NOTORNIS
is the journal of the Ornithological Society of New Zealand (Inc.)
Editor: E. W. Dawson,
P.O. Box 8009,
WELLINGTON.

VOLUME 20 PART 3 SEPTEMBER, 1973

THE FIELD IDENTIFICATION AND SUPPLEMENTARY NOTES ON THE SOFT-PLUMAGED PETREL (Pterodroma mollis GOULD, 1844)

By PETER C. HARPER

ABSTRACT

Features of plumage and behaviour of the Soft-plumaged Petrel are described and compared with those of other species of *Pterodroma,* especially *P. inexpectata,* and *Procellaria cinerea,* as an aid for further reports of the species at sea.

With the recent report of *Pterodroma mollis* in New Zealand waters (Warham 1969; Kinsky 1971) a note on the petrel's identification and flight behaviour might aid in further reports of this attractive seabird. I saw many summering Soft-plumaged Petrels in the Atlantic near the South Sandwich Islands and north of South Georgia. The notes below are compiled from my *Eltanin* Cruise 22 logbook February-March, 1966 (see Harper 1972 for details of cruise track, and Watson *et al.* 1971 for my records).

The Soft-plumaged Petrel is equivalent in size to the Mottled Petrel *(Pterodroma inexpectata)* and somewhat larger than the Cook's Petrel *(Pterodroma cooki)* or the Black-winged Petrel *(Pterodroma nigripennis).* It is significantly smaller than the White-headed Petrel *(Pterodroma lessoni)* which also breeds at the Antipodes Islands.

At sea *P. mollis* is readily distinguished from New Zealand grey-backed, white-bodied *Pterodroma* petrels by its conspicuous grey underwing (see Fig. 1). The head and eye area appear very dark and a grey collar extends over the neck to often join in the midline below. The remaining dorsal plumage is slate-grey as the Gould Petrel *(Pterodroma leucoptera)* and is distinct from the paler hoary grey pigmentation of many of the *Cookilaria* and the larger *Pterodroma* petrels with which *P. mollis* might be confused. The ventral body surface, lores and forehead are white with the short bill black and the feet particoloured flesh and black as described by Murphy (1936).

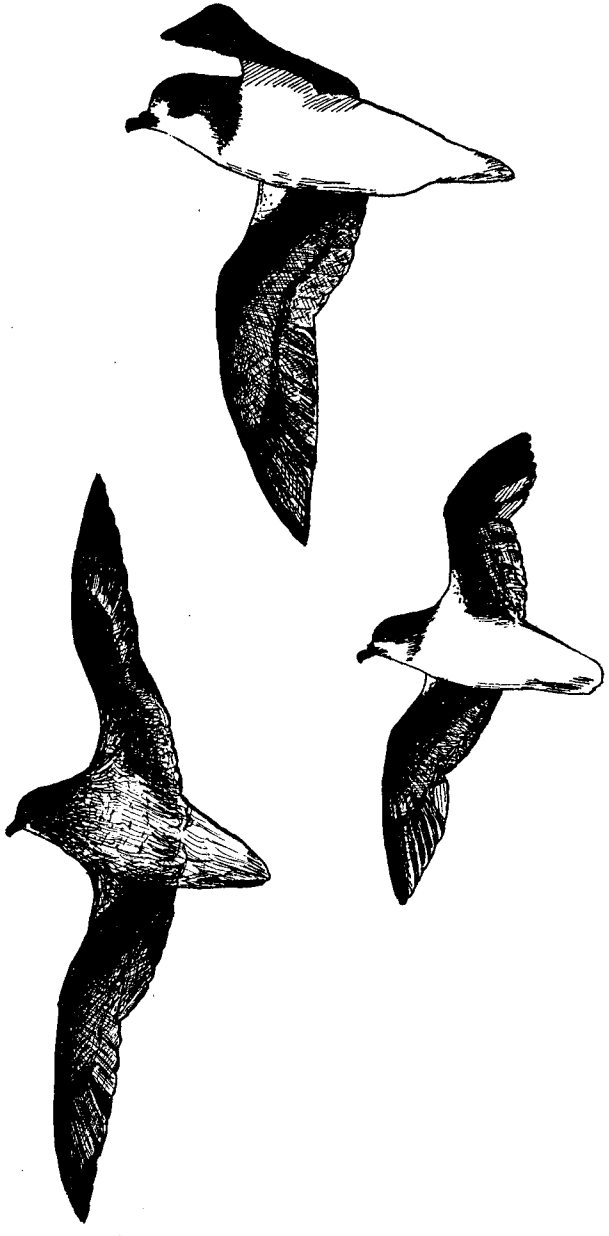

FIGURE 1 — A dorsal and two ventral views of *Pterodroma mollis* (length 330 cm) as it appears on the wing in the South Atlantic. The middle bird is in wing moult. Based on photographs taken 3 February, 1966.

Because of its generous dark pigmentation, the slate-grey areas mentioned above look quite black to an observer at sea. I might emphasize here that petrels in the hand look quite different from a bird on the wing some distance away, and *P. mollis* is no exception. This should be borne in mind when viewing my three sketches copied directly from projected colour transparencies.

I have included two other *Pterodroma* species for comparison with *P. mollis*. The first is the Mottled Petrel which is identical with the Soft-plumaged Petrel in size and proportion, but is unusual in having a discrete, discontinuous black bar extending from the carpal flexure of the underwing across the belly as an expansive abdominal patch, to the opposite wing as shown in Fig. 2. The visual effect is, to a lesser extent, an interesting restatement of the dorsal open M marking reaching across the wings of this and many members of the Procellariidae. This is perhaps well illustrated by a sketch of Edward Wilson's (Roberts 1967: sketch No. 204) which depicts an underside view of "*Pachyptila* sp" with a broad band as I have described above for *P. inexpectata*. Either the sketch in question is a dorsal view of *Pachyptila* or a ventral view of *P. inexpectata*. Considering the general excellence of Wilson's work, a ventral view of a Mottled Petrel appears more likely. The belly markings and to some degree the underwing bars are phenotypically variable and prone to fading as the plumage abrades.

A generally solitary and wide-ranging species in the Pacific Ocean, the Mottled Petrel could conceivably be mistaken for *P. mollis* in the New Zealand region and vice-versa in the South Atlantic, where the Mottled Petrel might appear among the more abundant *P. mollis* (see below).

My second sketch (Fig. 2) is of the White-headed Petrel, a widespread and common bird of the subantarctic. Like *P. mollis*, this species has a dark underwing with a white ventral aspect to the body. It is, however, considerably larger in size with wholly pale or white headparts and a conspicuous black line running through the eye. These features, together with the pale grey mantle and short, mostly white tail, will easily identify *P. lessoni* under reasonable light conditions.

From a distance, when bird size and proportion can be elusive in poor light, the Grey Petrel *(Procellaria cinerea)* can appear deceptively like a *Pterodroma*, with its dark underwing and diverse flight behaviour. The Grey Petrel is a larger bird than the *Pterodroma* species with a more uniformly pigmented grey dorsal plumage and a pale bill. It also breeds at the Antipodes Islands and elsewhere, and is another characteristic Subantarctic species of petrel. This species often congregate into small flocks of ten to eighteen individuals to follow slow moving large whales, diving to feed on the whales' faeces and macroplankton gently flushed in the displaced surface water.

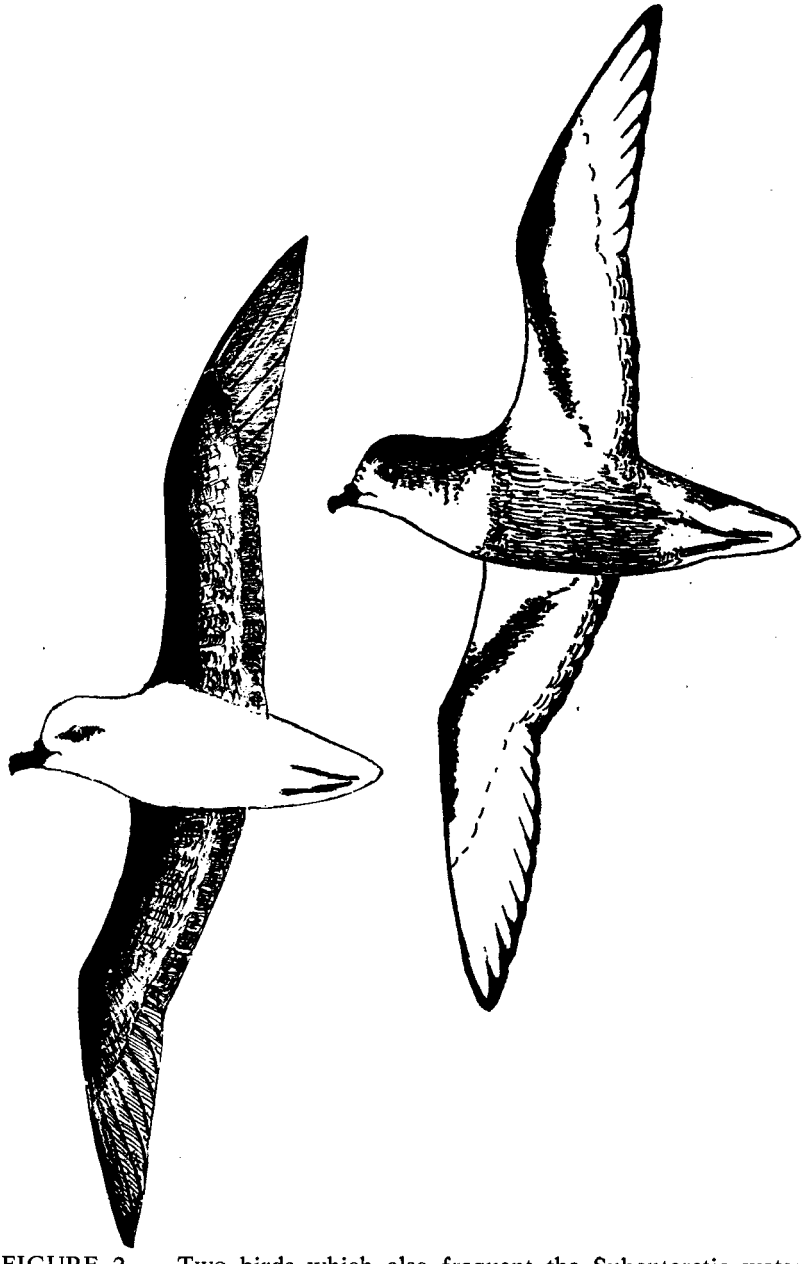

FIGURE 2 — Two birds which also frequent the Subantarctic water zone and with which *P. mollis* might be confused.
Bird left: *Pterodroma lessoni* — length 480 cm.
Bird right: *Pterodroma inexpectata* — length 330 cm.

The flight of *P. mollis* is typical of the *Pterodroma,* with the notable exception of the Kerguelen Petrel *(Pterodroma brevirostris)* (cf. Biermann & Voous, 1950; Harper, Watson & Angle, 1972). The birds thrive on winds about or above 30 kts, flying comparatively low over the sea in a swift rise and fall fashion. The flight pattern is more impetuous than the regimented flight of migrating shearwaters (notably the Sooty Shearwater *(Puffinus griseus)*), and as Biermann & Voous point out, is often accompanied with very rapid wingbeats. Long low gliding with high speed turns is a feature of *P. mollis* and other *Pterodroma* petrels.

The Soft-plumaged Petrel will sometimes follow ships. Biermann & Voous and Alexander (1928) had little luck in having *P. mollis* close at hand in the wake of the ship: Dr. Murphy and I were more fortunate. Murphy (1936) caught the birds readily on a line baited with loggerhead turtle meat. He reports, " after taking the hook the birds would fly high, so that the process of capturing them was like hauling in a kite." Although I did not fish for *P. mollis* in this way, I did succeed in capturing the birds on film at fairly close range, as they and Greater Shearwaters *(Puffinus gravis)* followed our ship in the South Atlantic. Both species alighted in the smooth, churned water to feed upon the disturbed zooplankton and to investigate any garbage thrown overboard. This behaviour is quite opposite from that of *P. inexpectata* or *P. lessoni* which showed no interest in the *Eltanin,* and were not drawn in for as much as a salutatory fly-by.

I would thus recommend that observers travelling south of New Zealand in Subantarctic waters should watch for a stray *P. mollis* overhauling their ship and following it in company with the usual gathering of Cape Pigeons *(Daption capensis)* and Albatrosses (*Diomedea* spp).

The distribution of *P. mollis* and *P. inexpectata,* when compared, show certain close affinities. Between them, they circle the Antarctic continent with *P. mollis* in the Atlantic and Indian Oceans, and *P. inexpectata* restricted to the Pacific. In my Fig. 3, the extent of the Soft-plumaged Petrel's dispersal over large tracts of ocean is evident, yet one should notice the paucity of records in the Australasian region. The odd bird has been captured by the prevailing westerlies and carried eastwards (Whitlock and Whittell 1942; Learmonth 1961) and it is probably by this method that a group of *P. mollis* recently found the Antipodes Islands, to give us the present anomalous situation there. Specimens of *P. mollis* collected at the Antipodes (Warham 1969) suggest that the species may be breeding though this has not been positively confirmed. If the population proves to be a viable one, then *P. mollis* will have effectively " invaded " the territory of *P. inexpectata,* and should the breeding of the Mottled Petrel be confirmed at the Antipodes, then both species are occupying the same island. In any event, the situation warrants clarification and study. Prior to this discovery, both *P. inexpectata* and *P. mollis* were effectively isolated from each other by different water habitats in the Indian

Ocean, the south Australian seas, and apparently the Cape Horn waters in the South American region (Fig. 3).

Throughout its range, *P. mollis* has generally been restricted by the Antarctic Convergence from travelling further south into cold waters. In the Weddell Sea Gyre, however, several species of Subtropical and Subantarctic petrels are attracted into Antarctic waters

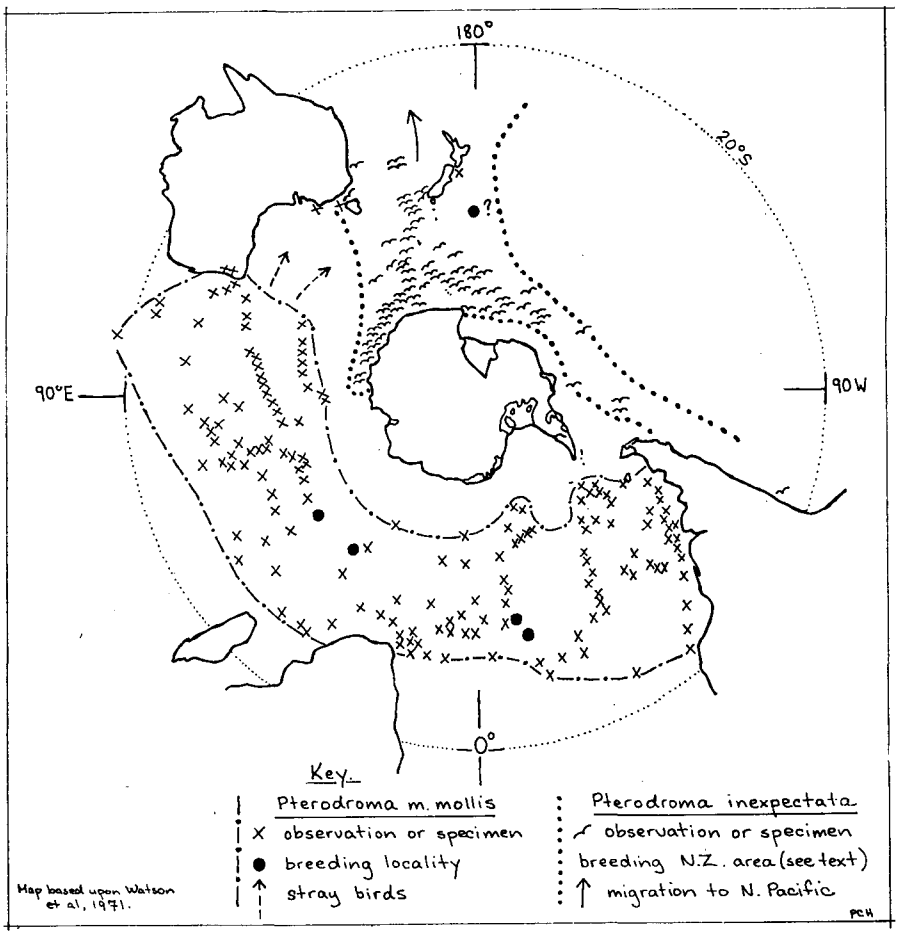

FIGURE 3 — A sketch map showing the distribution of both *P. mollis* and *P. inexpectata.* Note the apparently recent "invasion" by *P. mollis* into *P. inexpectata* territory at the Antipodes Islands, and the paucity of *P. mollis* records in east Australian seas. No *P. inexpectata* have been seen outside Pacific waters.

by the enormous quantity of Crustacea available to them as food. On 20 and 21 February 1966, for example, the *Eltanin* was 200 - 300 nautical miles southeast of the South Sandwich Islands between 61° 44′ and 62° 29′ S and 22° 27′ and 19° 03′ W. The skies were overcast with a 25 - 40 kt S.W. wind, and a large assortment of icebergs were rising and falling with us in the 12 - 15 ft swell. The sea temperature fluctuated between 0.7 and 1.0° C. The cosmopolitan company of Procellariidae seen during the above two days included the following 14 species:

Wandering Albatross	*Diomedea exulans*	4 seen
Black-browed Albatross	*Diomedea melanophris*	1
Grey-headed Albatross	*Diomedea chrysostoma*	1
Light-mantled Sooty Albatross	*Phoebetria palpebrata*	4
Sooty Albatross	*Phoebetria fusca*	5
Giant Petrel	*Macronectes giganteus*	10
Cape Petrel	*Daption capensis*	numerous
Antarctic Fulmar	*Fulmarus glacialoides*	„
Antarctic Petrel	*Thalassoica antarctica*	1
Antarctic Prion	*Pachyptila desolata banksi*	numerous
Kerguelen Petrel	*Pterodroma brevirostris*	„
White-headed Petrel	*Pterodroma lessoni*	„
Soft-plumaged Petrel	*Pterodroma mollis*	„
Wilson's Storm Petrel	*Oceanites oceanicus*	„

Apart from watching these birds gorging themselves on *Euphausia superba*, the Eltanin's crew were busy clearing the crustaceans by the bucketful from the seawater intakes cooling the ship's engines. It is not often that one can see an Antarctic Petrel and a Sooty Albatross in the same locality, but the amount of food present at the time clearly indicated why the birds were there. Some of the above Procellariidae had travelled considerable distances across water gradients and against the wind to reach the area, and yet the Mottled Petrel, upwind and in much the same latitude in the East Pacific, was not present, nor has it ever been recorded in the South Atlantic. The Mottled Petrel is by no means common in the southeast Pacific but a few birds are carried by the wind or wander into the area. Conceivably, they might in years to come, duplicate what *P. mollis* appears to have accomplished in New Zealand waters and colonize the more northern of the South Atlantic islands. For the present however, I seriously doubt whether migrating *P. inexpectata* are using the colder waters of the South Pacific to reach their New Zealand breeding grounds.

Because *P. brevirostris* and *P. mollis* were frequently seen flying together in the Indian Ocean, Falla (1937) postulated that "*P. brevirostris* may be a dark phase of *P. mollis*." This was later regarded as unlikely by Murphy & Pennoyer (1952) who gave the following

reasons for their opinion: "First, the under surface of the quills and the distal parts of the feet are paler than in *mollis* (i.e., the opposite of what might be expected if Falla's supposition were correct). Second, *brevirostris* seems to be a relatively short-tailed petrel. Third, it has a distinctive quality of plumage texture which is somewhat hard to define. Fourth, *brevirostris* and *mollis* breed in different oceanic zones, notwithstanding the fact their flight ranges may overlap."

The real difference actually lies in the structure of the skeleton, and particularly the skull. Recently I examined a very small series of relevant material, and although the quantity of skeletons was not great the differences between *P. mollis* and *P. brevirostris* are.

The Kerguelen Petrel in life is notable for its large, rounded head, finely proportioned bill and large eyes. Although the difference in the overall length of the skull between *P. brevirostris* and *P. mollis* is slight (no more than 3 mm) the orbits of *P. brevirostris* are some 20% longer in measurement between the lacrimals and the post-orbital process (25 mm compared to 20 mm). This larger eye size is accompanied by both a narrower width of the medially grooved part of the frontal bones between the orbits, and a greater width of the lateral edges housing the supra-orbital depressions. These ledges extend dorso-laterally to become characteristically crenated, fenestrated and ledged along their perimeters to a degree not shown in *P. mollis*. The depressions which support the paired nasal glands thus open directly upward in *P. brevirostris* rather than to the side as in *P. mollis*.

The fused lacrimals are reduced in size, while the post-orbital wing of the squamosals is expanded dorso-ventrally to provide greater protection and support for the eyes from behind.

These adaptations for a larger eye are probably associated with the Kerguelen Petrel's practice of feeding primarily at night on crustaceans and squid, whereas *P. mollis* commonly gathers its food during daylight hours (Harper, pers. obs.).

Another belief to be disposed of is that *P. mollis* has a dark phase. Authentic specimens to support this are so few and of doubtful origins that it would appear at most to be a rare aberration.

I might add that *P. inexpectata* and *P. mollis* show close similarity in structure; it is only their plumage character which distinguishes them.

ACKNOWLEDGEMENTS

My thanks again to the National Science Foundation and Sir Robert Falla for arranging my ornithological research programme aboard the *Eltanin*. Both Sir Robert and Professor J. A. F. Garrick have assisted me in the preparation of this note and Mr. F. C. Kinsky kindly allowed me access to the National Museum's skeletal material. For these services I am most grateful.

LITERATURE CITED

ALEXANDER, W. B. 1928. Birds of the Ocean. A handbook for voyagers. Pp. xxiv + 1-428, pls. 1-88. New York: Putnam.

BIERMANN, W. H.; VOOUS, K. H. 1950. Birds observed and collected during the whaling expeditions of the *Willem Barendsz* in the Antarctic, 1946-1947 and 1947-1948. Ardea 37 (extra no.): 1-123, illus.

FALLA, R. A. 1937. Birds. B.A.N.Z. Antarctic Research Expedition 1929-1931. Reports. (B). II: 1-304, figs 1-216, pls I-IV.

HARPER, P. C.; WATSON, G. E.; ANGLE, J. P. 1972. New records of the Kerguelen Petrel *(Pterodroma brevirostris)* in the South Atlantic and Pacific Oceans. Notornis 19 ,(1): 56-60, figs 1-2, table 1.

HARPER, P. C. 1972. The field identification and distribution of the Thin-billed Prion *(Pachyptila belcheri)* and the Antarctic Prion *(Pachyptila desolata)*. Notornis 19 (2): 140-175, figs 1-11, tables 1-11.

KINSKY, F. C. 1971. Recent occurrences of rare petrels in New Zealand. Notornis 18 (3): 215-216.

LEARMONTH, N. F. 1961. Another new petrel for Victoria. Emu 61: 196.

MURPHY, R. C. 1936. Oceanic birds of South America. Vol. II. Pp. viii + 641-1245, illus. New York: The Macmillan Co. and American Museum of Natural History.

MURPHY, R. C.; PENNOYER, J. M. 1952. Larger petrels of the Genus *Pterodroma*. Novitates. American Museum of Natural History. No. 1580: 1-43.

OSNZ, 1970. Annotated Checklist of the birds of New Zealand. The checklist committee (F. C. Kinsky, convener), Ornithological Society of N.Z., Inc. 96 pp. Wellington: A. H. & A. W. Reed.

ROBERTS, B. R. 1967. Edward Wilson's Birds of the Antarctic. Pp. 1-191. London: Blandford Press.

WARHAM, J. 1969. University of Canterbury Antipodes Island Expedition 1969. Antarctic 5 (6): 282.

WATSON, G. E. et al., 1971. Birds of the Antarctic and Subantarctic. Pp. 1-18, figs 1-2, tables 1-2, 2 maps, pls 1-15 *in:* BUSHNELL, V. C. (ed.). Antarctic Map Folio Series, Folio 14. New York: American Geographical Society.

Peter C. Harper,
4 Barber Grove,
Moera,
Lower Hutt