

A critical review of the prions (genus *Pachyptila*) collected and observed on Cook's voyages

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Abstract Three of the 6 widely accepted species of *Pachyptila* were first described and named on the basis of specimens collected between 1768 and 1780 during James Cook's 3 voyages of circumnavigation. Two of them, the thin-billed prion *Pachyptila belcheri* (Mathews, 1912) and the broad-billed prion *Pachyptila vittata* (Forster, 1777), were described and named on the 1st voyage as *Procellaria turtur* and *Procellaria latirostris* respectively, but those descriptions and names were never published at the time. As a result, the specific name which had been applied to 1 of them - *turtur* - became attached to a different taxon, the fairy prion *Pachyptila turtur* (Kuhl, 1820). The description of *Procellaria vittata* by Reinhold Forster, and the painting of it by his son, which were based on specimens taken in the southern Indian Ocean during the 2nd voyage, actually relate to the Antarctic prion *Pachyptila desolata* (Gmelin, 1789), and not to the broad-billed prion as previously believed. It would therefore be inappropriate to designate the bird in George Forster's painting of an Antarctic prion as the type of the broad-billed prion as has been suggested. The correct type locality of *Procellaria vittata* Forster, 1777 is 56° 31'S, 31° 19'E. Latham's description of the "Broad-billed Petrel", and therefore Gmelin's *Procellaria vittata* of 1789, is shown to have been based primarily on a specimen of the broad-billed prion. The type locality of *Procellaria vittata* Gmelin, 1789 is not known. Latham's description of the "Brown-banded Petrel", and therefore Gmelin's *Procellaria desolata* of 1789, was based on a 3rd voyage *Pachyptila* specimen from Kerguelen Island. However, Latham's description could apply to any 1 of the 3 species of *Pachyptila* which breed at that locality.

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INTRODUCTION

"In the whole order Procellariiformes there is probably no other aggregation of closely related species which has been so confused in the literature as these petrels. Not only are there several synonyms for most of the specific names now believed to have prior claims over others but, moreover, these names, through misinterpretation or misidentification, have become transposed from one species to the next in a manner which is bewildering if not altogether hopeless" (Murphy 1936:I: 610).

Falla (1940) recognized 6 species in the genus *Pachyptila*. Nearly all authors since, including Fleming (1941, 1953), Oliver (1955), Kinsky (1970), Serventy *et al.* (1971), Harper & Kinsky (1978), Harper (1980), Turbott (1990), Marchant & Higgins (1990), Howard & Moore (1991), Christidis & Boles (1994), Heather & Robertson (1996), and Enticott & Tipling (1997), have likewise considered the genus to contain 6 species - *turtur*, *crassirostris*, *belcheri*, *desolata*, *salvini*, and *vittata*. Watson (1975), Jouanin & Mougin (1979), and Warham (1990) recognized

5, while Cox (1980), followed by Harrison (1989), recognized only 3. The widely accepted 6 species-classification of Falla and later authors is followed in this paper, with nomenclature and authorship of the *Pachyptila* taxa as in Turbott (1990).

This review is to establish the historic and taxonomic facts relating to the *Pachyptila* species collected and observed on James Cook's voyages of circumnavigation between 1768 and 1780. The resulting implications for the nomenclature of those taxa - and there are several - are complex and not considered here. However, it is imperative in the interests of the stability of nomenclature that the taxa involved continue to bear the specific names by which they are currently known, and by which they have been known for at least a century.

COOK'S 1st VOYAGE, 1768-1771

Sir Joseph Banks, accompanied by Daniel Solander and Sydney Parkinson as natural history draughtsman, sailed with James Cook on his 1st voyage of circumnavigation on the *Endeavour* between 1768 and 1771. There is now a voluminous literature which deals with the voyage and its principal participants, and with the "natural and artificial curiosities" which

were taken back to England. There is no need to repeat that in any detail here.

The Banks and Solander descriptions of *Procellaria turtur* and *Procellaria latirostris*, which were 2 of the many new procellariiforms they met with in the course of the voyage, are included in Solander MS.Z4 held in The Natural History Museum, London. This manuscript of 512 pages is titled "A fair copy of the descriptions of animals observed during Capt. Cook's first voyage". The detailed Latin descriptions of birds which appear at pages 1-123 of the manuscript, in the writing of an amanuensis, include those of the albatrosses and petrels met with by Banks and Solander in the course of Cook's 1st voyage. The original descriptions of the albatrosses included in the manuscript are to be found, in Solander's handwriting, in the *Aves* volume of the Solander *Slip Catalogue*, the contents of which have been enumerated in detail by Wheeler (1986), but there are no similar original descriptions for the petrels. Solander MS.Z4 is therefore of prime importance containing, as it does, detailed descriptions of the many species of procellariid, previously unknown to science, which were first met with, described, and named by Banks and Solander.

Solander MS.Z4 was discussed by Mathews (1910-1928: II: 3, 6-8) who listed the southern procellariiforms described therein under the names applied to them by Banks and Solander. The manuscript has since been mentioned by several others, including Wheeler (1986) who discussed it at some length, and Lysaght (1959) who published a valuable list of "provisional identifications" of all the birds described in it by Banks and Solander.

However, none of the detailed descriptions of albatrosses and petrels contained in Solander MS.Z4 was published until 1912 when Mathews published most of those which relate to southern species in Volume 2 of his *Birds of Australia* (Mathews 1910-1928). Another, relating to the wandering albatross (*Diomedea exulans*), has since been published and discussed (Medway 1993), but other valuable descriptions contained in the manuscript still remain unpublished more than 2 centuries after they were compiled. Unfortunately, therefore, these original descriptions do not have the taxonomic or nomenclatural value they would no doubt have acquired had they been published shortly after the voyage. It is worth making the point here that most of the taxonomic and nomenclatural confusion which has plagued many of the procellariiforms for the past 2 centuries would probably have been avoided if Banks and Solander had themselves published their descriptions and names.

Also in The Natural History Museum, London, is an interleaved copy of the 12th edition of the *Systema Naturae* of Linnaeus (Linnaeus 1766-1767) which was part of the substantial library which

Banks took on board the *Endeavour*. This volume has been discussed by Marshall (1978), and briefly by Wheeler (1986) and Medway (1990a). It contains many annotations, including brief diagnoses of the procellariiforms described by Banks and Solander in the course of the voyage. Salvin (1875) knew of this annotated copy and quoted those diagnoses contained in it which relate to the Parkinson 1st voyage bird drawings which he described and identified. Included among the diagnoses, opposite page 212 of Volume 1, are 2 which are referable to the taxa which are fully described in Solander MS. Z4 as *Procellaria turtur* and *Procellaria latirostris*. Those diagnoses are reproduced in Appendix 1, and the specimens and descriptions are discussed below.

Procellaria turtur Banks & Solander, 1769

The southeastern Pacific Ocean was calm on 1 February 1769, and Banks went out in one of the *Endeavour's* boats to shoot birds. He killed birds of 3 species that were new to him, including an albatross and 2 procellariids. One of the species collected was described that day by himself and Solander as *Procellaria turtur* (Solander MS.Z4: 65; Appendix 1).

Banks went shooting again on 2 February 1769 and killed several birds of different species, including some more of the new *Procellaria turtur*. He said of it in his *Journal* entry of 1 February 1769 (Beaglehole 1963:I: 232):

"*Procellaria turtur* Mother Careys dove is of the peteril kind about the size of a barbary dove, of a light silvery blue upon the back which shines beautifully as he flies which he does very swiftly keeping generally near the surface of the water; more or less of these birds have been seen very often since we left the lat. of Faulklands Island where in a gale of wind we saw immense quantities of them".

Banks and Solander, in their description of *Procellaria turtur*, gave only 59° S as the locality in which they obtained the specimen or specimens which they described on 1 February 1769. Cook (in Beaglehole 1968: 55) shows that they were at about 58° 46'S, 78° 42'W at that time, which is in the South Pacific Ocean southwest of Tierra del Fuego.

When Mathews published this description in 1912 (Mathews 1910-1928:II: 218) he considered it to be of a fairy prion *Pachyptila turtur* (Kuhl, 1820), rather than of a thin-billed prion (*Pachyptila belcheri*), a species which he described as new in the same work. No doubt Mathews identified the *Procellaria turtur* of Banks and Solander with the *Procellaria turtur* of Kuhl because the birds as described by those authors appeared to him to be the same as each other and they bore the same name, *Procellaria turtur*. On the other hand, Lysaght (1959) thought that the *Procellaria turtur* of Banks and Solander possibly related to the thin-billed prion. There would seem to be no rea-

sonable doubt that the Banks and Solander description of *Procellaria turtur* is in fact of a thin-billed prion *Pachyptila belcheri* (Mathews, 1912).

Harper (1972, 1980) notes that the thin-billed prion has a pastel-blue upper surface which is appreciably paler than that of any other *Pachyptila*, and that it has conspicuous white lores and white superciliary stripe with a small suborbital patch. The distinctive facial pattern of the thin-billed prion is well shown in the photographs in Harper (1972) and Woods (1982). These are all features noted by Banks and Solander in their description of *Procellaria turtur*. The dark open "M" marking across the wings is narrow and ill-defined in the thin-billed prion (Harper 1972). Banks and Solander did not mention such a feature in their description of *Procellaria turtur*. Indeed, as will be seen, they noted that the shape of the bill of their *Procellaria latirostris* (= broad-billed prion) easily distinguished that species from all others "even from *Procellaria turtur* Mscr to which it is very similar in other respects quite apart from the oblique band across the back".

Thin-billed prions are present about the southern coasts of South America all year (Harper 1972). The species breeds in very large numbers at the Falkland Islands (Strange 1980; Woods 1988). In February 1984, Clark *et al.* (1984) found a very large, but previously unknown, breeding colony of thin-billed prions on Isla Noir off southern Chile, and saw vast numbers of birds flying to and from the colony during the night. There is no reason to believe that thin-billed prions were less common about the southern coasts of South America when Cook was in the area. Indeed, their breeding colonies may have been even more populous and widespread than they are at the present time.

Parkinson folio 15 - held in The Natural History Museum, London - is an unsigned and unfinished pencil drawing bearing the notations "The beak a pale blueish lead color - the legs & toes pale blue wt a cast of purple the webs dirty white. / 14. *Procellaria turtur*. Feb. 1st 1769. Lat. 59.00". Salvin (1875) identified the bird depicted with the *Prion turtur* of Kuhl, 1820 (= fairy prion). Sharpe (1906) thought it was most probably *Prion desolatus* of Gmelin, 1789 (= Antarctic prion). Lysaght (1959) considered that the drawing "appears to represent" a thin-billed prion "but since Solander's description contains no measurements of the width of the bill one cannot be certain of this". Likewise, Wheeler (1986) thought the drawing might represent a thin-billed prion. Harper (1972), whose attention was drawn to the Parkinson drawing by Sir Robert Falla, considered the bird depicted therein was "clearly identifiable" as a thin-billed prion. Harper's opinion is accepted here.

It will be noted that Parkinson's drawing bears the same name, *Procellaria turtur*, and the same date,

1 February 1769, as the Banks and Solander description. There is no reason to believe that more than 1 species of *Pachyptila* had been taken by Banks on 1 February 1769. Accordingly, the Parkinson drawing must represent the taxon described as *Procellaria turtur* by Banks and Solander on the same day. Therefore, both the description and the drawing must represent the thin-billed prion, a taxon which was not validly described until Mathews did so in 1912 under the name *Heteroprion belcheri* (Mathews 1910-1928: II: 215, 224-225).

Lysaght (1959) stated that Kuhl's *Procellaria turtur* was based on the Parkinson drawing which depicts a bird she considered to be of uncertain identity. In her opinion Kuhl's name, therefore, is indeterminate. She mentioned that a note on the ensuing changes in nomenclature was being published by Sir Robert Falla. No such note appears to have been published by Falla or by anybody else. Harper (1972), no doubt consistent with the opinion of Lysaght and Falla, also stated that the Parkinson drawing was the basis for Kuhl's description of *Procellaria turtur*, and that this had disturbing implications for nomenclature. Jouanin & Mougins (1979), Turbott (1990), and Marchant & Higgins (1990), following the opinion of Lysaght (1959), consider Kuhl's name to be a *nomen conservandum* based on an indeterminable drawing by Parkinson.

However, Kuhl's *Procellaria turtur* was not based on Parkinson folio 15. Kuhl (1820:143-144, and Fig. 8 which is a sketch of the head only) clearly based his description of *Procellaria turtur* on specimens which he indicated were then in the Paris Museum and in Temminck's collection, the latter having been obtained by Temminck at the sale of Bullock's collection which he attended in London in 1819. Kuhl spent the spring and summer of 1819 with Temminck in London where he was able to study the Parkinson bird drawings from Cook's 1st voyage, and those of George Forster from Cook's 2nd voyage, which were then in the library of Sir Joseph Banks (Kuhl 1820: 135; Stresemann in Cottrell 1975: 128). Thus, the following year, Kuhl was able to refer to Parkinson folio 15 when describing his *Procellaria turtur*. Presumably he did so in the belief that the Parkinson drawing represented the same species as that which he was then describing. Kuhl quoted the notations on the Parkinson drawing which he must have noted when he inspected it in London the year before. The name *Procellaria turtur* which Kuhl applied to his new taxon must also have been taken from the Parkinson drawing. Indeed, Kuhl specifically attributed the name *Procellaria turtur* to Banks, to whom he also attributed the Parkinson drawing, presumably because he had seen it in the Banks collection. But it is abundantly clear that Kuhl could not possibly have compiled his very detailed description of *Procellaria turtur*

from the unfinished Parkinson pencil drawing and the notations thereon. Probably, the Parkinson drawing provided no more than an appropriate and available name which Kuhl considered was properly referable to the taxon he was then describing.

This analysis of all pertinent evidence confirms that Kuhl's description of *Procellaria turtur* was based on the specimens to which he referred, and not on Parkinson folio 15. Furthermore, in the absence of evidence to the contrary, the specimens described by Kuhl were specimens of the taxon universally known today as the fairy prion (*Pachyptila turtur*). It is not known if the Paris specimen to which Kuhl referred still exists. Schlegel (1863) did not mention the Temminck specimen to which Kuhl also referred, so it may no longer have been in existence at that time.

The name *Procellaria turtur* Banks & Solander, 1769 - because it was not published until Mathews did so in 1912 - is a junior subjective homonym of the name *Procellaria turtur* Kuhl, 1820. Murphy (1936:I: 629), referring to the fact that *Pachyptila belcheri* was first validly described only in 1912, said it was not known under what other names specimens of the taxon taken before that date may have been listed. The name *Procellaria turtur* Banks & Solander, 1769 is clearly such a name which, however, by virtue of non-publication and the actions of another, has become firmly attached to a *Pachyptila* species different to that to which the name was originally applied by Banks and Solander.

***Procellaria latirostris* Banks & Solander, 1769**

On 31 August 1769, when the *Endeavour* was in the south Pacific Ocean close to 40° 12'S, 146° 29'W, Cook (in Beaglehole 1968: 161) had observed about the ship:

"some hundreds of Birds that were smaller than Pigeons, their backs were grey, their bellies white and the ends of their tails black, and have a blackish line along the upper parts of the wings from the tip of one to the other. We saw birds very like these near Falklands Islands on the Coast of Patagonia, only they had not the black strake along the wings. They fly low like sheer-waters or Mother Caries Birds and are perhaps of the same tribe. For distinction sake I shall call them Doves".

Almost a month later, on 29 September 1769, as the *Endeavour* neared New Zealand from the east, Cook (in Beaglehole 1968: 165) recorded "a number of Doves, of these we have seen more or less ever since the 31st of last month the day we first saw them". Some of these "doves" were obtained by Banks and Solander 3 days later. When just to the east of New Zealand, on 2 October 1769 at 37° 10'S, 171° 5'W (being the position as given by Banks and Solander in their description of *Procellaria latirostris*),

it was calm, and Banks (in Beaglehole 1963: I: 396) went out in the boat and shot a wandering albatross (*Diomedea exulans*) and some procellariids of several different species. He went out again the next day and obtained more procellariids. Included among the birds which Banks shot on those 2 days was a species new to himself and Solander which they described and named *Procellaria latirostris* (Solander MS.Z4: 61-62; Appendix 1). There is no Parkinson drawing of this species.

When Mathews (1910-1928: II: 207-208) published the Banks and Solander description of *Procellaria latirostris* in 1912, he identified it with the broad-billed prion. Lysaght (1959) considered that their description possibly related to the broad-billed prion. The available evidence confirms that the Banks and Solander description of *Procellaria latirostris* is indeed properly applicable to that taxon, as Mathews thought.

The *Procellaria latirostris* of Banks and Solander was clearly a large *Pachyptila*. They gave its length as 12 inches (= 30 cm) and its wingspan as 24½ inches (= 62 cm). Unfortunately, they did not give any measurements for the bill of their bird. Nevertheless, their very detailed description of that feature is clearly more applicable to the bill of a broad-billed prion than it is to the bill of any other species of *Pachyptila*. They described the bill of *Procellaria latirostris* as being, inter alia, very broad at the base with its various parts being of a leaden or black colour. They considered that "the shape of its bill easily distinguished" their *Procellaria latirostris* "from all others, even from *Procellaria turtur* Mscr to which it is very similar in other respects quite apart from the oblique band across the back".

Harper (1980) indicates that the broad-billed prion is unique among *Pachyptila* species in having an iron-grey bill with violet-blue mandibular rami. All other *Pachyptila* have a blue or blueish bill, with only the ridge of the culmen and nasal tube being black. Harper (1980) also indicates that the open "M" marking across the wings of the broad-billed prion is black, broad, and well-defined. Banks and Solander mentioned this marking in their description of *Procellaria latirostris*, and said that it was very conspicuous in flight.

In 1844, Gray (1844-1868: I: 165) identified "P. latirostris (Sol. Mss.) Bonn" with the *Procellaria vittata* of Gmelin of which 3 examples were then in the British Museum. Mathews (1910-1928: II: 208) observed that in 1791 Bonnaterre (in Bonnaterre & Vieillot 1790-1823:I: 81) called Latham's "Broad-billed Petrel" *Procellaria latirostris*, thus choosing the same name as Banks and Solander had applied to their bird. Mathews was unable to trace any connection between Bonnaterre and Solander and considered that the coincidence in names was due to

the fact that Bonnaterre simply latinized Latham's English name.

COOK'S 2nd VOYAGE, 1772-1775

Johann Reinhold Forster was official naturalist on Cook's 2nd voyage from 1772 to 1775. His son George was with him as assistant naturalist and natural history draughtsman. There is also a considerable literature relating to the 2nd voyage and its participants, and to the "natural and artificial curiosities" taken back to England (e.g., Forster 1777, reprinted in Kahn 1968; Hoare 1976, 1982).

The Forster specimens of *Procellaria vittata*

The *Resolution* and *Adventure* left the Cape of Good Hope on 23 November 1772, and headed south into the Southern Ocean. A week later, on 30 November 1772 when at about 42°S, Reinhold Forster recorded (in Hoare 1982: 187) that "The same birds were about the Ship & a kind of small grey bird with a white belly very much like a Tern, but perhaps may be a *Procellaria*: I had long wished to get one of them for Examination".

The first icebergs were seen on 10 December 1772 at about 51°S. On 14 December 1772, Reinhold Forster (in Hoare 1982: 197) recorded that they saw "Pintadas, Fulmars, *Snowbirds* & the little grey *Eggbird*, in great Numbers. The Ice is here & there in large & huge Masses, & these are surrounded by small pieces of drift-Ice, which form large Fields on the Water".

On 18 December 1772, Reinhold Forster noted (in Hoare 1982: 202) that:

"A Seal & several Pinguins were seen, as we passed the *packed* Ice. The great Quantities of it, made it necessary to alter frequently our course. We saw again a new bird of the Size of the Pintadas & very similar to them: it was quite brown above, had a white rump, tail, belly & one such spot on each of the wings. The white *Snow* or *Icebirds* we saw likewise, together with *Pintadas*, *Fulmars* & the small grey *Eggbirds*, which some call *Sea Snipes*. They are of a blueish grey with a black line running across the wings. The tail is edged black, under the throat & on the cheeks is likewise some black. The belly & vent white: bill & feet black".

Cook (in Beaglehole 1961: 66) gave the co-ordinates for 24 December 1772 (ship time), which would have been midday 23 December 1772, as 56° 31'S, 31° 19'E, at which time the ships had been amongst icebergs for several days. Reinhold Forster recorded what for him was undoubtedly the most significant event of 23 December 1772 (Forster in Hoare 1982: 204-205):

"In the morning we had almost a calm. Hove the boat out, & tried the Current but found

none....we shot the grey *Eggbirds*, which they called *Silverbirds* on board the *Adventure*, & found them to be of the *Petrelkind* having tubular closely connected nostrils, a hooked bill, & all the upper mandible on the Inside pectinated the bill is compressed & very broad. All the Upperside is of a blueish fine grey. The outer webs of the first 5 Quillfeathers & all the Upper coverts of the wing are black, so are some Scapulars, which however are tipped with white, a black band joins them across the back, the 6 middlemost of the 12 tailfeathers are black-tipped. The longest under coverts of the tail are black. The bill & webbed feet are blue, the nails black: a small round spur serves for a backtoe. All the throat, breast belly, vent, & underside of the wings is white; near the bill are white feathers, which form a stroke above & somewhat behind the Eyes. The head & a spott under the eyes is of a deeper blueish grey. The Tongue is very large & roundish. It might be called *Procellaria vittata* on account of the blackish stripe across the expanded wings".

George Forster (Forster, 1772) also wrote of this event in his journal:

"This day it being moderate Weather we went out in the Boat; and shot some of the grey birds mentioned in several places in this Journal They are not as I at first apprehend Terns, but a species of Petrel, and have a dark band across the wings & back, for which we called them *Procellaria vittata*".

George Forster later recorded (Forster 1777:I: 102; in Kahn 1968: 74) that on 23 December 1772 "The species of petrels which were numerous about us, were likewise examined, described, and drawn this day, having been shot as they hovered with seeming curiosity over our little boat".

The "grey *Eggbirds*" which the Forsters shot on 23 December 1772 were described by Reinhold Forster at the time under the MS name *Procellaria vittata*. His son completed an excellent painting of one of them. Reinhold Forster's Latin description appears in Forster (1772-1775: I: 35, no.17), but it was not published until Lichtenstein did so in 1844 (Lichtenstein 1844: 21-23, no.17). Lichtenstein included an account by Forster of the "petrels of the bluish species" which were recorded by the Forsters and Cook during their subsequent stay in Dusky Sound between the end of March and mid May 1773. However, it is clear that the text relating to Dusky Sound did not form part of Reinhold Forster's original entry for *Procellaria vittata*. It appears separately in the original manuscript, on the page opposite the principal description which had undoubtedly been completed some months earlier at the time the Forsters collected the specimens on which it was based. Reinhold Forster's

original description, and the text relating to Dusky Sound which will be dealt with elsewhere, is reproduced in Appendix 2.

It is appropriate here to include Cook's description of the birds shot by the Forsters on 23 December 1772 as it appears in the official narrative of the voyage (Cook 1777:I: 29-30):

"Mr. Forster, who went in the boat, shot some of the small grey birds before mentioned, which were of the peterel tribe, and about the size of a small pigeon. Their back, and upper side of their wings, their feet and bills, are of a blue grey colour. Their bellies, and under side of their wings, are white, a little tinged with blue. The upper side of their quill feathers is a dark blue tinged with black. A streak is formed by feathers nearly of this colour, along the upper parts of the wings, and crossing the back a little above the tail. The end of the tail feathers is also of the same colour. Their bills are much broader than any I have seen of the same tribe; and their tongues are remarkably broad. These blue peterels, as I shall call them, are seen no where but in the southern hemisphere, from about the latitude of 28°, and upwards".

On 27 December 1772, 4 days after they had collected and described their *Procellaria vittata*, the Forsters shot several more birds which were "perfectly similar to the *Silvery Petrel* or *Eggbird* which we had shot a few days before: I had observed these birds before, but was not certain whether they were the same bird or not". On examining them Reinhold Forster found, inter alia, that "The bill, however, which is so materially different, makes me believe them to be a different Species, & I called the species therefore *Procellaria similis*" (Forster in Hoare 1982: 208). Reinhold Forster's Latin description of *Procellaria similis*, dated 28 December 1772, appears in Forster (1772-1775:I: 94, no.74). It, like that of his *Procellaria vittata*, was not published until Lichtenstein did so in 1844 (Lichtenstein 1844:59-60, no.71). In his description, Reinhold Forster called his *Procellaria similis* "the white edged silvery Petrel". George Forster also drew these birds. His folio 86 has been described by Lysaght (1959). The specimens described and illustrated by the Forsters as *Procellaria similis* were specimens of the true blue petrel *Halobaena caerulea* (Gmelin, 1789).

From then until the *Resolution* reached Dusky Sound in New Zealand at the end of March 1773, Reinhold Forster in his *Journal* (in Hoare 1982) referred to some of the many birds recorded by him at sea as "*Silverbirds* or *Silvery Petrels* (*Procellaria vittata*)", or as "*silvery Petrels with a blacktip Tail*". Presumably these were *Pachyptila* of indeterminate species. But in this part of the voyage he also referred more commonly to "blackbanded Petrels".

These could have been birds of any 1 of a number of different procellariids, including several different *Pachyptila* species and *Halobaena caerulea*. After the *Resolution* left Dusky Sound in mid-May 1773, and for the remaining 2 years of the voyage, Reinhold Forster referred on numerous occasions to some of the multitude of birds recorded by him at sea simply as "blue petrels". The specific identity of those birds is also quite indeterminable. Again, they could have been specimens of any 1 of a number of different procellariids, including those already referred to.

The only "blue petrels" known to have been taken by the Forsters during the whole of their voyage, other than those specimens which they shot in the southern Indian Ocean and described as *Procellaria vittata* and *Procellaria similis*, were the 2 "blue petrels" of indeterminate identity which they shot on 4 February 1775 among ice off the South Sandwich Islands (Forster in Hoare 1982: 721-722). However, whatever their specific identity may have been, those specimens are irrelevant to a determination of the true identity of the "blue petrels" which the Forsters had described and illustrated as *Procellaria vittata* 2 years earlier in the southern Indian Ocean.

There is no evidence that any of the specimens of *Procellaria vittata* which the Forsters procured on 23 December 1772 were preserved by them and taken back to England. They may in fact have been eaten after the naturalists had finished with them. It is clear that many of the seabirds procured by the Forsters on the voyage, even if they represented species which the Forsters considered to be new to science, were not spared from the pot once they had been examined, described, and drawn. The following 2 examples will suffice here, both taken from the early stage of the voyage from England to the Cape of Good Hope. On 12 October 1772, the Forsters shot 2 specimens of what is now the yellow-nosed albatross (*Diomedea chlororhynchos*). They were eaten after they had been described. Reinhold Forster (in Hoare 1982: 176) said that "When skinned they afford a good palatable food". On 23 October 1772, the Forsters went out and "shott some Albatrosses and other Birds on which we feasted the next day and found them exceeding good" (Forster in Hoare 1982: 178-179; Cook in Beaglehole 1961: 44). All of the species represented in the catch were described by the Forsters. They included a wandering albatross, which Reinhold Forster said "afforded us, having been skinned, a good dish"; several more yellow-nosed albatrosses, and a white-chinned petrel (*Procellaria aequinoctialis*). Even the type specimen of the yellow-nosed albatross, which was 1 of the albatrosses killed on 12 and 23 October, was among those eaten! (Medway 1998).

George Forster's painting of *Procellaria vittata*

George Forster's folio 87, being the painting to which his father referred in his description of *Procellaria vittata*, is among the younger Forster's 2nd voyage bird paintings now in The Natural History Museum, London where they were most recently described by Lysaght (1959). The folio is an unsigned completed painting of what is clearly a *Pachyptila* in flight from above, with a separate side view of the head with the beak wide open to show the tongue and the laminae of the upper mandible. The painting bears the notation by the Forsters: "*Procellaria vittata*. Southern Ocean". Lysaght (1959) identified the bird depicted in the painting as a broad-billed prion.

Also in The Natural History Museum, London are 2 manuscript catalogues (89 f F.) of the zoological drawings done by George Forster on Cook's 2nd voyage. These, known as Catalogues B and C, have been generally described by Whitehead (1978). Catalogue B has the following brief entry relating to George Forster folio 87: "*Procellaria vittata*. South Sea. Nat size. *Nectris* ... MSS. Breed in Dusky Bay, under ground in holes which communicate: Make a noise like Toads or Chickens". *Nectris* is the generic name given by Banks and Solander on Cook's 1st voyage to various species of *Puffinus* that they collected and described. It has no relevance in the present discussion.

George Forster's folio 87 was reproduced on a small scale, with some minor alterations and without the drawing of the head, in the *Penny Cyclopaedia* for 1840 (18: 47) where, as Lysaght (1959) points out, there is a long and interesting article on petrels. The whole painting has been reproduced in colour on a reduced scale by Begg & Begg (1966: opp.161, 1969: 95, Plate 119). The drawing of the head only was reproduced in monochrome by Beaglehole (1961: fig.20). The painting is reproduced here as Plate 1, p.129.

An excellent copy of it, but lacking the additional drawing of the head in the original, is in the Mitchell Library at Sydney under PX*D 72, folio 39. Both Iredale (1925-1927) and Lysaght (1959) identified the bird depicted in the Sydney painting as a broad-billed prion. It was reproduced in monochrome on a reduced scale by Iredale (1925-1927: Plate VI, fig.3).

Procellaria vittata G. Forster, 1777

In his narrative published after the voyage, George Forster recorded on 7 December 1772 that the principal sorts of birds which had attended the ship since they left the Cape were "the Cape-petrel, or pintada (*procellaria capensis*), and the blue petrel, so called from its having a blueish-grey colour, and a band of blackish feathers across the whole wing". A week later, on 14 December 1772 at the edge of the pack ice, he noted that "Numbers of pinguins,

pintadas, fulmars, snowy and blue petrels attended this vast extent of ice...". He gave the names of those birds as "*Aptenodytes antarctica*; *Procellaria capensis*, *glacialis*, *nivea*, & *vittata*" (Forster 1777:I: 91, 98, fn; in Kahn 1968: 68-69,72,fn).

Obviously, George Forster's very brief description of the "blue petrels" to which he attached the name *Procellaria vittata* – "having a blueish-grey colour, and a band of blackish feathers across the whole wing" – could apply to any of a number of different procellariid taxa as now known, including all *Pachyptila* species and the true blue petrel (*Halobaena caerulea*).

Although the Forsters were among the first naturalists to be confounded about the identity of the "blue petrels" they saw and collected during their voyage, they were by no means the last. For example, Routh (1949) noted that the true blue petrel and prions "are so similar in size, general coloration and flight that, until one becomes completely familiar with them, one has to keep a very careful watch on individual birds for short periods before identity is certainly established". And, of prions, Murphy (1936: I: 611) doubted "whether the several species of *Pachyptila* are certainly determinable, as they may be seen over the ocean, except under the most extraordinarily favorable circumstances". As Clarke (1907) observed in his discussion of the true blue petrel, when writing of some of the ornithological results of the Scottish National Antarctic Expedition of 1902-1904:

"Under the collective name of "Blue Petrels", both this species and at least one of the Whale-Birds (*Prion*) were confounded by the Scottish explorers – a pardonable error also made long years ago during Cook's voyage in the Antarctic seas, and, no doubt, often since repeated. Fortunately, however, a number of specimens of these "Blue Petrels" were secured, and afford authentic information regarding both this species and *Prion banksi* in the seas visited by the Expedition".

Mathews (1910-1928: II, 206) appears to be the only writer to date who has specifically expressed an opinion on the authorship of the name *Procellaria vittata* as used by George Forster in 1777. At that time, in 1912, Mathews considered it could not be accepted as of that introduction by George Forster because it is indeterminable. Nevertheless, despite this view, Mathews later (Mathews 1934; Mathews & Hallstrom 1943), without appearing to have given any explanation for his change of opinion, treated Forster (1777) as the author of *Procellaria vittata*.

Many writers over the past 150 years — including Jouanin & Mougin (1979), Harper (1980), Fleming (1982), Warham (1990), Marchant & Higgins (1990), Sibley & Monroe (1990), Christidis & Boles (1994), and in successive New Zealand

Checklists, Fleming (1953), Kinsky (1970), and Turbott (1990) — who have attributed an authorship to the name *Pachyptila vittata* (originally *Procellaria vittata*) for the taxon known as the broad-billed prion have attributed it to Forster (1777).

Previous opinion on the identity of *Procellaria vittata* J.R. Forster

It appears that the bird described and illustrated by the Forsters as *Procellaria vittata* has always been identified with the taxon known today as the broad-billed prion (*Pachyptila vittata*). It is perfectly understandable that those early authors, such as Kuhl (1820: 149), Lichtenstein (1844: 21), and G.R.Gray (for example, Gray (1844-1849:III: 649), in Richardson & Gray (1844-1875: I: 18), Gray (1862: 247)), who discussed the identity of the bird described and illustrated by the Forsters as *Procellaria vittata*, should have identified it with the procellariid taxon which Gmelin had described under the same name in 1789. Later, Sharpe (1906) also identified the bird depicted in George Forster's drawing with *Procellaria vittata* Gmelin, 1789. More recently, both Lysaght (1959) and Fleming (1982) identified the bird in folio 87 as the broad-billed prion *Pachyptila vittata* (Forster, 1777). However, no recent author appears to have considered the actual identity of the bird described and illustrated by the Forsters with reference to the widely accepted 6 species-classification of the *Pachyptila* which is followed in this paper.

The correct identity of *Procellaria vittata*

J.R. Forster

In fact, it is not particularly difficult to determine the specific identity of the *Pachyptila* described and illustrated by the Forsters. Their *Procellaria vittata* is clearly a *Pachyptila*. The prominent palatal lamellae as described by Reinhold Forster, and as illustrated by his son, together with the obviously large bill as described by Reinhold Forster, mean that the specimens they described and illustrated as *Procellaria vittata* must have been representative of a *Pachyptila* of the *vittata-salvini-desolata* complex. The prominent palatal lamellae in *P. desolata*, for example, are well shown in the photographs in Prince (1980) and Harper (1980).

According to Harper (1980), the broad-billed prion is unique among *Pachyptila* species in having an iron-grey bill with violet-blue mandibular rami. Reinhold Forster described the bill of his *Procellaria vittata* as blueish, with both the nasal tube and the ridge of the culmen being black. This answers exactly to the description given by Oliver (1955) for the bill of the Antarctic prion. In fact, it is a description which is applicable to the bills of all *Pachyptila* species except that of the broad-billed prion. Therefore, on the basis of bill colouration alone, the taxon

described by Reinhold Forster as *Procellaria vittata* was not the broad-billed prion.

That, therefore, leaves only *P. salvini* and *P. desolata*. Harper (1980) says those 2 species are often inseparable on plumage characters alone. He further observes that, while the important distinction between the 2 species is in bill shape and size, immature *P. salvini* bill dimensions fall well within the range for adult *P. desolata*, and so species identification at this level is distinctly more challenging. Indeed, Serventy *et al.* (1971) say that correct allocation of some specimens to *P. salvini* or *P. desolata* may be impossible on the basis of bill measurements. The measurements given by Reinhold Forster for the bill of his *Procellaria vittata* are by no means accurate enough to discriminate between *P. salvini* and *P. desolata* on bill measurements. It is therefore not possible to tell whether the *Procellaria vittata* of Reinhold Forster was *P. salvini* or *P. desolata* from the plumage characters and bill measurements he recorded.

However, there is no reason to believe that the pelagic distributions of *P. salvini* and *P. desolata* were generally any different 200 years ago than they are today. The pelagic distribution of *P. salvini* is not well known, but it generally inhabits subantarctic waters and some subtropical seas outside the breeding season (Enticott & Tipling 1997). Similarly, Murphy (1936: I: 617) considered that "Around the world in the southern oceans" the broad-billed "Whale-bird", which he called *Pachyptila forsteri* and with which he included *P. salvini*, "seems to be a petrel of the lower sub-antarctic latitudes and adjacent parts of the Sub-Tropical Zone". On the other hand, Murphy (1936:I: 622) considered the Antarctic "Whale-bird" (*P. desolata*) to be "the only member of the genus native to the Antarctic Zone of surface water". Enticott & Tipling (1997) say that generally the pelagic range of *P. desolata* is from the pack ice to 40°S. In the far south, *P. desolata* inhabits the same zone of cold surface water as does *Halobaena caerulea* (Roberts 1967: 139). It has already been noted that the Forsters took their specimens of *Procellaria vittata* and *Procellaria similis* (= *Halobaena caerulea*) only 4 days apart in the same iceberg-strewn seas.

P. desolata is abundant in the South Atlantic and southern Indian Oceans (Harper 1980). The Forsters shot their *Procellaria vittata* on 23 December 1772 in iceberg-strewn seas in the southern Indian Ocean at 56° 31'S, 31° 19'E, in a region commonly frequented by *P. desolata* but not by *P. salvini*. Therefore it would seem, if distribution is a satisfactory way of discriminating between *P. salvini* and *P. desolata*, that the birds described and illustrated by the Forsters as *Procellaria vittata* can be identified as individuals of the taxon known today as the Antarctic prion (*Pachyptila desolata*). Murphy (1936:I: 622) also considered the specimens taken by the

Forsters on 23 December 1772, as referred to by Cook in his official account (Cook 1777:I: 29), to be of that species.

In summary, therefore, Reinhold Forster's description of *Procellaria vittata* almost certainly relates to the Antarctic prion. There is no reason to believe that the bird drawn contemporaneously by his son under the same name was based on an individual of a different species. In fact, George Forster's painting is a very good representation of the same *Pachyptila* species described by his father. Accordingly, there can be no reasonable doubt that the bird depicted in George Forster folio 87 is also an Antarctic prion, and not a broad-billed prion as previously identified. Fleming (1982) considered that the name *Pachyptila vittata* could be restricted to the broad-billed prion by selecting George Forster's folio 87 as the type. However, it would be clearly inappropriate to do so given that Forster's painting is demonstrably not of that taxon.

Two related matters can be dealt with at this point. Firstly, Forster's name *Procellaria vittata*, as published by Lichtenstein in 1844, is invalid because it is a junior subjective homonym of *Procellaria vittata* Forster, 1777. Secondly, the statement by Mathews (1910-1928:II: 208-209) that "Forster's description of *P. vittata* was founded on a New Zealand bird" is patently incorrect.

The identity of the "Broad-billed Petrel" of Latham, 1785

It is appropriate to also discuss the taxon described by Latham (Mathews 1931) in 1785 as the "Broad-billed Petrel" (Latham 1781-1801:III: 414-415, no. 20). The material used by Latham included information from several literature sources. His references to those literature sources have been omitted from his description of the "Broad-billed Petrel" as transcribed here, because, with the exception of Cook (1777:I: 29-30, quoted earlier), they are not directly relevant to the present discussion. Latham's narrative relating to the "Broad-billed Petrels" recorded in Dusky Bay will be dealt with elsewhere.

"*Lev. Mus.*

SIZE of a small Pigeon: length twelve inches. The bill blue grey, an inch and a quarter in length, and near an inch broad at the base; both mandibles bent at the points; the edges finely serrated; at each nostril a distinct very short tube: the tongue is very large and fleshy, and fills up the whole of the bill, conforming to the shape of it: the colour of the plumage is blueish ash on the upper parts; and some of the feathers are brown in the middle: the sides of the head, and under parts of the body, white: beneath the eye a dusky black streak: the quills, and the ends of the six middle tail feathers, dusky, almost black: when the wings

are expanded a dark band appears from the tip of one wing to the other, crossing the back: the legs are black.

The *female* has the same plumage; but the bill, though greatly exceeding that of any other *Petrel*, is scarcely more than half the breadth of that of the *male*.

These were seen all over the *Southern* hemisphere, from 28 degrees upwards. Met with in *Dusky Bay*, and other parts of *New Zealand*. On the north-west part of *Anchor Isle* found in immense numbers, among other species; some on the wing, and others in woods, in holes in the ground close to one another, or under the roots of trees and crevices of rocks; making a noise similar to the croaking of *frogs*; and fly much at night, so as to be taken for *Bats*. These were not to be seen in the day-time, but at three o'clock in the morning were very active, being diving throughout the day, at sea, in quest of food. Dr. *Forster* observes, that these birds are exceedingly well furnished with cloathing, equal to the *Penguin*; for "their plumage was amazingly abundant, and increased their bulk in great proportion; and two feathers, instead of one, proceeded out of every root, lying within one another, and formed a very warm covering".

The Leverian Museum to which Latham referred in the heading to this description, and its founder Sir Ashton Lever, are described in Mullens (1915). It seems, because he specifically refers to the Leverian Museum, that Latham's description of the "Broad-billed Petrel" was based primarily on a *Pachyptila* specimen which he saw in that repository when he was compiling his description of the taxon. It is true that the significant zoological collection of Sir Joseph Banks also contained 4 specimens (discussed below) which were almost certainly of 1 or more species of *Pachyptila*. Latham must have seen at least 1 of them because he used it as the basis for his description of the "Brown-banded Petrel" (also discussed below). However, there is no evidence that he used any of the Banksian *Pachyptila* specimens as the basis for any part of his description of the "Broad-billed Petrel".

The Leverian Museum specimen of *Pachyptila* which Latham used is almost certainly the same specimen depicted in a water-colour drawing, folio 967B in a collection of original water-colour drawings by various artists, including Latham, now in The Natural History Museum, London (Latham n.d.; Sawyer 1949). Latham folio 967B, not previously published, is reproduced here as Plate 2, p. 130. No doubt it was drawn by Latham himself. It is noted in his hand: "*Procellaria Forsteri*, Ind.orn. 2. 827. Broad-billed Petrel, Gen. Syn. 6. 414". Although the drawing is somewhat crude, the bird depicted is undeniably a broad-billed

prion, and is almost certainly of a mounted specimen. All of the bird specimens then in the Leverian Museum appear to have been mounted and displayed in glass cases, either on their own or with other specimens.

However, Latham clearly used other material apart from the Leverian Museum specimen, and information from literature sources, in preparing his description of the "Broad-billed Petrel". He saw George Forster's paintings, which had been purchased by Sir Joseph Banks in 1776, and used some of them when compiling his descriptions, including those of several New Zealand birds (Medway 1976, 1990b, 1998). George Forster folio 87 of the Antarctic prion was almost certainly used by Latham. It seems Latham could only have obtained the information that the tongue of his "Broad-billed Petrel" was "very large and fleshy, and fills up the whole of the bill, conforming to the shape of it" from the Forster painting, where the tongue and bill are very well shown in Forster's separate illustration of the bird's head. Latham's statement that "when the wings are expanded a dark band appears from the tip of one wing to the other, crossing the back", was probably obtained from the Forster painting of the whole bird in which this feature is obvious, rather than from Cook (1777:I: 30) who said of his "blue peterel" that "A streak is formed by feathers nearly of this colour, along the upper parts of the wings, and crossing the back a little above the tail". Furthermore, Latham probably thought that the bird depicted in the Forster folio was the female of the even broader-billed, but otherwise identical, specimen in the Leverian Museum which he obviously regarded as the male of his "Broad-billed Petrel".

It is not at all surprising that 217 years ago Latham should regard the similar-looking "broad-billed" birds which he inspected, either as a specimen or as depicted in a painting, as being properly referable to different sexes of a single species, his "Broad-billed Petrel". Harper (1978) has aptly observed that even today "The 6 species of prion have the dubious distinction of being the most difficult of all the Procellariiformes to identify, whether at sea or as museum skins".

The fate of the Leverian Museum specimen Latham described and drew is not known. No entry which could relate to it has yet been found in the extensive catalogue of the sale of the collection which took place over several weeks in London in 1806 (Donovan 1806). The specimen may not have been included in the sale, or it could have been discarded or otherwise disposed of before then. If any specimen is to be designated as the type of the broad-billed prion *Pachyptila vittata*, then, in the absence of an original, it should be the bird depicted in Latham folio 967B.

Procellaria vittata Gmelin, 1789

Latham's description of the "Broad-billed Petrel", including the literature references he gave, was the basis for *Procellaria vittata* Gmelin, 1789 (Gmelin 1788-1793:I: 560, no.10), and *Procellaria forsteri* Latham, 1790 (Latham 1790-1801:II: 827, no. 21).

Many writers, including Coues (1866), Buller (1873, 1887-1888), Godman (1907-1910), Mathews (1910-1928, 1927-1928), Falla (1940), Oliver (1955), and Serventy *et al.* (1971), have attributed the specific name *vittata* Gmelin, 1789 to the taxon now known as the broad-billed prion. On the other hand, very few writers over the years have used the specific name *forsteri* Latham, 1790 for the broad-billed prion. Those writers include Oberholser (1919), who gave it as *Prion forsteri* (Latham) in a confused and confusing note about the names *Halobaena caerulea* and *Prion vittatus*, Peters (1931), and Murphy (1936).

The type localities of *Procellaria vittata* Forster, 1777 and *Procellaria vittata* Gmelin, 1789

The type locality of a nominal species-group taxon is the geographical place of capture, collection or observation of the name-bearing type (ICZN 1999: Art.76.1). Mathews (1934) gave New Zealand as the type locality of *Procellaria vittata* Forster, 1777. This is patently incorrect because, as has been shown, the specimens on which the Forsters based the name *Procellaria vittata* were collected by them in the southern Indian Ocean. Mathews & Hallstrom (1943) further confined the purported type locality to "Anchor Isle, Dusky Sound", which was followed by Turbott (1990). Marchant & Higgins (1990) give it as "lat. 47° 10'S, Anchor Island, Dusky Sound, New Zealand". No doubt they obtained the latitude 47° 10'S from Jouanin & Mougou (1979) who gave only it as the type locality of *Procellaria vittata* Forster, 1777. It is not known how Jouanin & Mougou came to cite that latitude. It is not the latitude of the seas through which the *Resolution* was sailing on the date under which George Forster applied the name *Procellaria vittata* in his narrative of 1777, nor is it the latitude where the Forsters collected the specimens which they described as *Procellaria vittata*, and it is not the latitude of any locality in Dusky Sound. The correct type locality of *Procellaria vittata* Forster, 1777 is 56° 31'S, 31° 19'E.

Mathews (1910-1928:II: 209, 1927-1928:I:126, 1934) gave New Zealand as the type locality of *Procellaria vittata* Gmelin, 1789. Falla (1940) gave it as Dusky Sound. However, it is clearly not correct to give New Zealand, let alone a specific place therein, as the type locality of *Procellaria vittata* Gmelin, 1789. It is not known when, or from whom, Sir Ashton Lever received the specimen which Latham used when describing his "Broad-billed Petrel" which was the basis of Gmelin's *Procellaria vittata*. Nor is it known by whom, where, or when that Leverian Museum speci-

men had been collected. All that Latham said on the matter of locality, which he took from the literature sources he referred to, was that the "Broad-billed Petrel" was to be seen "all over the Southern hemisphere, from 28 degrees upwards", and that it had been "Met with in Dusky Bay, and other parts of New Zealand". It is quite clear, therefore, that the type locality of *Procellaria vittata* Gmelin, 1789 is not known, and can never be known in the absence of acceptable evidence.

COOK'S 3rd VOYAGE, 1776-1780

No official naturalist was appointed to accompany Cook's 3rd voyage from 1776 to 1780. However, William Ellis, who was surgeon's 2nd mate on the *Discovery* and then on the *Resolution*, executed many bird paintings. Most of these went to Sir Joseph Banks, but some are in the Alexander Turnbull Library in Wellington (Medway 1977, 1979a), and at least 1 is known to be in private hands. Those that went to Banks are now in The Natural History Museum, London where they have been described by Sharpe (1906) and Lysaght (1959). William Anderson, surgeon on the *Resolution*, described a number of new birds discovered during part of the voyage (Medway 1979b). Most of the bird specimens taken back to England from the 3rd voyage went to Banks, but only 2 which are probably from it are known to survive (Medway 1981). Only 1 *Pachyptila* specimen collected during the voyage is known to have been taken back to England. That specimen has also played a significant and complicated role in the taxonomic and nomenclatural history of the genus.

The identity of *Procellaria desolata* Gmelin, 1789

The name *Procellaria desolata* was founded in 1789 by Gmelin (1788-1793:I: 562, no.14) solely on the "Brown-banded Petrel" which Latham had described in 1785 (Latham 1781-1801:III: 409, no.14) as follows:

"LENGTH eleven inches. Bill an inch long, black, with the tip yellowish: the plumage on the upper parts of the body greenish ash-colour, deepest on the crown: the sides of the head, taking in the eyes, and all the under parts of the body, white: the ridge of the wing almost black: quills and tail dusky; the last rounded at the end, and tipped with dark brown: the legs brown: webs yellow: claws black: when the wing is expanded there appears a dark band from tip to tip, quite across the body.

Inhabits the *Isle of Desolation*. In the collection of Sir Joseph Banks."

There is no reason to doubt the "Isle of Desolation" (= Kerguelen Island) as the locality given by

Latham for his "Brown-banded Petrel". In 1785 when Latham described the taxon, Kerguelen Island had been visited only by those Europeans on the 2 ships of Cook's 3rd voyage which were at the island for 6 days from 24-30 December 1776.

Three species of *Pachyptila* - *P. desolata*, *P. belcheri*, and *P. turtur* - breed at Kerguelen Island (Weimerskirch *et al.* 1989; Bretagnolle *et al.* 1990), and all 3 probably bred there in 1776. Cook (in Beaglehole 1967:I: 43) recorded that "Mr Anderson my Surgeon who has made Natural history a part of his study, during the short time we lay in Christmas harbour took every opportunity to search the Country in every direction ..". Anderson (in Beaglehole 1967:II: 772-773, fn.) referred to what was probably a species of *Pachyptila* in the detailed account he gave of the birds he met with at the island:

"The Cape Petrel or Pintado bird, the small blue one which is always seen at sea, & the small black one or mother Carey's chicken, were not in great numbers but we found the nest of the first with an egg and the second though scarce was found in some holes like Rabbits burrows."

Anderson said of the "small blue one": "In a former voyage I made to the south sea amongst other papers I have one which I called *Characteres breves Avium adhuc incognitarum in itinire nostro visa annis 1772 1773 1774 et 1775*, where I call'd this *Procellaria cerulea* or blue Petrel". This manuscript (Anderson 1772-1775) contains brief diagnoses of the birds Anderson met with on Cook's 2nd voyage (Medway 1979b). The specific identity of the bird he described therein as *Procellaria caerulea* cannot be known, but it obviously belongs among the 2nd voyage "blue petrels" to which the Forsters and Cook referred. Anderson's previously unpublished description (Anderson 1772-1775: 4, no.6) reads: "*caerulea P(rocellaria) supra caerulescens subtus albescens, fascia subnigra dorsum alisque transversim. - Habitat ubique in mare ultra Latitudo 40.S°*".

Some specimens of "blue petrels" were taken back to England on the ships of at least 2 of Cook's voyages and passed into the collection of Sir Joseph Banks. He possessed 4 specimens of "*Procellaria vittata*" shortly after the 3rd voyage ships returned. Those specimens are referred to under that name in the Manuscript Lists of the bird specimens then in the Banks collection which he had received primarily from Cook's voyages (Medway 1979b). The specimens are identified in the lists with the bird depicted in Forster folio 87 which was by then in the Banksian Library. The Manuscript Lists reveal that, before the return of the 3rd voyage ships, Banks possessed 3 specimens, presumably all of *Pachyptila*, which were identified with the name *Procellaria vittata*, and the locality "southern ocean", both of which appear as notations on the Forster

drawing. One or more of those specimens may have been collected by Banks himself on the 1st voyage. The specimens are mentioned in Manuscript List 4, no. 48 as "*procellaria vittata*. Forsters drawgs. southern ocean. 3". A 4th specimen was received by Banks from the 3rd voyage. All 4 specimens are described briefly in Manuscript Lists 2 and 3, no. 72 as "*vittata proc(ellaria)*. Forster. corpore supra caeruleo-canescente, subtus albo tectricibus alarumque fusco vittatis. 4".

Latham's account quoted above shows that he used material in the possession of Sir Joseph Banks in compiling his description of the "Brown-banded Petrel". Only 2 procellariid specimens collected at Kerguelen Island during Cook's visit in 1776 are known to have been taken back to England in 1780 where they passed into the Banks collection. They are both referred to in what is known as the Solander catalogue, a manuscript list of the birds and drawings received by Banks from Cook's 3rd voyage (Medway 1979b). One of them, referred to in entry no. 54 of the catalogue, was obviously a cape pigeon (*Daption capense capense*). The other is referred to in entry no. 56 of the catalogue simply as "1. Ellis. Procellaria. Island of Desolation". The evidence indicates that this specimen was a *Pachyptila*. It is the 4th specimen referred to in the Manuscript Lists which was identified, along with the 3 others already in the Banks collection, as being referable to the *Procellaria vittata* of the Forster drawings. Although the relevant Forster drawing, Forster folio 87, depicts a specimen of *Pachyptila desolata*, this does not confirm that it and the 3rd voyage specimen in the Banks collection were of the same *Pachyptila* species. Nevertheless, it was the Banks specimen referred to in Solander catalogue entry no. 56 that formed the basis of Latham's 1785 description of the "Brown-banded Petrel" (Medway 1979b), and that specimen was indeed a *Pachyptila*. It is certain that the type specimen no longer exists.

However, it seems that more than 1 species of *Pachyptila* was met with at Kerguelen Island in December 1776. This is confirmed by Ellis folio 43, one of the 90 3rd voyage bird paintings by him which are in The Natural History Museum, London. It is undoubtedly the Ellis painting referred to in Solander catalogue entry, no. 56. The folio bears the notation in ink by Ellis "W:W:Ellis ad viv: delint: et pinxt: 1776", and on the back in pencil is "Island of Desolation". It is a painting of a whole bird, with a pen and ink sketch of the head only of what is almost certainly a different species. The Ellis drawing was reproduced in monochrome by Lysaght (1959, Plate 37b). It is reproduced again here as Plate 3, p. 131. The whole bird depicted in the painting is clearly a *Pachyptila*, obviously executed very shortly after the death of the subject because its legs and bill, which in *Pachyptila* soon blacken after death,

are still blueish as in life. Sharpe (1906) considered the Ellis painting to be of *Pachyptila desolata*. Lysaght (1959) thought the whole bird figured by Ellis is possibly *Pachyptila belcheri*. The bill of the whole bird depicted leaves little doubt that it is indeed a representation of *Pachyptila belcheri*. However, rather than being of *Pachyptila desolata* (Medway 1979b), it seems more likely that the bird whose head is depicted separately by Ellis was *Pachyptila turtur*, as Lysaght (1959) thought.

Latham saw the Ellis drawings in the Banks collection and used some of them when compiling his descriptions, including that of the white-fronted tern (*Sterna striata*) (Medway 1976, 1981). Latham undoubtedly saw Ellis folio 43, but there are reasons to believe that he did not use it when preparing his description of the "Brown-banded Petrel". For example, the colours of the legs, feet, and bill as given by Latham do not correspond to those shown in the Ellis painting. The colours of the soft parts given by Latham perhaps indicate that the specimen had been preserved in spirits of vinum which seems to have been the manner in which most zoological items in the Banks collection were preserved. In addition, Latham said of his bird that "when the wing is expanded, there appears a dark band from tip to tip". He could not have readily ascertained this from the Ellis painting which depicts a standing bird with folded wings.

It is clear, therefore, that although Latham's "Brown-banded Petrel" (and therefore Gmelin's *Procellaria desolata*) was almost certainly based on a Cook 3rd voyage specimen of *Pachyptila* from Kerguelen Island, his description could still apply to any of the 3 *Pachyptila* species known to breed there, 2 at least of which were probably met with at the island in 1776.

Several early taxonomists, including Kuhl (1820) and Schlegel (1863), considered that Gmelin's *Procellaria desolata* applied to a small *Pterodroma*. In 1820, a specimen which had been acquired by Temminck at the sale of Bullock's Museum in London the year before, was described by Kuhl and identified by him with *Procellaria desolata* of Gmelin. Temminck's private collection shortly afterwards became part of the University Museum of Leiden, now the National Museum of Natural History (Cottrell 1975). The specimen described by Kuhl was seen there later by Schlegel. In 1863, Schlegel (1863) also identified it, and 2 other supposedly identical specimens which were then in the museum, as *Procellaria desolata*. All 3 specimens referred to by Schlegel are still in the museum at Leiden, and are labelled *Pterodroma leucoptera brevipes* (Dr R. Dekker, pers. comm.).

This was generally the position until 1871, when Gray (1869-1871:III: 108) placed *Procellaria desolata* of Gmelin in the *Pseudoprion* of Coues

(1866: 164-167). Four years later, Coues himself (in Kidder 1875), when examining specimens which had been collected at Kerguelen Island during the American Transit of Venus Expedition in 1874-1875, considered 1 of them to be of the same species as that which Gmelin had described as *Procellaria desolata*:

"The single prepared specimen in the collection agrees with the characters I give of *P(seudoprion) banksii*, so that I so identify it with little hesitation. I never identified the *Procellaria desolata* of Gmelin in the least to my satisfaction, having allowed myself to suppose that it was an *Oestrelata*, being unconsciously biased by the fact that it had been very generally so considered by writers. In attentively re-examining Gmelin's diagnosis, with reference to the specimen in hand, I find, to my surprise, that it agrees in essential points with the bird brought in by Dr. Kidder, and I am forced to the conclusion that Gray is right in referring it to my section *Pseudoprion*".

Of course, Coues' conclusion does not of itself confirm that the *Pachyptila* specimen which he had before him was in fact of the same species as that which Latham had described as the "Brown-banded Petrel" and to which Gmelin had applied the name *Procellaria desolata*. Nevertheless, the taxon described by Latham and Gmelin has invariably been accepted since then as that which is known today as the Antarctic prion *Pachyptila desolata* (Gmelin, 1789).

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APPENDIX 1

Descriptions of *Procellaria turtur* (MS: Banks & Solander 1769) and *P. latirostris* (MS: Banks & Solander 1769).

A. *Procellaria turtur* Banks & Solander, 1769.

1. From Solander MS.Z4: 65 - published by Mathews (1910-1928: II: 218):

Turtur. Procellaria supra caerulescenti-cana, subtus alba, pedibus caeruleis, palma albida, rostro toto angusto plumbeo. Fig. Pict.

Habitat in Oceano Americas antarctico, a Terra del Fuego australi, Latit. austr. gr. LIX (Febr. 1. 1769.) Mother Careys Dove.

Caput & Collum supra ut & Dorsum & Uropygium amoene e caeruleo - cana nitida ; capitis latera alba. vitta suboculari plumbea.

Gula, Collum subtus, Pectus, Abdomen, Crissus & Femora alba.

Alae longissimae, angustae, supra plumbeae, dorso obscuriores subtus albae.

Cauda cuneata, brevis, plumbea, apice nigricans, subtus pallidior.

Rostrum pallide plumbeum, angustum rectum.

Mandibula superior superne ante nares depressa, planiuscula, unde sulcus obliquus cute repletus ad sinum extenditur.

Nares e cylindrico brevi, rostro quadruplo brevior, biloculari.

Dissepimentum orificium etjam divides.

Mandibula inferior recta apice vix adunca, rima longitudinali cutacea, antice dilatata, truncata.

Pedes pallide sed amoene caerulei, ut et digiti tres anteriores, quorum membrana connectens albida, subdiaphana est.

Digitus posticus minutus nigricans.

Ungues nigricantes, lanceolati, acuti.

Longitudo ab apice rostri ad finem caudae 11 unc.

———— inter apices alarum expans 22½ unc.

———— Rostri 1¼ unc.

Pondus. 4. unc.

2. From Linnaeus (1766-1767: I: opp. p. 212):

Procel(laria) supra caerulescenti-cana, subtus alba, pedibus caeruleis, palma albida, rostro toto angusto plumbeo. Mscr. Turtur.*

Fig.pict.

Hab. in Oceano Americas antarctico.

B. *Procellaria latirostris* Banks & Solander, 1769

1. From Solander MS.Z4: 61-62 - published by Mathews (1910-1928: II: 207-208):

latirostris. Procellaria supra caerulescenti - cana, strigo obliqua fusca subtus alba, pedibus caerulescentibus, rostro basi dilatato.

Habitat in Oceano australi. Lat. austr. XXXVII : 10. Longit. occ. CLXXI. 5. (Octob. 2. 1769.)

Pileus, Nucha, Cervix, Dorsum & Uropygium pulcre e caeruleo cana.

Capitis latera alba: vitta suboculari plumbea retrorsum extensa.

Gula, Jugulum, Pectus, Abdomen et Femora alba.

Crissi Pennae breviores totae albae, laterales longiores intus plumbei, intermedii toti extra medium nigricantes.

Alae longae totae subtus albae, supra cinereo-glaucae.

Fascia obliqua nigricante ab angulo cubiti versus Uropygium ducta, quae sub volatu valde conspicua.

Remiges quatuor primores supra extus nigricantes.

Cauda rotundato-subcuneata, longitudine pedum, a basi extra medium plumbea apice nigricans.

Rostrum antice compressum, basi valde dilatatum, incrassatumque.

Mandibula superior a tubo narium ad sinum rima obliqua, cutacea exarata, dorso subdepresso sed rotundato, nigro ; apice adunco plumbeo ; Lateribus infra & pone rimam plumbeis, rotundato – dilatatis.

Tubus narium convexus, rostro quadruplo brevior, niger, antice parum elevatus, subplumbeus, bilocularis.

Dissepimentum subretusum.

Aperturae obovatae ; superne angustiores.

Mandibula inferior recta, plumbea, basi dilatata, apice dilutior,

parumque adunca, utrinque exarata rima recta cutacea versus apicem ampliata.

Cutis submento rugis plicata.

Oculi nigricantes.

Pedes amoene caerulei, ut et *Digit*.

Palma albida, subdiaphana, venulis paucis purpurascens.

Ungues lanceolati, nigricantes, basi plumbei.

Loco digiti postici Unguis conicus, sessilis, niger, basi albidus.

Figura rostri ab omnibus facillime distinguenda, etiam a *Procellaria*

Turtur Mscr cui alias simillima, ut taceam fasciam obliquam dorsalem.

Longitudo ab apice ad fin. Caudae 12.

———— inter apices alar. expans. 24½.

Pondus 5. unc.

2. From Linnaeus (1766-1767: I: opp. p. 212):

Proc(ellaria) supra caerulescenti cana, striga obliqua fusca, subtus alba, pedibus caerulescentibus, rostro basi dilatato.

Mscr. latirostris.*

Hab. in Oceano Australi.

APPENDIX 2

Description of *Procellaria vittata* (MS: Forster 1772).

Procellaria vittata J.R. Forster, 1772.

Forster (1772-1775:I: 35, no.17) - published more or less *verbatim* in Lichtenstein (1844: 21-23, no.17).

1772 Oceanus antarcticus. Nov. 30 – Decembr. 23d. *Procellaria vittata*

17. *Procellaria vittata* N. Sp. F. (fig. pict. G.).
the banded Petrel.

Pr(ocellaria) supra coeruleo cana, vitta transversali nigra; rostro lato pectinato, pedibusque coeruleis.

Habitant a Tropico Capricorni in Circulum Antarcticum usque, Volant celerrime.

Nidos habent in cuniculis sub saxis & radicibus arborum in rupibus Novae Zeelandiae. Parentes mane relinquunt pullos & tota die, cibum sibi & pullis in mari ex piscibus & vermibus colligunt, noctu vel vesperi redeunt gregatim ad pullos, (nam multa earum millia simul redeuntia vidi) & tum cibum evomunt in ora pullorum: ante diluculum tantum clamorem faciunt ubi in cuniculis degunt, ut nescias unde is oriatur, & ut vix prope te loquentem exaudire possis, ipso diluculo mare repetunt gregatim, & tum toto mari sparsae indesinenter horsum vorsum volitando videntur.

Corpus magnitudine Turdi aut Sturni vel majus. A Rostro ad extremitatem rectricum 11 pollices Anglic. A Rostro in medium digitum pedum 10¼ poll. Alae expansae 25 poll. Rostrum cum rictu longum 1⅙ poll. latum ad rictum ⅞ poll. a genu in extremum medium unguem 3 poll. Digitus medius cum ungue 1⅙. Unguis digiti medii ⅜. Cauda ab Uropygio 3½ poll. Supra plumis coeruleo-incanis, subtus prorsus candidis. Vitta transversalis nigra per apicem alarum (i.e. 5 primas remiges & tectrices superiores) transit, indeque descendit in apices scapularium, & imum dorsum vel regionem supra uropygium.

Caput saturatius coeruleum s. nigrescens, plumulae albae circa rostrum, supercilia candida, sub oculis circa aures macula saturate coerulea. *Oculi* Iride nigra.

Rostrum, depressum, latum, longitudinaliter sulcatum, coerulescens. *Mandibula superior* apice adunca, margine exteriore acuto, simplici, interiore pectinato, pectinibus parallelis elasticis sensim versus apicem decrescentibus. *Inferior* apice compresso canaliculato. *Gula* intra duo mandibulae latera expansilis. *Nares* cylindricae, bitubulosae, truncatae, e basi Rostri in tertiam ejus partem procurrentes, nigrae; & inde rostrum nigrum est supra inter sulcos longitudinales usque in aduncam ejus partem. *Lingua* crassa, carnosae, conica.

Remiges primae 10. secundariae 18. quinque primae primorum marginibus exterioribus nigris, interioribus pallidis. Tectrices superiores & scapulares extremae sunt nigrae, hae margine albido.

Rectrices 12, harum 6 mediae apice nigro fasciatae. Cauda rotundata. Tectrices inferiores caudae nigrae.

Pedes tridactyli, palmati, coerulei, cute granulosa tecti. Margo digiti exterioris membrana longitudinali instructus. *Ungues* nigri concavi. *Unguis* sessilis, conicus, niger, loco digiti postici.