.W.

The "stiff-winged" attitude of this bird in flight together with its colouring and large size make it relatively easy to identify. It seems usual for it to remain within 30 feet of the surface of the water in flight; however, on 19 November during the afternoon watch, one Giant Petrel flew over and around the ship at heights estimated to be between 50 and 70 feet for nearly 4 minutes. At this time the wind was S.W. force 2 to 3.

Daption capensis. Pintado Petrel or Cape Pigeon.

1/10/62	(1630-1800K)	Tasman Sea.	34°04′S. 155°51′E.	to 34°05′S. 156°11′E.	One bird.
2/10/62	(0500-0800K)	Tasman Sea.	34°09 S. 158°35 E.	to 34°09′S. 159°19′E.	One bird.
	(1430-1620K)	Tasman Sea.	34°09 S. 160°49′E.	to 34°09′S. 161°12′E.	One bird.
3/10/62	(1030-1230L)	Tasman Sea.	34°20′S. 164°22 E.	to 34°20′S. 164°45′E.	One bird.
4/10/62	(0830-1030L)	Tasman Sea.	34°29 S. 168°30 E.	to 34°30 S. 169°03′E.	Nine birds.
	(1700-1800L)	Tasman Sea.	34°29′S. 171°29 E.	to 34°29′S. 171°40′E.	Six birds.
5/10/62	(0530-0630M)	Sea area off North Cape, N.I.	Three birds.		
11/10/62	1030-1230M)	S.W. Pacific.	36°46′S. 176°14′E.	to 37°00′S. 176°14′E.	One bird.
26/10/62	(1000M)	S.W. Pacific.	40°28′S. 176°51′E.	Ten birds.	
1/11/62	(1030-1230M)	Hawke Bay.	Forty birds.		
8/11/62	(0515-0530M)	S.W. Pacific.	36°10′S. 177°00′E.	One bird.	
20/11/62	(0430-0630M)	S.W. Pacific.	40°10 S. 177°19 E.	to 40°27′S. 177°01′E.	One bird.
	(1430-1630M)	S.W. Pacific.	41°30′S. 175°50′E.	to 41°47′S. 175°32′E.	Fourteen birds.
21/11/62	(0430-0630M)	S.W. Pacific.	43°24′S. 173°42 E.	to 43°38′S. 173°25′E.	Seven birds.
	(0850-1000M)	S.W. Pacific.	43°54′S. 172°59 E.	to 44°04′S. 172°49′E.	Five birds.
	(1400-1600M)	S.W. Pacific.	44°34′S. 172°14′E.	to 44°50′S. 171°55′E.	Twelve birds.
22/11/62	(0630)	Off-shore approaches to Otago Harbour.	45°43′S. 170°50′E.	Five birds.	
26/11/62	(1430-1630M)	S.W. Pacific.	45°19′S. 170°06′E.	to 46°33′S. 169°45′E.	38 birds.
27/11/62	(1630-1830M)	Tasman Sea.	45°54′S. 166°07′E.	to 45°44′S. 165°53′E.	Two birds.
28/11/62	(1640-1720L)	Tasman Sea.	42°52′S. 162°05′E.	to 42°48′S. 161°59′E.	One bird.

This is one of the most distinctive petrels of the Southern Oceans. Its chequered plumage of black, grey brown or grey, and white combined with its pigeon-like appearance make identification no problem. Many writers have commented upon its ugly behaviour when congregated in large numbers around whaling and sealing centres. Nevertheless, there can be few more beautiful sights than a flock of these birds, in bright sunlight, following astern on rigid wings in the slip-stream of the ship.

I have noticed considerable variation in the plumage of individuals: birds generally become whiter on the back, scapulars and wing coverts as the breeding season approaches. Even so, the differences between some individuals at any one time seem to be great, particularly in October and November. Murphy suggests that such variation is due to wear.

They were observed continuously throughout the East-bound passage of the Tasman Sea. But in 17 periods of observations between North Cape and East Cape, North Island, it was only seen twice, some 70 miles out to sea. During the passage of 25 October to 3 November previously referred to, at least 20 Pintado Petrels were always in view. Two and a-half weeks later numbers had decreased noticeably; it was only when the submarine was S. of latitude 46°S. that numbers arose above 20 again. The species was not recorded in the Foveaux Strait

area and was only seen once in the southern Tasman Sea on the return voyage to Sydney. It was a matter of ship's routine that galley refuse was disposed over the side about mid-day and early evening. Other observers have recorded that the Cape Pigeon is an eager devourer of garbage yet I have never seen it show any interest in this gash although these birds have been in the vicinity frequently following astern.

Pachyptila Spp. Prions.

5/10/62	(1120-1335M)	Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. Five birds.
1/11/62	(1030-1230M)	Hawke Bay. Three birds.
9/11/62	(0430-0630M)	S.W. Pacific. 35°29'S. 176°21'E. to 36°28'S. 175°04'E. One bird.
20/11/62	(0430-0530M)	S.W. Pacific. 40°10'S. 177°19'E. to 40°27'S. 177°01'E. 13 birds.
	(1030M)	S.W. Pacific. 41°20'S. 176°22'E. Two birds.
	(1430-1630M)	S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E. Approx. 40 birds.
21/11/62	(0430-0630M)	S.W. Pacific. 43°24'S. 173° 42'E. to 43°38'S. 173°25'E. Eight birds.
	(1400-1600M)	S.W. Pacific. 44°34'S. 172°52'E. to 44°50'S. 171°55'E. 65 birds.
26/11/62	(1430-1630M)	S.W. Pacific. 45°19'S. 170°06'E. to 46°33'S. 169°45'E. 49 birds.
27/11/62	(1630-1830M)	Tasman Sea. 45°54'S. 166°07'E. to 45°44'S. 165°53'E. Two birds.
28/11/62	(0430-0530M)	Tasman Sea. 44°25'S. 164°18'E. to 44°10'S. 163°58'E. Three birds.
29/11/62	(0430-0630L)	Tasman Sea. 41°24'S. 160°05'E. to 41°10'S. 159°41'E. 800+ birds.

The problem of specific identification of members of this genus at sea has long been regarded as insoluble except when the bird is in the hand. The six species are all small with blue/grey upperparts, white underparts, a distinctive dark W across the wings and back, and a dark-tipped, wedge-shaped tail. The very similar Blue Petrel *Halobaena caerulea* differs in that it is slightly bigger and has a squarish tail with a white terminal band. Under good light conditions, I have noticed some variation in the colour of the backs of individual prions when seen together. This has ranged from blue-grey to light blue/grey tinged with buff. The flight sequence of prions is alternate flaps and glides during which the bird seldom attains much height above the water. While feeding, they either swoop to pick food from the surface or patter along the surface with the bill in the water acting as a scoop. Scooping has been timed to continue for up to 5 seconds and has been observed in calm seas and on the back of the huge swell often encountered in the open ocean. Picking is more likely to be used in areas of confused water.

Few prions were seen off the N. of New Zealand where they were only seen on 3 of 19 watches. As the ship progressed southwards from East Cape, they were observed more frequently and in increasing numbers. On the East-bound transit of the Tasman Sea no "Whale-birds" were found and, on the return passage to Sydney from Foveaux Strait, they were only observed twice. On the last occasion, a great flock of 800 was encountered in calm, fine weather crossing ahead of the ship feeding mainly by scooping. This large flock made a delightful sight, the effect being of a gentle snow flurry —hence another colloquial name, the "Snow-bird."

Procellaria aequinoctialis. White-chinned Petrel.

27/11/62	(1630-1830M)	Tasman Sea. 45°54'S. 166°07'E. to 45°44'S. 165°53'E.	One bird.
28/11/62	(0430-0530M)	Tasman Sea. 44°25'S. 164°18'E. to 44°10'S. 163°58'E.	Two birds.
29/11/62	(0430 0610L)	Tasman Sea. 41°24'S. 160°05'E. to 41°10'S. 159°41'E.	One bird.
	(1630-1900L)	Tasman Sea. 39°37'S. 157°45'E. to 39°15'S. 157°20'E.	One bird.

This large petrel was only seen during the N.W. transit of the southern Tasman Sea from the Cape Puysegur region. Of the birds seen, 2 had some white on the chin while the other 3 had black. This species is fairly distinctive on account of its size, which makes it the second largest petrel after the Giant Petrel, to occur in New Zealand

waters, and its long bill, which may be either straw-coloured or pale green, tipped black. In a good light the body appeared sooty black with the wings slightly darker and the flight feathers black, out to 100 yards. The wings are long and fairly broad. In the White-chinned Petrel there is no suggestion of the stiff-winged appearance of the closely related Black Petrel *P. parkinsoni* and the flight sequence was a continuous flap and glide with some shearwatering. In calm weather, the flight of *aequinoctialis* was laboured. This laboured appearance was lost in wind force 4 conditions and in force 6 the wing action became more flexible and, at times, was similar to the wing flapping of the Wedge-tailed Shearwater *Puffinus pacificus*.

Identification of this petrel in New Zealand waters, particularly the S. and W. of South Island, is complicated by the existence of the "Westland Petrel." Oliver (1955) considers this petrel breeding in South Island is a small, dark chinned race of *aequinoctialis*. He is supported by W. R. P. Bourne (pers. comm.) who states that the size and proportions of this race fit into a cline of decreasing size in low latitudes and the dark chin into a cline of loss of white from W. to E. However, Murphy (1936) considers that the extent of white on the chin is without geographical significance. Certainly there were no differences in size, shape, colour or manner of flight between dark- and white-chinned birds observed from H.M.S. TABARD, if the former were "Westland Petrels." Thus it seems that observation at sea may help in the solution of this problem.

Procellaria parkinsoni. Black Petrel.

5/10/62 (1630-1835M) N. approaches to the Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. Four birds.
9/10/62 (1330-1800M) S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. One bird.
11/10/62 (1030-1230M) S.W. Pacific. 36°46'S. 176°14'E. to 37°00'S. 176°14'E. One bird.
20/10/62 (0515M) Hauraki Gulf. Approx. 2 miles off the S. coast of Little Barrier Island. Eight birds.

Any ship constantly operating in the Hauraki Gulf region in October and November must surely encounter this little known petrel which breeds on Little Barrier Island. Alexander (1955) and Murphy (1936) have treated it as a full species, while Harrison (1962) prefers to regard it as a race of *P. aequinoctialis*. In flight there are a number of differences in the characteristics of the Black and White-chinned Petrels in most wind conditions. In calm weather on 9 and 20 October the flight of *parkinsoni* was stiff-winged with a sequence of flap and glide. On 5 October with the wind force 3 to 4 the appearance of 3 of these birds was the same but the sequence involved some swooping and soaring. In force 7 conditions the petrel observed demonstrated much swooping and soaring. At no time did the flight of the Black Petrel look laboured. The characteristics of *aequinoctialis* have been discussed.

Puffinus carneipes. Pale-footed Shearwater.

4/10/62 (0330-1030L) Tasman Sea. 34°29'S. 168°30'E. to 34°30'S. 169°03'E. One bird.
5/10/62 (1630-1835M) N. approaches to the Hauraki Gulf. 35°45'S. 174°45'E. to 36°10'S. 174°54'E. One bird.
9/10/62 (1330-1800M) S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. 10 birds.
11/10/62 (1030-1230M) S.W. Pacific. 36°46'S. 176°14'E. to 37°00'S. 176°14'E. Three birds.
13/10/62 (0645-0830M) Sea area off Gt. Barrier Is., Cape Barrier to Whakatautuna Pt. Three birds.
(1640-1800M) Sea area within 2 miles E. of Cape Barrier. One bird.
14/10/62 (1115-1230M) S.W. Pacific. 36°24'S. 175°33'E. to 36°24'S. 175°46'E. One bird.
1/11/62 (1030-1230M) Hawke Bay. Two birds.
9/11/62 (1233-1430M) S. Hauraki Gulf. 35°32'S. 176°11'E. to 36°42'S. 174°53'E. Approx. 250 birds.
15/11/62 (0430-0630M) S.W. Pacific. 36°08'S. 175°55'E. One bird.

16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E.	Approx. 240 birds.
19/11/62	(0840-1035M)	S.W. Pacific. 37°16'S. 177°47'E. to 37°26'S. 178°10'E.	One bird.
	(1430-1630M)	S.W. Pacific. 37°54'S. 178°35'E. to 38°20'S. 178°31'E.	41 birds.
20/11/62	(0430-0530M)	S.W. Pacific. 40°10'S. 177°19'E. to 40°27'S. 177°01'E.	Three birds.
	(1430-1630M)	S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E.	One bird.
21/11/62	(1400-1600M)	S.W. Pacific. 44°34'S. 172°14'E. to 44°50'S. 171°55'E.	Four birds.
29/11/62	(1630-1900L)	S.W. Pacific. 39°37'S. 157°45'E. to 39°15'S. 157°20'E.	Two birds.
30/11/62	(1440-1630L)	S.W. Pacific. 36°40'S. 154°16'E. to 36°23'S. 153°50'E.	One bird.

Alexander (1955) states that this species is "larger than the Wedge-tailed Shearwater, with a very pale bill, but hardly distinguishable in life." With care there should be no problem for the observer at sea in the identification of either of the species in the S.W. Pacific. Table I demonstrates the differences which are clear out to a range of 200 yards, the bill and feet of *carneipes* being obvious out to approximately 50 yards.

This shearwater was sighted once in 6 periods of observation on the E. bound crossing of the Tasman Sea and during 2 of 6 watches on the return trip from Point Puysegur. It was most frequently observed in the Hauraki Gulf, where it was seen on nine of thirteen watches kept within the 100 fathom line. On the voyage from Auckland to Dunedin and the Foveaux Strait, it was encountered on each of five watches from the vicinity of Cape Palliser and again during one watch when approaching latitude 45°S.

R.B. Sibson (pers. comm.) states that the Pale-footed Shearwater had been observed to concentrate in the S.E. corner of the Hauraki Gulf off the Firth of Thames, where tidal conditions were found to be strong. The two large concentrations seen on 9 and 16 November in this area were fishing in company with large numbers of Australian Gannets *Sula serrator* and Fluttering Shearwaters *(P. gavia)* on both occasions and with White-fronted Terns *(S. striata)* in addition on the first. The majority of *carneipes* appeared to catch their prey by lunging at their targets after fluttering above the surface; the individuals then settled in the water for a few seconds either to swallow their food or to recover before commencing this clumsy performance once more. This species was not observed to immerse itself completely while fishing. When the shoals of fish seemed to concentrate, the ensuing melee of shearwaters, gannets and terns produced much splashing: indeed, the diving of the gannets seemed to make the fishing of the other birds a somewhat hazardous task, some near misses being observed.

Puffinus bulleri. Buller's or Grey-backed Shearwater.

4/10/62	(0830-1030L)	Tasman Sea. 34°29'S. 168°30'E. to 34°30'S. 169°03'E.	One bird.
5/10/62	(0530-0630M)	Sea area off North Cape, N.I.	Twenty birds.
	(1120-1335M)	*Off-shore approaches to the Bay of Islands.* 34°57'S. 174°02'E. to 35°16'S. 174°25'E.	74 birds.
	(1630-1835M)	N. approaches to the Houraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E.	26 birds.
9/10/62	(1330-1800M)	S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E.	31 birds.
11/10/62	(1030-1230M)	S.W. Pacific. 36°46'S. 176°14'E. to 37°00'S. 176°14'E.	21 birds.
13/10/62	(0645-0830M)	Sea area off Gt. Barrier Is., Cape Barrier to Whakatautuna Pt.	5 birds.
	(1640-1800M)	Sea area within 2 miles E. of Cape Barrier.	Three birds.
14/10/62	(1115-1230M)	S.W. Pacific. 36°24'S. 175°33'E. to 36°24'S. 175°46'E.	Three birds.
	(1400-1405M)	S.W. Pacific. 36°22'S. 176°00'E.	One bird.
8/11/62	(0415-0530M)	S.W. Pacific. 36°10'S. 177°00'E.	Two birds.
	(1700-1830M)	S.W. Pacific. 36°09'S. 177°08'E.	Three birds.
9/11/62	(0430-0630M)	S.W. Pacific. 36°29'S. 176°21'E. to 36°28'S. 176°04'E.	Approx. 100 birds.
15/11/62	(0430-0630M)	S.W. Pacific. 36°08'S. 175°55'E.	*Eight birds.*
	(1500M)	S.W. Pacific. 36°06'S. 175°44'E.	Two birds.
16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E.	Three birds.
19/11/62	(0840-1035M)	S.W. Pacific. 37°16'S. 177°47'E. to 37°26'S. 178°10'E.	Two birds.
20/11/62	(0430-0630M)	S.W. Pacific. 40°10'S. 177°19'E. to 40°27'S. 177°01'E.	Six birds.
	(1030M)	S.W. Pacific. 41°00S. 176°22'E.	Ten birds.
	(143-1630M)	S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E.	Two birds.
29/11/62	(1630-1900L)	Tasman Sea. 39°37'S. 157°45'E. to 39°15'S. 157°20'E.	Six birds.

On the east-bound crossing of the Tasman Sea, this shearwater was first seen some 180 miles W. of Cape Maria Van Diemen. However, the majority of observations over the entire period were made along the E. coast of North Island. Thus it was seen during 19 of 26 watches. It was not observed in the vicinity of South Island, but, somewhat surprisingly, a group of 6 was seen well meandering westwards in fine weather some 400 miles east of Bass Strait on 29 November.

This is one of the easier "tubinares" of New Zealand waters to identify. Buller (188) has likened it to a small shag with the long neck and relatively long tail. He might have included the longish, slightly hooked beak in his simile, too. Beck (Loomis 1926) has compared the flight of the Grey-backed Shearwater in light winds to that of an albatross under similar conditions. Such a comparison presumably refers to the effect of the combination of the long wings and their flexibility. The body seems to dip and rise with each wing beat cycle. In addition, the salient plumage features are (i) the entirely white underparts and the ventral surfaces of the wings (no other shearwater of this region of comparable size shows this characteristic), (ii) the dark cap, nape, wing tips and tail, and (iii) the inverted W across the wings and back.

The majority of Australian records of this bird refer to specimens which have been either washed ashore or storm-blown inland along the S.E. coast. Therefore, it seems worth quoting the following personal records made off the coast of N.S.W.:—

24 February, 1961 34°32'S. 151°25'E. One bird. Wind: S. force 2.
17 October, 1961 34°54'S. 151°07'E. One bird. Wind: N.E. force 5.

Puffinus griseus. Sooty Shearwater.

5/10/62	(0530-0630M)	Sea area off North Cape, N.I. 31 birds.
	(1120-1335M)	Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. Approx. 50 birds.
5/10/62	(1630-1835M)	N. approaches to the Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. Seven birds.
9/10/62	(1330-1800M)	S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. Four birds.
11/10/62	(1030-1230M)	S.W. Pacific. 36°46'S. 176°14'E. to 37°00'S. 176°14'E. Six birds.
13/10/62	(0645-0830M)	Sea area off Gt. Barrier Is., Cape Barrier to Whakatautuna Pt. Approx. 50 birds.
	(1640-1800M)	Sea area within 2 miles E. of Cape Barrier. Approx. 60 birds.
14/10/62	(1115-1230M)	S.W. Pacific. 36°24'S. 175°33'E. to 36°24'S. 175°46'E. Five birds.
	(1400-1405M)	S.W. Pacific. 36°22'S. 176°00'E. Three birds.
26/10/62	(1000M)	S.W. Pacific. 40°28'S. 176°51'E. Two birds.
28/10/62	(0915M)	Sea area between Kapiti Island and the Mainland. Six birds.
1/11/62	(1030-1230M)	Hawke Bay. Eight birds.
8/11/62	(0415-0530M)	S.W. Pacific. 36°10'S. 177°00'E. Four birds.
	(1100-1230M)	S.W. Pacific. 36°08'S. 177°10'E. Two birds.
	1700-1830M)	S.W. Pacific. 36°09'S. 177°08'E. Four birds.
9/11/62	(0430-0630M)	S.W. Pacific. 36°29'S. 176°21'E. to 36°28'S. 176°04'E. Six birds.
15/11/62	(0430-0630M)	S.W. Pacific. 36°08'S. 175°55'E. Eight birds.
	(1500M)	S.W. Pacific. 36°06'S. 175°44'E. Two birds.
19/11/62	(0840-1035M)	S.W. Pacific. 37°16'S. 177°47'E. to 37°26'S. 178°10'E. Two birds.
	(1430-1630M)	S.W. Pacific. 37°54'S. 178°35'E. to 38°20'S. 178°31'E. 171 birds.
20/11/62	(0430-0630M)	S.W. Pacific. 40°10'S. 177°19'E. to 40°27'S. 177°01'E. Two birds.
	1030M)	S.W. Pacific. 41°00'S. 176°22'E. Approx. 1,500 birds.
	(1430-1630M)	S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E. Nine birds.
21/11/62	(0430-0630M)	S.W. Pacific. 43°24'S. 173°42'E. to 43°38'S. 173°25'E. Forty birds.
	(0850-1000M)	S.W. Pacific. 43°54'S. 172°59'E. to 44°04'S. 172°49'E. 170 birds.
	(1400-1600M)	S.W. Pacific. 44°34'S. 172°14'E. to 44°50'S. 171°55'E. 240+ birds.
22/11/62	(0630M)	Off-shore approaches to Otago Harbour. 45°43'S. 170°50'E. Ten birds.
26/11/62	(1430-1630M)	S.W. Pacific. 46°19'S. 170°06'E. to 46°33'S. 169°45'E. 112 birds.
27/11/62	(0830-1030M)	W. approaches to Foveaux Strait. 46°26'S. 167°26'E. to 46°26'S. 167°03'E. Approx. 2,000 birds.
29/11/62	(0430-0610M)	Tasman Sea. 41°24'S. 160°05'E. to 41°10'S. 159°41'E. One bird.
	(1630-1900L)	Tasman Sea. 39°37'S. 157°48'E. to 39°15'S. 157°20'E. Five birds.

It may be significant that the Sooty Shearwater was not observed in the Tasman Sea in early October and only in small numbers further S. on two occasions in late November. It was frequently observed off

the entire length of the Eastern seaboard of New Zealand. The observations show that it was not seen during any watches kept in the Hauraki Gulf but was always noted in the turbulent waters off Cape Barrier in the Eastern approaches to the Gulf. Taken together the observations that the further southwards the ship progressed, the more Sooty Shearwaters were seen.

Many writers have shown diffidence when dealing with reports of sightings of very dark shearwaters in areas where Sooty, Wedge-tailed and Short-tailed Shearwaters *P. tenuirostris* are likely to occur (Robinson 1964). Such an area is the Tasman Sea. With a reasonable view, good light and a careful, systematic examination, specific identification of the bird in question should be possible. Table I summarises the "field characteristics" of each of the dark shearwaters.

TABLE I — CHARACTERISTICS OF SOME DARK SHEARWATERS OF THE TASMAN SEA REGION

	P. carneipes	*P. pacificus*	*P. griseus*	*P. tenuirostris*
Length	19"	15"	Variable, 16 - 20"	12"
Body appearance	Heavy build.	Slight build giving appearance of longish body.	Fairly heavy build.	Stock. Very short body behind wings.
Wings	Long & narrow.	Long & broadish, flexible.	Long & narrow. Stiffly held. Silver wing linings.	Long & narrow.
Bill	Large, heavy & straw-coloured.	Long & fine. Colour variable; appears darkish.	Long & dark.	Slender, small & dark.
Colour —				
(a) Upperparts	Chocolate brown.	Dark brown.	Dusky black.	Sooty brown.
(b) Underparts	ditto	Grey brown.	Medium brown.	Lighter than uppers.
Feet	Pink.	Dusky flesh; dark borders to leg and outer toe. Tips to feet dark. Flesh is variable, in some birds being absent.	Blue-grey.	As **griseus.**
Flight	Laboured with a flap & glide sequence.	Buoyant with much shearwatering. Flexible wing action at low wind speed (Force 2 and less).	Flutter & glide at low wind speed. Stiff-winged with much shearwatering at high wind speeds.	Flap & glide at low wind speeds. Swooping & soaring with shearwatering at high wind speed. Very fast.

Notes: (1) The wedge-shaped tail of **pacificus** is never obvious. I have only been satisfied with this characteristic with the bird in my hands.

(2) A white phase form of **pacificus** occurs, and appears rare in the Tasman Region. The underparts have white on the abdomen, breast and face.

(3) The salient differences of these species occur in body appearance, wings and manner of flight.

Puffinus tenuirostris. Short-tailed Shearwater.

1/10/62 (1630-1800K) Tasman Sea. 34°04'S. 155°51'E. to 34°05'S. 156°11'E. 49 birds.
2/10/62 (0500-0800K) Tasman Sea. 34°09'S. 158°35'E. to 34°09'S. 159°19'E. Approx. 300 birds.
(1430-1620K) Tasman Sea. 34°09'S. 160°49'E. to 34°09'S. 161°12'E. 47 birds.
3/10/62 (1030-1230L) Tasman Sea. 34°20'S. 164°22'E. to 34°09'S. 164°48'E. Approx. 300 birds.

There can be few more apt names for a seabird than that given to this bird. Differences between this and other dark shearwaters are given in Table I.

In early October a fairly vigorous depression moved slowly northwards through the Tasman Sea, the centre appearing to pass astern of the submarine. Thus from 1 to 4 October the wind was initially force 5 to 6, N.W. veering N. and N.E. and moderating slowly. On each of four daylight watches kept during this time, a passage of Short-tailed Shearwaters moving in a general S.W. direction was noted. The passage was fairly marked in the forenoon watches with parties averaging 7 birds but occasionally totalling 15 individuals. Other officers of the watch confirmed that the passage was continuous, with a marked movement in the morning easing off to a few birds in the early evening. Estimations of speed by 5 officers showed that the birds were progressing at speeds between 25 and 30 knots. The effortless flight involved a sequence of swooping and soaring. Calculations showed that a total of approximately 1,000 birds flew within half a mile of the submarine in daylight hours on both 2 and 3 November.

Puffinus gavia. Fluttering Shearwater.

5/10/62	(1120-1335M)	Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. Approx. 150 birds.
	(1630-1835M)	N. approaches to the Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. Twenty birds.
9/10/62	(1330-1800M)	S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. Approx. 100 birds.
13/10/62	(0645-0830M)	Sea area off Gt. Barrier Is., Cape Barrier to Whakatautuna Pt. Approx. 300 birds.
	(1640-1800M)	Sea area within 2 miles E. of Cape Barrier. Approx. 350 birds.
14/10/62	(1115-1230M)	S.W. Pacific. 36°24'S. 175°33'E. to 36°24'S. 175°46'E. 21 birds.
20/10/62	(0630M)	Hauraki Gulf. Approx. 3 miles off the S. coast of Little Barrier Island. Six birds.
6/11/62	(1430M)	Approaches to Auckland Harbour. One bird.
9/11/62	(1230-1430M)	S. Hauraki Gulf. 36°32'S. 175°11'E. to 36°42'S. 174°53'E. Approx. 100 birds.
16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E. Approx. 50 birds.
19/11/62	(1430-1630M)	S.W. Pacific. 37°54'S. 178°35'E. to 38°20'S. 178°31'E. Seven birds.
21/11/62	(0430-0630M)	S.W. Pacific. 43°24'S. 173°42'E. to 43°38'S. 173°25'E. 17 birds.
	(0850-1000M)	S.W. Pacific. 43°54'S. 172°59'E. to 44°04'S. 172°49'E. 34 birds.

This bird is a familiar winter visitor to the coastal waters off central N.S.W. During the period under review, it was only seen regularly and in sizeable flocks close to the islands off the N.E. coast of North Island between latitudes 35° and 37°S. and well inside the 100 fathom line. Elsewhere, it was seen between East Cape and Gable-end Foreland and in the offshore approaches to the Banks Peninsula. Fluttering Shearwaters showed a marked preference for the tidal eddies west of the Coromandel Peninsula and to the east of Great Barrier Island, depending upon the direction of the tidal stream in that region. It was also observed in the eddies just N. of Cape Brett.

I was impressed by the manner in which Fluttering Shearwaters along with gannets appeared to gravitate towards areas where shoals of small fish were being forced to the surface layers by submerged predators. On 13 October close to the E. coast of Great Barrier Island in a good light and with a calm sea, using radar and direct vision, gannets were observed to approach from 9 to 10 miles away while Fluttering Shearwaters converged from 3 to 4 miles away. The noise made by large shoals of fish is often detectable at fair ranges depending upon water conditions. The question which puzzles me relates to the manner in which these birds receive an indication of the presence of shoals of fish at such ranges. The Fluttering Shearwater seems to spend a considerable time at sea resting upon the water where it is conceivable that the bird may hear fish noise and be attracted to the source; once an individual is attracted, others follow in a "follow my

leader" order. Gannets appear to spend much of their time at sea in flight so that excellent eye-sight may provide the initial indication to the first birds; other birds following in a "follow my leader" order.

During the period, Fluttering Shearwaters were observed usually resting on the water. If large numbers were present then the birds gathered into small rafts of 20 to 60 individuals in each. They appeared to feed whenever the opportunity occurred. There was a tendency to use particular areas at particular times in the tidal cycle; this also applied, to a lesser extent, to the Pale-footed Shearwater. However, there was insufficient time available to confirm such a phenomenon by direct observation.

The taxonomics of the smaller *Puffinus* shearwaters have been discussed at length by Murphy (1936) and more recently by Bourne (1962). My $2\frac{1}{2}$ years in Australasian waters have been followed by $1\frac{1}{2}$ years service in the N.E. Atlantic. This 4-year period has allowed comparison of the Manx Shearwater *P. puffinus* with *gavia*. Certainly the flight and behaviour of these two at sea is similar in every respect. In appearance, they differ slightly in shape in that *gavia* is bulkier and has proportionately shorter and broader wings.

Puffinus assimilis. Dusky or Allied Shearwater.

2/10/62	(0500-0800K)	Tasman Sea.	34°09'S. 158°35'E. to 34°09'S. 159°19'E. One bird.
3/10/62	(1030-1230L)	Tasman Sea.	34°20'S. 164°22'E. to 34°30'S. 164°48'E. One bird.
4/10/62	(0830-1030L)	Tasman Sea.	34°29'S. 163°30'E. to 34°30'S. 169°03'E. Four birds.
5/10/62	(0530-0630M)	Sea area off North Cape, N.I.	Six birds.
	(1120-1335M)	Off-shore approaches to the Bay of Islands.	34°57'S. 174°02'E. to 35°16'S. 174°25'E. 25 birds.
	(1630-1835M)	N. approaches to the Hauraki Gulf.	35°46'S. 174°45'E. to 36°10'S. 174°54'E. Five birds.
9/10/62	(1330-1800M)	S.W. Pacific.	36°25'S. 175°45'E. to 36°40'S. 176°19'E. 18 birds.
11/10/62	(1030-1230M)	S.W. Pacific.	35°46'S. 176°14'E. to 37°00'S. 176°14'E. Three birds.
12/10/62	)0530-0630M)	S.W. Pacific.	36°29'S. 176°57'E. to 36°28'S. 176°43'E. Three birds.
13/10/62	(0545-0830M)	S.W. Pacific.	Sea area off Gt. Barrier Is., Cape Barrier to Whakatautuna Pt. Eight. birds.
14/10/62	(1115-1230M)	S.W. Pacific.	36°24'S. 175°33'E. to 36°24'S. 175°46'E. Two birds.
8/11/62	(0415-0530M)	S.W. Pacific.	36°10'S. 177°00'E. One bird.
	(1100-1230M)	S.W. Pacific.	36°03'S. 177°10'E. One bird.
9/11/62	(0430-0630M)	S.W. Pacific.	36°29'S. 176°21'E. to 36°28'S. 176°04'E. Five birds.
29/11/62	(0430-0610L)	Tasman Sea.	41°24'S. 160°05'E. to 41°10'S. 159°41'E. Two birds.

Since this is a winter breeder (Falla 1934), it was not surprising that it was encountered in the Tasman Sea on both passages across this region. Otherwise the species was seen off the N.E. coast of North Island between latitudes 34°20' and 37°S. on 12 occasions.

Observers at sea seem to experience some difficulty in differentiating between *P. assimilus* and *P. (p) gavia*. The following table summarises the differences between the species:

	P. assimilis	**P. gavia**
Length	11 ins.	13 ins.
Upperparts	Dark grey to black.	Back varying black to dark brown.
Underparts	White	White.
Body appearance	Compact & stubby with small head. Neckless.	Fairly bulky, largish head.
Wings	Longish and narrow.	Fairly long and broadish.
Flight:		
(a) Light to mod. winds	Stiff-winged with very rapid beats. Some shearwatering.	Laboured flap and glide sequence.
(b) High winds	Stiff-winged with shearwatering. Few wing beats, buoyant.	Flap and glide sequence with some shearwatering.
Bill	Small.	Fairly long.
Legs & feet	Grey.	Pink.

Gavia seems to be more gregarious in its behaviour and is more likely to be seen settled upon the water, whereas *assimilis* is more likely to be encountered in flight and individually.

Pterodroma macroptera. Great-winged Petrel.

1/10/62	(1630-1800K)	Tasman Sea.	34°04'S. 155° 51'E. to 34°05'S. 156°11'E. Five birds.
2/10/62	(0500-0800K)	Tasman Sea.	34°09'S. 158°35'E. to 34°09'S. 159°19'E. Five birds.
	(1430-1620K)	Tasman Sea.	34°09'S. 160°49'E. to 34°09'S. 161°12'E. 20– birds.
3/10/62	(1030-1230L)	Tasman Sea.	34°20'S. 164°22'E. to 34°20'S. 164°45'E. 14 birds.
4/10/62	(0830-1030L)	Tasman Sea.	34°29'S. 168°30'E. to 34°30'S. 169°03'E. 10 birds.
	(1700-1800L)	Tasman Sea.	34°29'S. 171°29'E. to 34°29'S. 171°40'E. Five birds.
5/10/62	(1630-1835M)	N. approaches to the Hauraki Gulf. 35°46'S. 174° 45'E. to 36°10'S. 174°54'E. Two birds.	
9/10/62	(1330-1800M)	S.W. Pacific.	36°25'S. 175°45'E. to 36°40'S. 176°19'E. Ten birds.
11/10/62	(1030-1230M)	S.W. Pacific.	36°46'S. 176°14'E. to 37°00'S. 176°14'E. Eight birds.
12/10/62	(0530-0630M)	S.W. Pacific.	36°29'S. 176°57'E. to 36°28'S. 176° 43'E. Twelve birds.
1/11/62	(1030-1230M)	Hawke Bay.	Four birds.
8/11/62	(0415-0530M)	S.W. Pacific.	36°10'S. 177°00'E. Twelve birds.
	(1100-1230M)	S.W. Pacific.	36°08'S. 177°10'E. Eleven birds.
	(1700-1830M)	S.W. Pacific.	36°09'S. 177°08'E. Six birds.
9/11/62	(0430-0630M)	S.W. Pacific.	36°29'S. 176°21'E. to 36°28'S. 176°04'E. Ten birds.
19/11/62	(0840-1035M)	S.W. Pacific.	37°16'S. 177°47'E. to 37°26'S. 178°10'E. Four birds.
20/11/62	(0430-0530M)	S.W. Pacific.	40°10'S. 177°19'E. to 40°27'S. 177°01'E. Three birds.
	(1430-1630M)	S.W. Pacific.	41°30'S. 175°50'E. to 41°47'S. 175°35'E. Two birds.
27/11/62	(1630-1830M)	Tasman Sea.	45°54'S. 166°07'E. to 45°44'S. 165°53'E. One bird.
29/11/62	(1630-1900L)	Tasman Sea.	39°37'S. 157°48'E. to 39°15'S. 157°20'E. 17 birds.
30/11/62	(1440-1630L)	Tasman Sea.	36°40'S. 154°16'E. to 36°23'S. 153°50'E. 22 birds.

On the east-bound transit of the Tasman Sea this petrel was observed in small numbers on all six periods of observation. It was only seen during the second half of the return passage to Sydney. The analysis of sightings around New Zealand showed that this bird was more often found either in the region of the 100 fathom line or beyond over deeper water. Thus it was observed on 2 of 14 periods within the 100 fathom line off North Island and on 10 out of 12 either on or outside this line. It was not observed during any one of the 8 watches off South Island.

All the individuals of this species which I saw in the Tasman Sea region had the conspicuous grey face of the race *gouldi.* Uniformly dark brown with the grey patch around the bill and on the throat, the Great-winged Petrel has a spectacular flight in rough weather. It sweeps along in a series of towering sine waves often reaching heights of 35 to 50 feet at the peaks of its progress, the wings looking like great scythes. In calmer water the flight sequence is a flap and glide. The reaction of this petrel to shipping seems indeterminate: some follow, while others take no notice.

Pterodroma lessoni. White-headed Petrel.

29/11/62 (1630-1900L) Tasman Sea. 39°37'S. 157°48'E. to 39°15'S. 157°20'E. One bird.

One bird was seen resting on a calm sea in company with ten Great-winged Petrels. Lieutenant B. F. King, U.S.N. (1964) likened *lessoni* to a miniature albatross in colouration; in calm weather, there are also similarities in flight. In rough weather the flight resembles that of *P. macroptera* but is not so spectacular. White-headed Petrels appear to ignore the proximity of shipping.

Pterodroma inexpectata. Mottled Petrel.

27/11/62 (0830-1030M) W. approaches to Foveaux Strait. 46°26'S. 167°26'E. to 46°26'S. 167°03'E. Four birds.
(1630-1830M) Tasman Sea. 45°54'S. 166°07'E. to 45°44'S. 165°53'E. Three birds.

The region where the "Rain-bird" was observed lies to the west of the breeding islands of the species around Stewart Island described by Richdale (1964). This writer suggests that Cuvier Island, E. of the Coromandel Peninsula is also a breeding station; in view of the time spent in the E. approaches to the Hauraki Gulf without seeing this petrel, it seems unlikely that it breeds there now, if it ever did.

This petrel is a distinctive bird out to a range of 100 yards and its appearance has been frequently described. However, little prominence has been given to the most noticeable underwing pattern when the bird is seen at sea. Basically this pattern is white with moderately thick, black edging; from the carpel joint region to that of the abdomen is a thin band of grey. In some individuals, this band is conspicuous while in others it was faint. On 27 November the wind conditions were force 4 to 5. The petrel flew on longish, narrow wings with low swooping and soaring. No flapping was really seen but the species gave the impression of being stiff-winged.

Pterodroma arminjoniana heraldica. Herald Petrel.

30/11/62 (1440-1630L) Tasman Sea. 36°40'S. 154°16'E. to 36°23'S. 153°50'E. Two birds.

One of the most difficult problems associated with the identification of the gad-fly petrels of the genus *Pterodroma* in the Tasman region is that a large series of polymorphic species occus in the S.W. Pacific. Therefore, whenever a strange gad-fly petrel appeared, I found it imperative to make copious notes upon every aspect of the bird's appearance. A measurement of the water temperature is of great help, too.

The observation relates to two individuals of this series of petrels. The sea was calm, the weather fine and the water temperature relatively high. The birds were resting on the water with a party of Great-winged Petrels some way ahead of the submarine. As the ship approached, the party got up and flew towards us to settle finally at a range of 100 yards. The ship steamed past the group which remained settled until it was lost from sight far astern. After consultation with Dr. W. R. Bourne, I think that they must have been Herald Petrels which have been observed by Warham along the Great Barrier Reef off Queensland (Warham 1959).

The following is a summary of the description taken that afternoon. Length and shape similar to the Great-winged Petrels but a little smaller. Upperparts generally grey-brown; primaries, leading edge of the wings, crown and breast-band blackish-brown, tending to be very dark on the primaries. Undersides of the wings, lightish brown. Face, forehead and remaining underparts white. In one bird, the abdomen to the upper breast-band was dusky brown. Palish shafts to the primaries above and below were not conspicuous. Bill dark. Flight, a flap and glide sequence, being fairly buoyant.

The size of these two birds limited the identification to three species: the Kermadec Petrel *P. neglecta,* the Phoenix Petrel *P. alba* and the Herald Petrel. Although *neglecta* tends to vary from having an entirely dark head and underparts to having a white head and underparts, it does not appear to have the very dark and well-defined breast band whereas *alba* and *heraldica* do. *Alba* has a sooty black face. *Neglecta* always shows conspicuous white patches in the webs of the primaries, a useful field characteristic emphatically indicated by Murphy (1936).

COOKILARIA PETRELS

It was most fortunate that in June, 1962, Captain P. P. O. Harrison's book "Seabirds of the South Pacific" was published for it produced in pocket book form among other things, a basis for the visual identification of the species of this group. "Cookilaria" petrels have long been regarded as impossible to identify at sea unless

examined in the hand. Murphy (1936) has shown how an observer may differentiate between *P. cooki* and *P. leucoptera*. Before H.M.S. TABARD left Sydney for New Zealand waters, I examined the skins available in the Australian Museum, Sydney, besides examining all the references available.

Pterodroma cooki. Cook's Petrel.

9/10/62	(1330-1800M)	S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. 15 birds.
11/10/62	(1030-1230M)	S.W. Pacific. 36°46'S. 176°14'E. to 37°00'S. 176°14'E. Two birds.
13/10/62	(0645-0830M)	Sea area off Gt. Barrier Is., Cape Barrier to Whakatautuna Pt. Three birds.
	(1640-1800M)	Sea area within 2 miles E. of Cape Barrier. Nine birds.
14/10/62	(1400-1405M)	S.W. Pacific. 35°22'S. 176°00'E. Two birds.
8/11/62	(0415-0530M)	S.W. Pacific. 36°10'S. 177°00'E. One bird.
	(1100-1230M)	S.W. Pacific. 36°08'S. 177°10'E. Four birds.
	(1700-1830M)	S.W. Pacific. 36°09'S. 177°08'E. Five birds.
9/11/62	(0430-0630M)	S.W. Pacific. 36°29'S. 176°21'E. to 36°28'S. 176°04'E. One bird.
15/11/62	(0430-0630M)	S.W. Pacific. 36°08'S. 175°55'E. One bird.
	(1500M)	S.W. Pacific. 36°06'S. 175°44'E. One bird.
16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E. Seven birds.
19/11/62	(0840-1035M)	S.W. Pacific. 37°16'S. 177°47'E. to 37°26'S. 178°10'E. One bird.

The thirteen positive observations of this petrel were made with one exception near Great and Little Barrier Islands or within 80 miles to the east of Great Barrier. The exception occurred some 15 miles north of Cape Runaway, North Island. In the straits between Great Brarier Island and the Coromandel Peninsula individuals were observed moving E. on each of two early morning watches (0630-0830). On the only occasion that a watch was kept in this area in the early evening (1640-1800) nine Cook's Petrels moved westwards in to the Hauraki Gulf. The remaining nine watches during which this petrel was seen were kept when the ship was in the region of the 100 fathom line or beyond. Two watches were kept within 5 miles of Little Barrier Island, the breeding area of *cooki*, and during my visit to the island from 16 to 19 October I made numerous sea watches from the shore in the S.W. quarter of the island. I saw nothing of the "ring of Cook's Petrels" which Sibson (1949) stated surrounds the island by day in considerable depth.

This paper is principally concerned with observations made at sea; nevertheless, notes upon this petrel during my stay on Little Barrier Island may be of interest. During the day nothing was seen or heard of Cook's Petrel. The first were regularly heard to arrive over the coast of the island at approximately 1850 despite considerable variation in the weather and begin the ascent to the nesting areas between the 1,000 feet contour and the 2,370 feet summit of Mount Hauturu (Turbott, 1947 et al.). From then until 0030 this passage continued, with the air full of the chattering cries of the petrels. The volume of noise seemed loudest from 1930 until 2200. A spotlight was frequently used as a searchlight, and revealed tens of the birds crossing the Te Maraeroa at the S.W. corner of the island to begin the ascent with a hesitant, bat-like flight which was quite unlike their flight at sea. At approximately 2300 the volume of sound decreased and by 0030 the passage appeared to have stopped. No birds were observed to fly seawards from 1850 to 0300. On 18 October a watch was continued until 0200; from 0030 until 0200 no Cook's Petrels were seen or heard. On all four days the wind had a southerly component and blew force 1 to 5 over the period. It seemed to be possible that the birds used the updraft on the S. side of the island to ascend on arrival and flew down wind on departure, i.e. departed over the N. coast. Every morning several individuals were found. These had either collided

with the branches of trees in the forest and had either fallen to the ground where feral cats had usually killed them or remained caught in the trees, from when a few were extricated in an exhausted state. They died shortly after. Measurements of a dozen birds showed a variation in overall length of from 10.3 to 11 inches.

Pterodroma leucoptera. Gould's Petrel.
29/11/62 (1630-1900L) Tasman Sea. 39°37'S. 157°45'E. to 39°15'S. 157°20'E. Two birds.
30/11/62 (1440-1630L) Tasman Sea. 36°40'S. 154°16'E. to 36°23'S. 153°50'E. Three birds.

Navigation and measurements of surface water temperature had shown that the submarine was under the influence of the warm East Australian Current which flows southwards from the tropics, when this "Cookilaria" Petrel was encountered in calm weather. On 29 November two birds were seen together and passed close flying S.E. while the following day, three more were seen together meandering southwards. The contrast between the dark dorsal surfaces and the white underparts of Gould's Petrel is quite striking.

STORM-PETRELS

Four species of this intriguing family were seen in New Zealand waters during the period, while the fifth was encountered in the warmer waters of the western Tasman Sea. It has been found that when learning to identify unfamiliar storm-petrels at sea, the birds must approach to well within 100 yards before more than an inspired guess is possible. Fortunately, these tiny birds often approached much closer to the submarine, and many excellent views were obtained sometimes at ranges better measured in feet than in yards.

Oceanites oceanicus. Wilson's Storm-Petrel.
8/11/62 (1100-1230M) S.W. Pacific. 36°08'S. 177°10'E. One bird.
29/11/62 (1630-1900M) Tasman Sea. 39°37'S. 157°45'E. to 39°15'S. 157°20'E. Two birds.

The only Wilson's Storm-Petrel seen in New Zealand waters was seen some 80 miles E. of Great Barrier Island; it remained around the submarine for nearly 5 minutes.

Two species of Storm-petrel generally coloured black and having white rumps have been recorded around the Dominion: Leach's Storm-Petrel, *Oceanodroma leucorhoa* and Wilson's. The latter, being an Antarctic breeder, seems more likely to be encountered. The following table demonstrates the differences:

	O. oceanicus	**O. leucorhoa.**
Length	7ins.	8¼ ins.
Upper parts & wings	Black. White rump. Pale wing coverts.	Sooty black. White rump with grey centre.
Underparts	Slightly paler than back.	Blackish.
Bill	Short, black.	Short, black.
Legs and feet	Long, extending beyond tail in flight. Appear black.	Short, not extending beyond tail in flight. Black.
Tail	Short and square.	Medium length and forked.

Perhaps the most notable difference between the two species is in the manner of flight. That of *oceanicus* is a sequence of erratic gliding and fluttering interspersed with bouts of hovering and pattering. The flight of *leucorhoa* is more direct, faster and bounding. Wilson's follows shipping while Leach's does not. Many observers have claimed that it is possible to see the yellow webs of *oceanicus* at sea; I have only found this possible on one occasion out of nearly 50 with the bird down-sun at 15 yards range. Thus, this 'aid' to sight identification is best forgotten.

Pelagodroma marina. White-faced Storm-Petrel.

5/10/62	(1630-1835M)	N. approaches to Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. Two birds.
9/10/62	(1330-1800M)	S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. Fourteen birds.
11/10/62	(1030-1230M)	S.W. Pacific. 36°46'S. 176°14'E. to 37°00'S. 176°14'E. One bird.
14/10/62	(1400-1405M)	S.W. Pacific. 36°22'S. 176°00'E. 43 birds.
8/11/62	(1700-1830M)	S.W. Pacific. 36°09'S. 177°08'E. 2 birds.
9/11/62	(0430-0630M)	S.W. Pacific. 36°29'S. 176°21'E. to 36°28'S. 176°04'E. Eleven birds.
15/11/62	(0430-0630M)	S.W. Pacific. 36°08'S. 175°55'E. Two birds.
	(1500M)	S.W. Pacific. 36°06'S. 175°44'E. Three birds.
16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E. Four birds.

This storm-petrel was only found off the N.E. of North Island and was observed during 9 of 20 watches. Of these, it was seen on 2 of 10 periods well inside the 100 fathom line, on each of 6 periods spent close to the 100 fathom line while in deeper water far off shore it was found once in four watches. Again, the numbers seen in any single period were seen along the edge of the littoral region.

This bird is comparatively easy to identify. It is about 8 inches long, having darkish grey upperparts, a very pale rump, a dark terminal bar across the tail and a white forehead and underparts. It has a dusky patch under the eye and on the sides of the breast. The flight feathers are very dark. The Grey-backed Storm Petrel, *Garrodia nereis,* is the only other grey and white storm-petrel of New Zealand waters and lacks the white forehead and pale rump, besides being smaller.

During lulls between exercises in calm weather, it was customary to remain at periscope depth moving slowly with the officer of the watch using one periscope and the author the other for observation of birds and fish. On 14 October during such a period in the early afternoon, a total of 43 White-faced Storm Petrels were seen pattering very close to the periscope. With wings out-spread and heading into a gentle breeze, these birds used their very long legs to bounce and jump forward. On occasions, the range was so short that the small splashes of water caused by the feet striking the water were clearly seen. Fairly frequently the birds dipped their bills to pick at the surface of the water. By dipping the periscope below the surface it was noted that some small marine animal life was close to the surface in spite of strong sunlight.

Fregetta. Storm-Petrels.

Fregetta grallaria. White-bellied Storm Petrel.

1/10/62	(1630-1800K)	Tasman Sea. 34°04'S. 155°51'E. to 34°05'S. 156°11'E. Three birds.

Fregetta tropica. Black-bellied Storm Petrel.

2/10/62	(1430-1630K)	Tasman Sea. 34°09'S. 160°49'E. to 34°09'S. 161°12'E. One bird.
5/10/62	(1630-1835M)	N. approaches to Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. One bird.
4/10/62	(0830-1030L)	Tasman Sea. 34°29'S. 168°30'E. to 34°30'S. 169°03'E. Three birds.
	(1700-1800L)	Tasman Sea. 34°29'S. 171°29'E. to 34°29'S. 171°40'E. One bird.
29/11/62	(1630-1900L)	Tasman Sea. 39°37'S. 157°45'E. to 39°15'S. 157°20'E. One bird.

Ornithologists seem to have the greatest difficulty in identifying the two storm-petrels of this group. I have seen the White-bellied Storm-Petrel, *F. grallaria,* in tropical waters such as the Coral Sea and as far south as 34°S. in the Tasman Sea where surface waters temperatures have been warm. On the other hand, the Black-bellied Storm-Petrel, *F. tropica,* has been observed in cooler water and in higher latitudes. Murphy (1936) has represented that *tropica* is thoroughly mis-named bird for it breeds at high latitudes close to the Antarctic while *grallaria* is a breeder on islands near the Sub-tropical Convergence. On the scanty evidence available, it seems that both species migrate

to the tropical and sub-tropical areas in the non breeding season. Thus it would seem that *tropica* is the more likely of these two to occur in New Zealand waters. The observations of these storm-petrels during this period fit this pattern.

Both Fregetta Storm-Petrels are disposed to follow ships with a flutter and hop sequence. When following the submarine, they seemed to prefer the wash and to approach the stern from the lee quarter. Specific identification was usually possible when the bird suddenly sheared away when close under the quarter, when a good view was obtained of the entire ventral surface. On several occasions, individuals approachd very close to leeward abreast of the bridge. In strong wind, air turbulence around the bridge, a fin-like structure, frequently caused the bird to tilt suddenly on its side thereby allowing a very good view of the underparts. The Black-bellied Storm-Petrel seen in the Northern approaches to the Hauraki Gulf on 5 October was observed for nearly half an hour as it repeatedly approached from each quarter until close under the stern to allow a long series of excellent views in the evening sunlight.

In *tropica,* the upperparts, head, throat, upper breast, wings, tail and under tail-coverts are a sooty black while the rump, upper tail-coverts, wing linings and remaining underparts are white. From the centre of the upper breast, through the abdomen to the under-tail coverts is a fairl ythick, sooty black line. The tail is short and square. The feet do not project beyond the tail in flight. In *grallaria* at a distance the only difference is the lack of the stripe through the abdomen. If a good, close view is obtained, then the upperparts are a greyish black and the median wing coverts are a fairly conspicuous greyish brown. The problem of identification is complicated by variable amounts of dark streaking on the under sides of *grallaria.* However, this problem was resolved in good light by examination of the wing coverts and the colour of the dorsal surfaces.

Garrodia nereis. Grey-backed Storm-Petrel.

21/11/62	(0430-0630M)	S.W. Pacific.	43°24'S.	173°42'E.	to 43°38'S. 173°25'E.	One bird.
	(1400-1600M)	S.W. Pacific.	44°34'S.	172°14'E.	to 44°50'S. 171°55'E.	One bird.
27/11/62	(1630-1830M)	Tasman Sea.	45°54'S.	166°07'E.	to 45°44'S. 165°53'E.	One bird.
28/11/62	(0430-0630M)	Tasman Sea.	44°25'S.	164°18'E.	to 44°10'S. 163°58'E.	Three birds.

It was expected that this storm-petrel would be found to the S. of the approximate position of the Subtropical Convergence as the submarine steamed S. towards Dunedin. On the night of 20/21 November the surface water temperature dropped 7°F. and early the following morning as we approached the Banks Ueninsula a single bird was seen. The last observation occurred when 3 were seen together 150 miles W. of Milford Sound over very cold surface water.

G. nereis is a distinctive bird, generally grey on the dorsal surfaces, having a darkish head, fore-wings and flight feathers and a very dark and fairly thick, terminal bar across the tail. The underparts and under wing coverts are white. The flanks showed some variation from light dusky grey in one bird to white in others. The feet projected slightly beyond the square tail in flight which is strongly reminiscent of that of the Wilson's Strom-Petrel. The overall length is about 7 ins. This species showed no interest in the presence of the submarine.

DIVING-PETRELS

Pelecanoides urinatrix. Common Diving-Petrel.

5/10/62	(1120-1335M)	Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. 75 birds.
	(1630-1835M)	N. approaches to Hauraki Gulf. 35°46'S, 174°45'E. to 36°10'S. 174°54'E. 21 birds.
13/10/62	(1640-1800M)	Sea area off Cape Barrier, Great Barrier Island, N.I. 11 birds.
14/10/62	(1400-1405M)	S.W. Pacific. 36°22'S. 176°00'E. One bird.
9/11/62	(0430-0630M)	S.W. Pacific. 36°29'S. 176°21'E. to 36°28'S. 176°04'E. Approx 70 birds.
15/11/62	(0430-0630M)	S.W. Pacific. 36°08'S. 175°55'E. One bird.
	(1500M)	36°06'S. 174°44'E. One bird.
16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E. 11 birds.
21/11/62	(1400-600M)	S.W. Pacific. 44°34'S. 172°14'E. to 44°50'S. 171°55'E. One bird.
27/11/62	(0830-1030M)	W. approaches to the Foveaux Strait. 46°26'S. 167°26'E. to 46°26'S. 167°03'E. Fifteen birds.
	(1630-1830M)	Tasman Sea. 45°54'S. 166°07'E. to 45°44'S. 165°53'E. One bird.

To any ornithologist from the North Atlantic region, this family represents a remarkable example of convergence. It was only with the greatest difficulty that several ship's officers were convinced that these birds were not Little Auks *Plautus alle.* Analysis of the observations shows that these diving-petrels were observed on 8 of 14 occasions from Cape Brett to the vicinity of the Mercury Islands and in the Hauraki Gulf region. Off North Island it was not observed out of the littoral zone. Elsewhere, it was seen on 3 of 8 periods off South Island in small numbers. With the exception of a group of over fifty encountered off Cape Brett, the birds were never seen in groups of more than eight and frequently they occurred in one's and two's.

Over the entire period covered by these notes there seemed to be an increasing incidence of diving-petrels with plumage of lighter colour. According to Falla (1934) the period October/November forms the latter half of the breeding period which is followed by the annual moult. In these faded individuals, the gloss of the black upperparts and the wings was gone and they now seemed to be washed with darkish grey/brown. The deep grey on the sides of the neck and breast had faded to mid-grey, and, on occasions, seemed to be almost completely replaced by a dirty white. The underparts of some birds appeared badly soiled. It seems that this could be the result of nesting activities or the early onset of moult.

OTHER SEABIRDS

Sula serrator. Australian Gannet.

5/10/62	(1120-1335M)	Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. Twelve birds.
	(1630-1835M)	N. approaches to the Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. Thirteen birds.
13/10/62	(0645-0830M)	Sea area off Gt. Barrier Is., Cape Barrier to Whakatautuna Pt. Twenty birds.
	(1640-1800M)	Sea area within 2 miles E. of Cape Barrier. Approx. 120 birds.
14/10/62	(1115-1230M)	S.W. Pacific. 36°24'S. 175°33'E. to 36°24'S. 175°46'E. 30 birds.
9/11/62	(1230-1430M)	S. Hauraki Gulf. 36°32'S. 175°11'E. to 36°42'S. 174°58'E. Approx. 50 birds.
16/11/62	(0615-0830M)	S. Hauraki Gulf. 36°22'S. 175°23'E. to 36°35'S. 175°00'E. 160 birds.
19/11/62	(1430-1630M)	S.W. Pacific. 37°54'S. 178°35'E. to 38°20'S. 178°31'E. 12 birds.
21/11/62	(0850-1000M)	S.W. Pacific. 43°54'S. 172°59'E. to 44°04'S. 172°49'E. One bird.

Apart from a single sighting off Waipiro, North Island, and another off the Banks Peninsula, gannets were seen only near the islands off the N.E. coast of North Island. Numbers were always present in the Hauraki Gulf usually fishing with shearwaters. Gannets were not found well out to sea and seemed to be coastal rather than offshore

in their distribution. Furthermore, I was surprised that on the two occasions when "Tabard" passed Cape Kidnappers some 25 miles offshore and on the surface, no gannets were seen.

Catharacta skua. Southern Skua.

27/11/62 (0830-1030M) W approaches to the Foveaux Strait. 46°26'S. 167°26'E. to 46°26'S. 167°03'E. One bird.

Stercorarius parasiticus. Arctic Skua.

9/11/62 (1230-1430M) S. Hauraki Gulf. 36°32'S. 175°11'E. to 36°42'S. 174°53'E. Two birds.
20/11/62 (0430-0630M) S.W. Pacific. 40°10'S. 177°19'E. to 40°27'S. 177°01'E. Two birds.
29/11/62 (1630-1900L) Tasman Sea. 39°37'S. 157°45'E. to 39°15'S. 157°20'E. One bird.

Larus dominicanus. Southern Black-backed Gull.

5/10/62 (0530-0630M) Sea area off North Cape, N.I. One adult, two immatures.
(1120-1335M) Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. Two adults.
(1630-1830M) N. approaches to the Hauraki Gulf. 35°46'S. 174°45'E. to 36°10'S. 174°54'E. One adult.
9/10/62 (1800M) S.W. Pacific. 36°40'S. 176°19'E. Four adults.
28/10/62 (0900-1000M) Sea area between Kapiti Is. and the Mainland. Approx. 50 birds.
19/11/62 (0840-1035M) S.W. Pacific. 37°16'S. 177°47'E. to 37°26'S. 178°10'E. One adult.
(1430-1630M) S.W. Pacific. 37°54'S. 178°35'E. to 38°20'S. 178°31'E. Eleven adults, two immatures, five juveniles.
20/11/62 (0430-0630M) S.W. Pacific. 40°10'S. 177°19'E. to 40°27'S. 177°01'E. One immature.
20/11/62 (1430-1630M) S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E. Five adults, one immature.
21/11/62 (0430-0630M) S.W. Pacific. 43°24'S. 173°42'E. to 43°38'S. 173°25'E. Four adults, one immature.

This is the only gull which was seen out of coastal waters. On each of the ten watches during which this bird was observed, the weather was fine and the sea calm. On 9 October four adults settled on the fore-casing of the submarine which was stopped. They remained for nearly half an hour. They disgorged a large quantity of grey sludge and then began to feed; once one bird had completed its own portion it tried to steal from one of its neighbours on several occasions. Such intrusions were successfully repulsed.

Larus novae-hollandiae. Silver Gull.

5/10/62 (1120-1335M) Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. Approx. 150 birds.
28/10/62 (0900-1000M) Sea area between Kapiti Is. and the Mainland. Approx. 40 birds.

Sterna striata. White-fronted Tern.

5/10/62 (1120-1335M) Off-shore approaches to the Bay of Islands. 34°57'S. 174°02'E. to 35°16'S. 174°25'E. 64 birds.
9/10/62 (1330-1800M) S.W. Pacific. 36°25'S. 175°45'E. to 36°40'S. 176°19'E. 5 birds.
13/10/62 (1640-1800M) Sea area within 2 miles and E. of Cape Barrier, Gt. Barrier Island. Two birds.
20/10/62 (0630) Hauraki Gulf. Approx. 3 miles off the S. coast of Little Barrier Island. One bird.
28/10/62 (0900-1000M) Sea area between Kapiti Is. and the Mainland. Six birds.
9/11/62 (1230-1430M) S. Hauraki Gulf. 36°32'S. 175°11'E. to 36°42'S. 174°53'E. Approx. 80 birds.
20/11/62 (1430-1630M) S.W. Pacific. 41°30'S. 175°50'E. to 41°47'S. 175°32'E. Eight birds.
21/11/62 (0850-1000M) S.W. Pacific. 43°54'S. 172°59'E. to 44°04'S. 172°49'E. Four birds.
29/11/62 (0430-0610L) Tasman Sea. 41°24'S. 160°05'E. to 41°10'S. 159°41'E. One bird.

The individual seen on 29 November was an immature bird flying westwards in calm weather.

SUMMARY

In October and November, 1962, sightings of 38 species of sea-birds were made from H.M. Submarine TABARD in the Tasman Sea and around New Zealand. In addition, further observations were achieved at Taiaroa Head and during a visit to Little Barrier Island. Descriptions taken at sea together with relative differences of albatrosses and storm-petrels are given; this information results from 2½ years watching in the Australasian Region.

Analysis suggests that there was a departure from the N.E. and E. coasts of North Island of Wandering Albatrosses and Giant and Pintado Petrels in the first two weks of November. Some evidence was found to account for albatrosses only occurring outside the littoral region north of the Bay of Plenty. The 100 fathom line seemed to be of importance to the distribution in spring of the White-faced Storm-Petrel, the Fluttering Shearwater and the Common Diving-Petrel to the East of Great Barrier Island. It is likely that the feeding habits of the Fluttering and Pink-footed Shearwaters in the Hauraki Gulf are related to the tidal cycle. The speed of a penguin under water was calculated and the submerged swimming of the Fluttering Shearwater was seen. The means by which Fluttering Shearwaters and Gannets achieved indication of the proximity of shoals of fish are discussed; Gannets are attracted from 9 miles and Fluttering Shearwaters from 4 miles. The Herald Petrel was seen 170 miles east of Montagu Island, N.S.W. The position of the Subtropical Convergence off the E. coast of the Dominion and in the Tasman Sea was determined.

ACKNOWLEDGMENTS

I am very grateful to Dr. W. R. P. Bourne for his encouragement, interest and criticism throughout the preparation of this paper, and to the many members of the Royal Naval Bird-Watching Society, particularly Lieutenant Commander R. O. Morris, R.N., whose records from the Tasman Sea and waters around New Zealand have provided much useful background information. My thanks are due to the Director and staff of the Australian Museum, Sydney, for allowing me access to the collection of skins and to the library. I am indebted to the officers of the Dominion Department of Crown Lands for permitting me to visit Little Barrier Island, Kapiti and Taiaroa Head sanctuary, and to the caretakers of those sanctuaries for their attention. R. B. Sibson and F. C. Kinsky kindly provided me with a mass of relevant information which enabled me to gain much value and enjoyment from my stay in their country. Dr. A. Olssen of the Naval Research Laboratory, Auckland, was always ready to answer my queries about the marine biology of the Hauraki Gulf and its ocean approaches. His kindness has been much appreciated. Finally, my Commanding Officer, fellow officers and the other members of the ship's company showed commendable restraint when faced with my constant demands to help with counting the birds and other requirements; without their co-operation, I could not have gathered all the information in addition to fulfilling my normal duties. I am grateful to them all.

REFERENCES

ALEXANDER, W. B., 1955: Birds of the Ocean. New York & London.

BOURNE, W. R. P., 1962: Article on Shearwaters in Palmer, R.S. (ed). Handbook of North American Birds, Vol. I. New Haven & London.

BOURNE, W. R. P., 1963: A Review of Oceanic Studies of the Biology of Seabirds. Proc. XIII Internat. Orn. Congr., Ithaca, N.Y., 1962: 831 - 854.

BOURNE, W. R. P., 1964: Article 'Petrel' in Thomson, A. L. (ed.). New Dict. Birds. London & New York.

BOURNE, W. R. P., 1960: The petrels of the Indian Ocean. Sea Swallow 13: 26 - 36.

BOURNE, W. R. P., 1961: Notes on observations of sea-birds received during 1960. Sea Swallow 14: 7 - 27.

BOURNE, W. R. P., 1962: Observations of Sea Birds. Sea Swallow 15: 7 - 27.

BOURNE, W. R. P., 1963: Observations of Sea Birds. Sea Swallow 16: 9 - 40.

BULLER, W. L., 1888: A History of the Birds of New Zealand. 2nd Ed. 2 Vols. Buller: London.

FALLA, R. A., 1934: The distribution and breeding habits of petrels in northern New Zealand. Rec. Auckland (New Zealand) Inst. Mus. I (5): 245 - 260.

FALLA, R. A., 1942: Review of the smaller Pacific forms of **Pterodrom** and Cookilaria. Emu 42: 111 - 118.

FALLA, R. A., 1953: (Discussion on the migration of **P. tenuirostris**). Proc. 7th Pacific Sci. Congr. 4: 407.

FLEMING, C. A., 1941: Notes on neozelanic forms of the subgenus Cookilaria. Emu 41: 69 - 80.

FLEMING, C. A., et al., 1953: Checklist of New Zealand Birds. Wellington.

Fleming, C. A., 1954: North Island Record of the Black-winged Petrel. Notornis 6: 20 - 21.

GIBSON, J. D., & SEFTON, A. R., 1962: First Australian record of the Royal Albatross. Emu 62: 167 - 168.

HAMILTON, W. M., et al., 1961: Little Barrier Island (Hauturu). N.Z.D.S.I.R. Bull. 137. Wellington

HARRISON, P P. O., 1962: Sea Birds of the South Pacific. Narbeth.

JACKSON, R., 1958: The Westland Petrel. Notornis 7 (8): 230 - 233.

KURODA, N., 1957: A brief note on the pelagic migration of the Tubinares. Misc. Rep. Yamashina's Inst. Orn. II.

KURTH, D. E., 1951: The Mewstone rookery of the White-capped Albatross. Emu 51: 76 - 77.

LOCKLEY, R. M., 1942: Shearwaters. London.

LAYARD, E. L., 1863: Ornithological notes from the Antipodes. Ibis 5 (19): 241 - 250.

LOOMIS, L. M., 1918: Review of albatrosses, petrels and diving-petrels. Proc. Calif. Acad. Sci. (4) 2, pt. 2: 1 - 187.

LOOMIS, L. M., 1921· Remarks on the migration of southern hemisphere albatrosses and petrels. Auk 8: 528.

MACDONALD, D., & GREEN, R. H., 1963: Albatross Island. Emu 63: 23 - 31.

MARSHALL, A. J., & SERVENTY, D. L., 1956: The breeding cycle of the Short-tailed Shearwater **P. tenuirostris** in relation to trans-equatorial migration and its environment. Proc. Zool. Soc. Lond. 127: 489 - 510.

McGILL, A. R., 1960: A Handlist of the Birds of New South Wales. Sydney.

MORELAND, J., 1957: A Guide to the Larger Oceanic Birds of N.Z. Waters. Tuatara 6 (3): 99 - 107.

MURPHY, R. C., 1936: Oceanic Birds of South America. 2 vols. New York.

MURPHY, R. C., & PENNOYER, J. M., 1952: Larger petrels of the genus **Pterodroma.** Amer. Mus. Novit. no. 1596: 1 - 17.

MURPHY, R. C., & SNYDER, J. P., 1952: The 'Pealea' phenomenon and other notes on storm-petrels. Amer. Mus. Novit. no. 1596.

OLIVER, W. R. B., 1955: New Zealand Birds. Wellington.

PHILLIPS, J. H., 1963: The pelagic distribution of the Sooty Shearwater **P. grisea.** Ibis 105: 340 - 353.

RICHDALE, L. E., 1936: The Kuaka or Diving-Petrel **P. urinatrix.** Emu 36: 24-48, 97-107.

RICHDALE, L. E., 1952: Post-egg Period in Albatrosses. (Biological Monograph No. 4). Dunedin.

RICHDALE, L. E., 1964: Notes on the Mottled Petrel **P. inexpectata** and other petrels. Ibis 106: 110 - 114.

ROBERTS, B. B., 1964: Article 'Antarctic' in Thompson, A. L. (ed.). New Dict. Birds. London & New York.

ROBINSON, F. N., 1964: The Breeding of the Sooty Shearwater on Courts Island, Tasmania, and Montagu Island, N.S.W. Emu 63 (4): 304 - 306.

SIBSON, R. B., 1947: A visit to Little Barrier Island. New Zealand Bird Notes 2 (6): 134 - 144.

SIBSON, R. B., 1949: Visit to Little Barrier Island. New Zealand Bird Notes 3 (6): 151 - 155.

SIBSON, R. B., 1949: A visit to Hen Island. New Zealand Bird Notes 3 (7): 183 - 188.

SIBSON, R. B., 1951: A Tasman Bird Log. Notornis 4: 158 - 161.

SERVENTY, D. L., 1953: Movement of pelagic sea-birds in the Indo-Pacific region. Proc. 7th Pacific Sci. Congr. 4: 394 - 407.

SWALES, M. K., 1965: The sea-birds of Gough Island, Part I. Ibis 107: 17 - 42.

TICKELL, W. L. N., & SCOTLAND, C. D.: Recoveries of ringed Giant Petrels **Macronectes giganteus.** Ibis 103a: 260 - 266.

TURBOTT, E. G., 1947: Birds of Little Barrier Island. New Zealand Bird Notes 2 (5): 92 - 108.

TURBOTT, E. G., 1947: New Zealand Bird Life. Wellington.

WARHAM, J., 1959: The Trinidad Petrel. A New Bird for Australia. Emu 59 (3): 153 - 158.

WARHAM, J., 1962: Biology of the Giant Petrel. Auk 79: 139 - 160.

WILLIAMS, G. R., 1960: The birds of the Pitcairn Islands, Central South Pacific Ocean Ibis 102: 58 - 70.

WILSON, R. A., 1959: Bird Islands of New Zealand. Christchurch.

Lieutenant A. Y. NORRIS, Royal Navy, 16 Bruce Close, Park Lane Estate, Fareham, Hampshire, England.