

COOKILARIA PETRELS IN THE EASTERN PACIFIC OCEAN: IDENTIFICATION AND DISTRIBUTION

Part I of a Two-Part Series

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THE SMALL *PTERODROMA* PETRELS of the subgenus *Cookilaria* are among the least understood seabirds in the world. Two species, Cook's Petrel (*P. cookii*) and Stejneger's Petrel (*P. longirostris*), have been recorded off the west coast of North America; others have been tentatively reported. Knowledge of their status has been clouded by the lack of identification criteria separating Cook's Petrel from Defilippe's Petrel (*P. defilippiana*) and Pycroft's Petrel (*P. pycrofti*). Indeed, the California Bird Records Committee, accepting records of *cookii*, has used a disclaimer that "*defilippiana* and *pycrofti* were considered eliminated solely on known range and not on plumage" (Roberson 1986, Dunn 1988). Tyler and Burton (1986) thought *defilippiana* was "nearly identical" to *cookii* in the field. The purposes of this paper are to develop identification criteria for the Cook's/Defilippe's/Pycroft's/Stejneger's group, and to summarize identification features

and known distribution of all small *Pterodroma* in the eastern Pacific. We review six species: Cook's Petrel, Defilippe's Petrel, Pycroft's Petrel, Stejneger's Petrel, White-winged Petrel (*P. leucoptera*, including "Collared Petrel" [*P. (l.) brevipes*]), and Black-winged Petrel (*P. nigripennis*).

Two other species, Chatham Petrel (*P. axillaris*) and Bonin Petrel (*P. hypoleuca*), are often included in *Cookilaria*. They do not generally occur in the eastern Pacific, and they have distinctive underwing patterns; see Harrison (1983, 1985, 1987) and Pratt *et al.* (1987). Although we review the taxonomic history of these forms, we have not included them in the main body of this paper.

Methods

We examined a large percentage of the *Cookilaria* specimens in American and New Zealand collections, studying 100 *cookii*, 34 *defilippiana*, 37 *pycrofti*, 95 *longirostris*, 95 *leucoptera* (of all races), and 79 *nigripennis*

specimens. We scored characters including mantle color, tail pattern, and head pattern; sketched head and rectrix patterns; and took measurements of culmen length, bill depth, and tail length, and measured individual rectrices to determine tail shape. Wing lengths were obtained from the literature and from specimen tags, although it is likely these were not all taken by the same methods. Biometrics from this review will appear in Part II of this paper. Both authors have studied Cook's Petrels off California, and Bailey participated in an April 1989 cruise that recorded 113 Cook's Petrels (Bailey *et al.* 1989). Roberson observed seabirds in the eastern Pacific, August-December 1989, on a NOAA-sponsored survey. He obtained experience with hundreds of Cook's, White-winged, and Black-winged petrels, and a few Stejneger's and "Collared" petrels. Illustrator Keith Hansen, whose color plate will appear in Part II, also has experience with most of these species in the eastern Pacific.

Neither author has field experience with Defilippe's or Pycroft's petrels. We discussed these species with observers who had field experience (e.g., J. A. Bartle, C. Corben, B. Haase, P. Meeth, R. L. Pitman, P. Pyle, L. Spear), and reviewed photographs and the literature. While we believe that our conclusions will prove of value, they remain open to revision.

History and Taxonomy

Taxonomy of *Pterodroma* petrels is far from settled, and much of the literature is confusing. The first specimens were described by Gray (1843) under the name *Procellaria cookii*. Bonaparte (1855) first used the generic names *Cookilaria* and *Pterodroma*, placing Cook's Petrel and allies in *Cookilaria*, but he soon moved them to *Rhantistes* Kaup (Bonaparte 1856). Numerous other species were described in the late

1800s, but Mathews (1912) lumped all these birds under the single species *Pterodroma cookii*. Murphy (1929) reviewed the situation and concluded there were but two species: pale-headed birds *Pterodroma cookii* (including those we now call Cook's, Black-winged, Chatham, and Defilippe's petrels) and those with dark crown and nape *P. leucoptera* (including those now known as White-winged, Stejneger's, and Bonin petrels). He called the dark-headed birds nesting in the Juan Fernandez islands off Chile the "Mas Afuera Petrel" (*P. l. masafuera*), and used "Mas Atierra Petrel" for the pale-headed form here, *P. [c.] defilippiana*. He also described a new race, *orientalis*, for birds that were very like the Cook's Petrels nesting around New Zealand, but which occurred off Chile; these had a scaly back pattern formed by whitish feather tips. He was unable to place the taxon *longirostris* described from seas off Japan by Stejneger (1893), not having seen the type specimen, but he thought it likely belonged to the *leucoptera* group. Soon thereafter he referred five other specimens from the northeastern Pacific to *longirostris* (Murphy 1930). Moffitt (1938) followed Murphy's taxonomy and referred the 1908 specimens far off California (Loomis 1918) to *P. leucoptera masafuera*. Although "*masafuera*" later proved to be *longirostris*, and these specimens were of Stejneger's Petrel, the original label of *leucoptera* persisted and the records were mistakenly attributed to White-winged Petrel (e.g., Pough 1957).

During this period Falla (1933) described Pycroft's Petrel (*P. pycrofti*). Falla also discussed an immature Cook's specimen that had a scaly back and wondered if Murphy's *orientalis* might be a young Cook's on migration. This interpretation is now generally accepted, and "*orientalis*" is not considered valid.

In a subsequent review, Falla (1942) restricted the subgenus

Cookilaria to birds with a delicate bill and skull structure and bluish feet. Having reviewed Stejneger's description of the bird off Japan, and the later specimens, he concluded that those in the northeastern Pacific were molting migrants of the Mas Afuera nesting bird and called them all *P. longirostris*, this having priority over Murphy's name *masafuera*. (The type specimen, in Tokyo, remained inaccessible owing to World War II.) Within the *Cookilaria* subgenus, he concluded there were three species: *P. longirostris* (Stejneger's and Pycroft's petrels), *P. cookii* (Cook's and Defilippe's petrels), and *P. leucoptera* (White-winged Petrel). There remained Bonin, Black-winged, and Chatham petrels; these had stout bills and usually flesh-colored feet. He decided they were one species: *P. hypoleuca*. Fleming (1941) considered Cook's and Pycroft's separate species, and lumped Black-winged and Chatham petrels as one species, *P. axillaris*, within the *Cookilaria* subgenus. Later, Falla (1962) received notes on *P. longirostris* from Kuroda in Japan, supporting his conclusion that it was a migrant from the Mas Afuera islands; the species has been known as Stejneger's Petrel ever since.

Jouanin and Mougin reviewed the Procellariiformes in 1979. Among these petrels, they lumped Pycroft's with Stejneger's and Collared with White-winged. All were placed in the subgenus *Cookilaria* and considered a superspecies. Black-winged and Chatham were considered another superspecies, but Bonin was termed "distinct." The A.O.U. (1983) largely followed this taxonomy, though they restricted the superspecies to *cookii/defilippiana*. Bourne (1983) reviewed the entire group and used the subgenus *Cookilaria* for all species except Black-winged, Chatham, and Bonin. He treated all distinctive populations as separate species, including the recently discovered birds from New Caledonia (de Naurois 1978). However, the

New Caledonia bird is best considered a race of White-winged Petrel *P. leucoptera* (Imber and Jenkins 1981), and Bourne (in litt.) now considers it a poorly defined race, not separable in the field. Bourne (1983) also pointed out that Collared Petrel may be a form of *leucoptera*, as suggested by Murphy (1929). Our limited experience suggests it is similar in shape and flight to White-winged Petrel, and that pale birds are not separable from that species in the field. We follow Jouanin and Mougin (1979) in considering it a race of *P. leucoptera*. [Ainley and Boekelheide (1983) mistakenly used the name "*P. l. gouldi*" for *P. l. brevipes* (D. Ainley, pers. comm.). The term "*gouldi*" is not available for any population of these petrels, as "*Pterodroma gouldi*" (Hutton) is now considered the New Zealand race of Great-winged Petrel (*P. macroptera*).]

The popular literature has tended to discuss all taxa as separate species, but it is not without its own confusion. Harper and Kinsky (1978) split Pycroft's from Stejneger's and Collared from White-winged, as did Harrison (1983), who greatly improved on earlier discussions of field identification. However, Harrison (1983) confused *defilippiana* with Murphy's discredited *orientalis*, and thus failed to include Defilippe's Petrel in his guide. This was partly remedied in Harrison (1985), who called it "at best an allopatric form of Cook's Petrel"; but he gave a range of "to 12°N," again confusing Defilippe's with specimens of the old "*orientalis*" (all specimens taken north of the equator are Cook's). In Harrison (1987), *defilippiana* (under the name "Masatierra Petrel") merited full text and illustrations, and the range was somewhat reduced (though still mapped too far north), but the painting of *defilippiana* showed an incorrect tail pattern. Plate 129 in Harrison (1987), also appearing in Löfgren (1984) and Lindsey (1986), labelled "Cook's

Petrel," is actually a fine photo of Defilippe's Petrel taken by Lars Löfgren off Chile. Harrison's plate 135, labelled "Pycroft's Petrel," taken by Piet Meeth north of New Zealand, is actually a Cook's Petrel in worn plumage. Harrison, Löfgren, and Meeth (in litt.) now concur with our reidentifications of these photos, which will both be printed in Part II of this paper.

Except for considering "Caledonian" and "Collared" petrels as races of White-winged, we use Bourne's selection of English names. "Defilippe's Petrel" is much better for *P. defilippiana* than the name "Masatierra Petrel" used by Harrison (1983, 1985, 1987) or "Mas Atierra Petrel" used by Murphy (1936). The bird breeds on a number of islands outside the Mas a Tierra group. "Masatierra" is easily confused with "Masafuera," Murphy's old name for Stejneger's Petrel, while "Defilippe's" is easily referable to the Latin *P. defilippiana*. Finally, all the other species in its subgroup (Cook's, Stejneger's, Pycroft's) are known by patronyms, and the name Defilippe's is in worldwide use. The A.O.U. (1989) added to the confusion by proposing to use the name "Juan Fernandez Petrel" (long established for *P. externa externa*) for *P. defilippiana*, but this was withdrawn (A.O.U. 1990) and they now also use the name Defilippe's Petrel. [The spelling "Defilippe's" is technically incorrect, because the professor for whom the bird is named was de Filippi (Giglioli and Salvadori 1869). To our knowledge, no author has used the correct spelling. We propose that the spelling "Defilippe's" be conserved to avoid further confusion.]

As to the choice of White-winged Petrel over "Gould's Petrel" (used by Harrison 1983, 1985, 1987), we note that the polytypic species *P. leucoptera* needs a group name ("Gould's" is often restricted to one population), that *leucoptera* means

"white-winged," and that the name White-winged Petrel is used widely by researchers in the Pacific (e.g., Pitman 1986).

Group Characteristics

Cookilaria Petrels are small, fast-flying *Pterodroma*, approaching Bonaparte's Gull (*Larus philadelphia*) in size. All are gray above, with a dark carpal-ulnar bar and dark primaries forming an "M" pattern across the mantle, and mostly white below (except for melanistic White-winged Petrels). Important characters include tail pattern, presence or absence of a prominent underwing carpal-ulnar bar, and overall size and proportions. Facial pattern is also important, and some species show a "half-collar" up the sides of the neck, and a dusky pectoral patch of variable extent. Unfortunately, it is generally not possible to obtain decent views at sea of birds more than 300 m distant, and for many features, such as tail pattern or bill size, it is often necessary to approach the bird within at least 100 m. Throughout this paper we consider what an observer might see through 8 or 10 power binoculars from a reasonable height above the sea. Observers restricted to viewing from near sea level may not see details well even at the distances we cite, and may need to have even closer encounters with these frustrating birds.

None of the species seem to be ship-followers, and many avoid ships. The Cook's Petrels off California in April 1989 did not come to cod-liver oil slicks as did Murphy's Petrels, although slicks attract *Cookilaria* in the tropics (P. Pyle, L. Spear in litt.). In the eastern tropical Pacific, only White-winged Petrel typically joins mixed bird flocks feeding over tuna, but less so than the larger Juan Fernandez Petrel (*P. externa*) (Au and Pitman 1986, pers. obs.). Loose feeding flocks of *Cookilaria* and other species have been reported off Australia (Wood

1990), in the central Pacific (Gould 1983), and off Baja California (pers. obs.), but in general most individuals forage alone. Any *Cookilaria* may be attracted to flotsam, and we have seen most species drop onto the water surface to investigate objects. All are partial to deep, warm, open ocean, and we are aware of extremely few records of shore-based sightings away from the breeding grounds.

The species with which we have experience fly in rapid, mostly shallow arcs, contouring over the waves. In high winds, exceeding 15 knots, *Cookilaria* are prone to arc up quickly and high, in very rapid roller-coaster fashion; but in light winds many species (especially White-winged and Black-winged) glide low over the water in shallow arcs between buoyant, rapid, shallow wingbeats. In high winds, the arcs of the slimmer species are rapid and ascend to sharp, high apexes, recalling a fast see-saw. Often the ventral surface is quickly turned to the observer, then the bird banks down quickly, to reappear with the ventral surface again, making it quite difficult to observe dorsal features. The wings look thin and stiff. All species appear quite maneuverable, unlike the heavier, more deliberate glides of larger *Pterodroma*.

Each species has a subtly characteristic shape owing to differing wing and tail proportions; these will likely be learned only with experience. The observer faced with a *Cookilaria* should concentrate on (1) underwing pattern, (2) presence or absence of nape/back contrast, (3) exact head pattern, (4) tail pattern, and (5) bill size/shape. Underwing and head patterns may be noted at fair distances, but tail pattern or bill size are not likely to be useful until one is at close range (although these may often be studied later if photos are obtained). There may be differences in foot color (see Falla 1933), but we have never seen the feet of a *Cookilaria* petrel in the field.



Figure 1. Cook's Petrel in molt, with fresh back but heavily worn and molting wings, off Baja California, March 23, 1980. Photograph/Robert L. Pittman.

Molt, Wear, and Lighting

The appearance of a bird at sea is affected by molt, wear, and lighting. All *Cookilaria* become darker as the feathers wear. This is most apparent on the back: a pale gray mantle may wear to a dingy gray-brown, reducing the contrast between nape and back (Stejneger's and White-winged petrels). Wear may also affect the prominence of the "M" pattern across the mantle. Some birds with very worn upperwing coverts may look essentially black-winged at sea; molt may also account for irregular white patches on wings or tail (see Figure 1). The pale head of Cook's, Defilippe's, Pycroft's, and Black-winged petrels becomes duskier as it becomes worn. These species may show a suggestion of a dark cap when these worn feathers contrast with either less-worn or newly molted back feathers. Body wear often seems correlated with remix and rectrix wear, so that the entire bird looks ragged. At these times, one should reduce reliance on head/back contrast. Characteristic shape features may be altered when the wing or tail feathers are growing. In all species, the extent of a white forecrown is affected by wear. New feathers of the mid-forehead are tipped white, appearing as a broad white fore-

crown, especially contrasting against the dark cap of species like Stejneger's Petrel. As the plumage wears, these white tips are worn off, reducing the extent of the white forecrown and giving way to a mottled appearance.

Little has been published on molt of *Cookilaria*. In the species accounts, we summarize what we have learned about timing of molt by reviewing specimens and photos; a full analysis is not possible, as specimens from all seasons are often lacking.

Lighting and distance play important roles in *Cookilaria* observations. These small, pale seabirds are usually seen against a dark sea, and contrast is heightened in glare or strong sun-

light. Under these conditions, the dark margins of the underwings may be lost against the background, especially at a distance. The effect is that the width of dark margins or the strength of the carpal-ulnar bar are underestimated when a bird is seen at a distance or in strong light, a phenomenon called "sea glare illusion." Cook's Petrel, for example, often looks "uniformly bright white" on the underwings at a distance, but distinct dark margins and a thin, short carpal bar are seen in flat lighting or at close range (see Figure 2). An observer who sees distant Cook's, and then a close one, might be tempted to think two species were present, based upon the margins and carpal bar seen on the near individual. Even the broad underwing margins of White-winged and Black-winged petrels may seem reduced under strong lighting at a distance.

Lighting can also affect perceptions of molt. In a strong glare, fresh plumage may reflect less light than worn plumage. In these situations, a worn Black-winged Petrel, for example, may look paler than a fresh bird (P. Gould in litt.), although the feathers are actually darker. Observers should always take environmental conditions into account.

Part II will appear in the Winter issue of American Birds, Volume 45, No. 5.



Figure 2. Cook's Petrel in molt, off Baja California in July 1980. Photograph/Robert L. Pittman.

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