

MURPHY'S PETRELS ON DUCIE ATOLL: ANOTHER PIECE OF THE PUZZLE

Text and photography by Kevin J. Zimmer

Historical Background

Since first described by Robert Cushman Murphy in 1949, Murphy's Petrel (*Pterodroma ultima*) has remained something of an enigma. The type specimen of this gadfly petrel of the central tropical Pacific was collected during the Whitney South Seas Expedition (1922) from Oeno Island (of the Pitcairn group) (Murphy 1949). Although it was encountered and collected in numbers during that same expedition, *P. ultima* would wait more than 25 years before being named. This deferment was the result of "the apparent unlikelihood that such a large, striking, and abundant petrel could fail to turn up in the collections of museums, or at least in the literature of Pacific exploration" (Murphy 1949). Unlikely as this seemed to Murphy, it eventually became apparent that he was talking about a petrel unknown to science.

The Whitney Expedition revealed that the apparent

breeding range of Murphy's Petrel was limited to five islands (all between 22°s and 28°s): Rapa Island and Bass Rocks (of the Austral or Tubuai group), Timoe Atoll and Maria Island (outliers of the Tuamotu Archipelago), and Oeno Island (of the Pitcairn group). This "breeding range" was largely inferred. No real nest of *P. ultima* was ever found. Nearly all of the birds collected by Rollo H. Beck and his associates on the Whitney Expedition were reported in breeding condition (= having enlarged gonads) (Murphy 1949,



Ducie Atoll in November 1989.

Murphy and Pennoyer 1952). This applied equally to birds collected at Bass Rocks in February, as well as to individuals from Rapa, Oeno, Timoe, and Maria in April and May. In a few instances Beck noted that gonadal regression had begun (Murphy 1949). In spite of the abundance and apparent breeding readiness of the birds, no eggs, nests, or dependent young were found. A female removed from a niche in a cliff face on Rapa during an earlier trip merely hinted at the nesting habits of Murphy's Petrel (Murphy 1949).

On January 3, 1935, James P. Chapin collected a female fledgling of *P. ultima* in the lagoon of Ducie Atoll (in the Pitcairn group) and noted the presence of adults over the island and surrounding waters (Murphy 1949). Beck worked extensively on this island in March, 1922, without collecting a single specimen of *P. ultima* (Murphy 1949). From these conflicting reports came more assumptions: (a) The assumed breeding range of Murphy's Petrel was slightly enlarged to include Ducie Atoll; (b) because a fledgling was recorded in early January with no sign of occupation in March, it appeared that Murphy's Petrels bred much earlier on Ducie than on other islands; (c) because of the hardness of the coral ground at Ducie, Chapin hypothesized that *P. ultima* was a surface nester, contrary to the burrowing habits of some of its congeners (Murphy 1949).

Remarkably, the current state of knowledge regarding the breeding range, chronology, and habits of Murphy's Petrel has not advanced beyond that first described by Murphy, and outlined above. Even the pelagic range of the species is poorly understood (Harrison 1987), in part due to the extreme difficulty of separating the various *Pterodroma* petrels in the field. This difficulty is the result of having a number

of confusingly similar and at least partially sympatric congeners, many of which are morphologically variable, combined with the inherent problems of observation at sea.

In recent years, Murphy's Petrel has been at the center of controversy over records of dark *Pterodroma* petrels off the Pacific Coast of North America, calling into question just how much is known about identifying the species and about its penchant for post-breeding dispersal into North Pacific waters. A recent paper by Bailey *et al.* (1989) summarizes the current known status of *P. ultima* and other dark gadfly petrels in the North Pacific, and also establishes some solid criteria for at-sea identification of these birds.

M/V Society Explorer voyage to Ducie Atoll

In November 1989, I was privileged to take part in a South Pacific voyage aboard the *M/V Society Explorer* that would shed light on some of the mysteries surrounding Murphy's Petrel. I, along with Peter Harrison and Arnold Small, was one of three ornithologists on board. The voyage began at Papeete, Tahiti, and our route took us eastward through the Australs, the Gambiers, and the Pitcairns before ending at Easter Island. Scheduled landings put us ashore on Rapa, Timoe Atoll, and Ducie, three of the purported breeding islands of Murphy's Petrel. Prior to landing on Ducie Atoll, our encounters with Murphy's Petrel and its two morphologically similar sympatric congeners—Kermadec Petrel (*P. neglecta*) and Herald Petrel (*P. arminjoniana*)—were few, and are best recounted in chronological sequence.

November 6, 1989—One Murphy's and one Kermadec Petrel were observed at sea west of Rapa, associating with a large mixed-species aggregation that included Wedge-tailed Shearwater (*Puffinus pacificus*), Christmas Shearwater (*Puffinus nativitatis*), Brown



Murphy's Petrel chick on Ducie Atoll on November 13, 1989, the first confirmed nesting of Murphy's Petrel.

Noddy (*Anous stolidus*), Blue-gray Noddy (*Procelsterna cerulea*), and White Tern (*Gygis alba*) among others. At Rapa, we visited three separate seabird breeding rocks. No Murphy's Petrels were encountered, but at the third rock we saw several Kermadec Petrels circling the islet and vocalizing just before and after dusk. All but one of these birds were of the dark morph. Others seen earlier at sea were of intermediate-plumage. We continued to hear Kermadecs calling overhead in the dark, but a flashlight search of the slopes above failed to yield any *Pterodroma* nests or chicks.

November 7, 1989—One Murphy's Petrel and one intermediate-morph



Captive Murphy's Petrel on Mangareva Island. This individual has relatively little white on the throat.

Kermadec found in a large mixed-species aggregation surrounding Marotiri Rocks (Australs). Species composition of the flock was much the same as on the previous day.

November 9, 1989—We landed on Mangareva Island (Gambiers). One of the villagers had a tethered Murphy's Petrel in his yard. This provided our first opportunity for close study and photography.

November 10, 1989—We anchored off Timoe Atoll (Gambiers). While a party was ashore scouting landing conditions, several of us observed at least two Murphy's Petrels wheeling about just above the tree tops. After landing we repeatedly encountered individual Murphy's Petrels flying low over the island. We never saw more than one at a time, and no evidence of nesting was found.

November 11, 1989—A single dark-morph Herald Petrel was sighted from the waters just off Pitcairn Island.

November 12, 1989—We landed at Henderson Island (Pitcairns). Ten

Herald Petrels (two light-morph, eight dark) were seen flying about the island, but no evidence of nesting was found.

On November 13, 1989, at 0800 hours we anchored off Ducie Atoll. This is a coral atoll about two miles wide, with a distinct central lagoon. It is the easternmost island of the Pitcairn group, which consists of four islands—the others being Pitcairn, Oeno, and Henderson. Only Pitcairn is inhabited. Even prior to disembarkation, it was obvious that something special was happening on Ducie. Murphy's Petrels were common in the waters just offshore and in large numbers over the island itself. Once ashore, we discovered the reason. Murphy's Petrels were nesting everywhere on the island. There were so many birds and our time was so limited that an accurate census was impossible. However, it was clear that there were thousands of Murphy's Petrels on Ducie. Every gnarled tree seemed to have one or more chicks and/or adults situated beneath it. In many instances the lone chicks were seemingly unattended; in others, a single adult was nearby. We saw no eggs, but the young birds ran the developmental gamut from down-covered chicks to nearly-fledged juveniles with only patches of down remaining. All chicks that I saw were old enough to be fully covered with down and capable of sitting upright. The assumptions of Chapin regarding the surface-nesting habits of *P. ultima* were borne out. The "nest" here is probably nothing more than a slight scrape (if that) beneath a tree or shrub (for shade).

During our morning on the island, I did not observe any feeding of young petrels by adults. Parental care consisted solely of close attendance of chicks by single parents. On numerous occasions a low pass over the trees by a Great Frigatebird (*Fregata minor*) would result in the potential pirate being aerially harassed by one



Under harsher light, this adult individual appears less glossy and more brownish than bird below. Note also the general lack of white on the throat and forehead.

or more of the many adult Murphy's that were constantly flying overhead. These chases were purposeful and effective, always resulting in the frigatebird being at least temporarily driven from the area. Neither chicks nor sitting adults made any attempt to flee or defend themselves when we approached closely. This is in keeping with Mathews' (1936) reported findings that surface-nesting *Ptero-*

droma petrels tend to be more passive when disturbed than do burrow-nesting species.

The air space immediately over the island was crowded with petrels, gaining speed and altitude with a series of rapid-fire shallow wingbeats, then spiking in high arcs (with the birds oriented vertically or perpendicular to the ground) before tailing down in a long glide on set wings. On



In this adult Murphy's Petrel note the glossy steel-blue coloration, that the back is paler than the wings and head, and that the back feathers have narrow dark fringes. This individual has an intermediate amount of white mottling on the throat, but almost none on the forehead.

several occasions I witnessed petrels engaged in what appeared to be some type of display flight. A single bird would gain altitude, rear its head up and back, thrusting its breast forward, pumping and rocking as it flew high over the trees.

Murphy's Petrel was the most numerous species on the island, and the only *Pterodroma* present in numbers. One light-morph Kermadec Petrel and 7-10 Herald Petrels (two light-morph, the others dark) were seen flying over the island, but no evidence of nesting could be found. Brown Noddies and White Terns were also nesting in numbers, and we located one active nest of a Red-tailed Tropicbird (*Phaethon rubricauda*). Other species present but for which we could find no active nests included Masked Booby (*Sula dactylatra*), Red-footed Booby (*Sula sula*), Great Frigatebird, Lesser Frigatebird (*Fregata ariel*), Black Noddy (*Anous minutus*), and Sooty Tern (*Sterna fuscata*).

Sympatry of *Pterodroma* petrels on Ducie Atoll

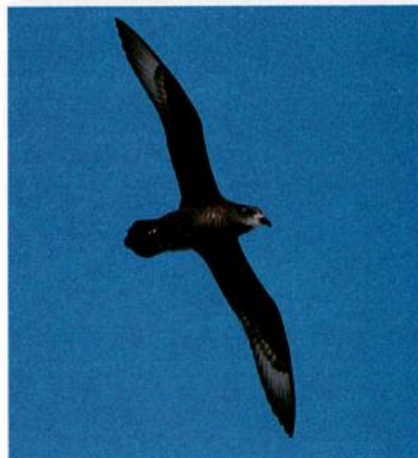
Both Kermadec and Herald petrels (along with another congener, the Phoenix Petrel, *P. alba*) apparently breed on Ducie in numbers. E. H. Quayle (of the Whitney Expedition) estimated the Ducie population of Herald Petrels in March, 1922, at 230,000 birds, with light-morphs far outnumbering dark birds (Murphy and Pennoyer 1952). The following excerpts from the field notes of Quayle and Beck are taken from Murphy and Pennoyer (1952).

"Although the two abundant resident species [*neglecta* and *heraldica* = *arminjoniana*] are thoroughly intermixed on the nesting grounds, there still seems to be a decided tendency toward agglomeration of either species in small groups."

"At Ducie we could inspect many hundreds of these petrels merely by walking among the tangled trees. The birds had just selected nesting sites and were mostly in pairs [March 20]."

The timing of breeding in both Kermadec and Herald petrels seems to be prolonged, and when the entire ranges of the two species are considered, nearly continuous (Murphy and Pennoyer 1952). Even when only Ducie is considered, it is obvious that Kermadec Petrels have a prolonged potential nesting season. Beck collected a newly hatched Kermadec chick with its parent on March 20, and noted the presence of many fresh eggs (Murphy and Pennoyer 1952). On his visit to Ducie in January 1935, Chapin collected a nestling Kermadec associated with an adult (Murphy and Pennoyer 1952). Many eggs of Herald Petrels were collected from both Ducie and Oeno in March and April, 1922 (Murphy and Pennoyer 1952). Given the prolonged potential breeding period for both Kermadec and Herald petrels, it is interesting that Ducie populations of these two surface-nesting congeners should be overlapping and synchronized. At the same time, our experience, combined with those of Chapin and Beck, would indicate that Murphy's Petrel, at least on Ducie, is very asynchronous in its breeding with respect to its congeners. We found no firm evidence that either Herald or Kermadec petrels were breeding there in November, and neither species was present in any real numbers. Chapin's collection of a fledgling Murphy's Petrel in January would suggest that time period as the tail-end of any nesting activity on Ducie by *P. ultima*, a time-frame in keeping with the developmental state of most of the chicks that we saw in November.

Bailey *et al.* (1989) speculated that post-breeding dispersal from an early-nesting Ducie population might account for North Pacific occurrences of Murphy's Petrel in March-June, a time when the findings of Beck and his colleagues indicated the bulk of the population should be nesting. Although our confirmation of an early nesting period for *P. ultima* on Ducie



Top: The steep rise to the forehead, the wedge-shaped tail, and the chunky build are typical of the Murphy's Petrel. This bird has an extensively white throat and forehead, and the white intrudes well into the malar region. Transient light conditions make the underprimaries appear extensively white.

Middle: Note the intermediate color of the greater primary coverts relative to the lighter primary bases and the darker median coverts in this Murphy's Petrel. The resulting three-toned look is reminiscent of the stronger pattern of Kermadec Petrel.

Above: The bicolored feet of the Murphy's Petrel is a good field mark, when it can be seen. Note also the subdued underprimary flash.



The bull-necked, front-heavy appearance of this Murphy's Petrel is typical of the flight profile of the species.

Atoll has no concrete bearing on such hypotheses, it is at least consistent with them. Banding or color-marking Ducie birds, along with more extensive summer field work in the deeper waters of the North Pacific, would be required before any firm conclusions could be drawn. Concrete evidence (beyond adult birds with enlarged gonads) of the timing of nesting of Murphy's Petrels on the other islands in its assumed breeding range is a major piece of the puzzle that is still missing.

IDENTIFICATION SUMMARY

The presence of large numbers of Murphy's Petrels both on the ground and in the air at Ducie provided a unique opportunity to critically examine field characters of this species, and to obtain numerous photographs.

At great distances, Murphy's Petrels typically appeared dark gray. At closer range, the apparent color of flying birds could change dramatically with the light conditions. Harshly-lit individuals appeared much more brown. Sitting birds examined from several feet away could be seen to be a somewhat glossy, steel-blue. In fact, Beck's field notes from the Whitney South Seas Expedition referred to the as yet undescribed *P. ultima* as "the blue shearwater" (Murphy 1949). The head, back, and sides of the neck, and wing coverts of sitting birds appeared distinctly darker gray than the center of the back, which was more medium blue-gray. At very close range the back had a scaly look resulting from thin dark fringes to each of the mantle feathers. The glossy bluish look of the upperparts was indicative of fresh plumage and, thus, was somewhat transitory (Murphy 1949, Bailey *et al.* 1989). Worn birds and specimens become browner with time. This led Harrison (1983), who was painting the bird for the first time from skins (at that time never having seen it in life), to depict Murphy's Petrel as being distinctly brown (Harrison, pers. comm.).

Most Murphy's Petrels exhibited



Murphy's Petrel engaged in "display" flight, Ducie Atoll, November 1989.

mottled whitish throats due to exposure of feathers which are basally white with thin sooty edges. The extent of the white or mottling on the throat varies considerably among birds, some individuals appearing to have almost solid white throats and others being nearly dark. Individuals with more extensively mottled throats typically show white intruding into the malar region. There is also considerable variation in the amount of white or mottling in the lores and above the bill, possibly resulting from differential wear. These feathers are basally dark with narrow whitish margins and should become darker with wear (Murphy 1949). Many birds have dark foreheads and lores, others are irregularly mottled with white in those areas, and still others are extensively white. The latter individuals appear to have a complete white band encircling the bill, a feature that can be obvious on flying birds at reasonably close distances. In spite of individual variation, the most extensively white area on a Murphy's Petrel is always the throat, a character first pointed out by Bailey *et al.* (1989). All individuals seem to have a dark smudge immediately anterior and posterior to the eye, a character that in the field can only be discerned at very close range. Below, Murphy's Petrels are evenly dark gray, although under some light conditions they may impart a dark-hooded look with a zone of contrast at the breast. Ac-



This individual exhibits a dark-hooded look, a result of the glossiness of the plumage, combined with transient light conditions.

ording to Bailey *et al.* (1989), this is an artifact of the glossiness of the plumage rather than a real character.

Wing pattern is an important aid to identifying *P. ultima* in the field, and most birders will never see this species other than in flight. One's impression of pattern in this species is largely dependent on existing light conditions. Under overcast skies, Murphy's Petrels will appear dorsally blue-gray, with the upperwings often showing an "M" pattern formed by darker outer primaries, diagonal carpal bar, and tertials against the lighter gray inner primaries, secondaries, lesser coverts, and back. The apparent strength of the "M" pattern depends on light conditions—under bright sun it may disappear completely with the bird taking on a more brownish hue. The same effect can be seen on Buller's Shearwater (*Puffinus bulleri*), which has a much stronger dorsal pattern than does *P. ultima*.

The underwings appear mostly dark gray, usually contrasting strongly with the under-primaries which are pale silvery-gray darkening toward the tips. The apparent brightness of the underprimaries depends on light conditions, sometimes appearing bright white and at others seeming dull gray. The greater primary coverts are intermediate in color between the paler primary bases and the darker median coverts, thus creating a three-toned look that is reminis-

cent of, but never as strong as, the distinctive underwing pattern of dark-morph Kermadec Petrels.

The bill is black and the eye dark. The legs and feet are bicolored, being mostly pinkish except for the distal portions of the toes and webbing, which are black. Because the feet and legs are typically held tucked into the belly feathering in flight, they are seldom visible.

Observation of structural features can be important in securing a firm identification of Murphy's Petrel. This species appears distinctly large-headed and bull-necked, two features that are accentuated by a somewhat smallish bill. The forehead also rises steeply from the base of the bill, a character that is prominent in profile. The tail is longish and distinctly wedge-shaped. The overall flight profile is of a bird that projects farther behind the trailing edge of the wings than it does in front of the leading edge of the wings, but which, at the same time, is somewhat front-heavy owing to the relative bulk of the head and neck. I found it comparable in bulk to Kermadec Petrel, although still appearing slightly smaller due to its somewhat shorter, narrower wings. In direct comparison, *P. ultima* appears distinctly heavier, bigger-headed, and wider-winged than Herald Petrel.

Readers desiring a more comprehensive treatment that includes detailed discussion of other *Pterodroma* species relative to Murphy's Petrel are urged to consult Bailey *et al.* (1989).

Summary

This paper constitutes the first published account of confirmed nesting of Murphy's Petrels, and almost certainly the first published photograph of a nestling Murphy's Petrel. Other photographs and discussion of field characters are included as a reference source for observers attempting to identify Murphy's Petrels off the Pacific Coast of North America.

We now have solid evidence that *P. ultima* is a surface nester, and that the breeding season on Ducie Atoll is early. Murphy's Petrels on Ducie breed and apparently disperse prior to the onset of nesting by the bulk of the Kermadec and Herald petrel populations. The nesting season for *P. ultima* on Ducie also appears to be asynchronous with respect to other insular populations of the species. This is evidenced by the findings of the Whitney South Seas Expedition, by our own failure to find any Murphy's Petrels at Rapa, and by the presence of only a few individuals on Timoe.

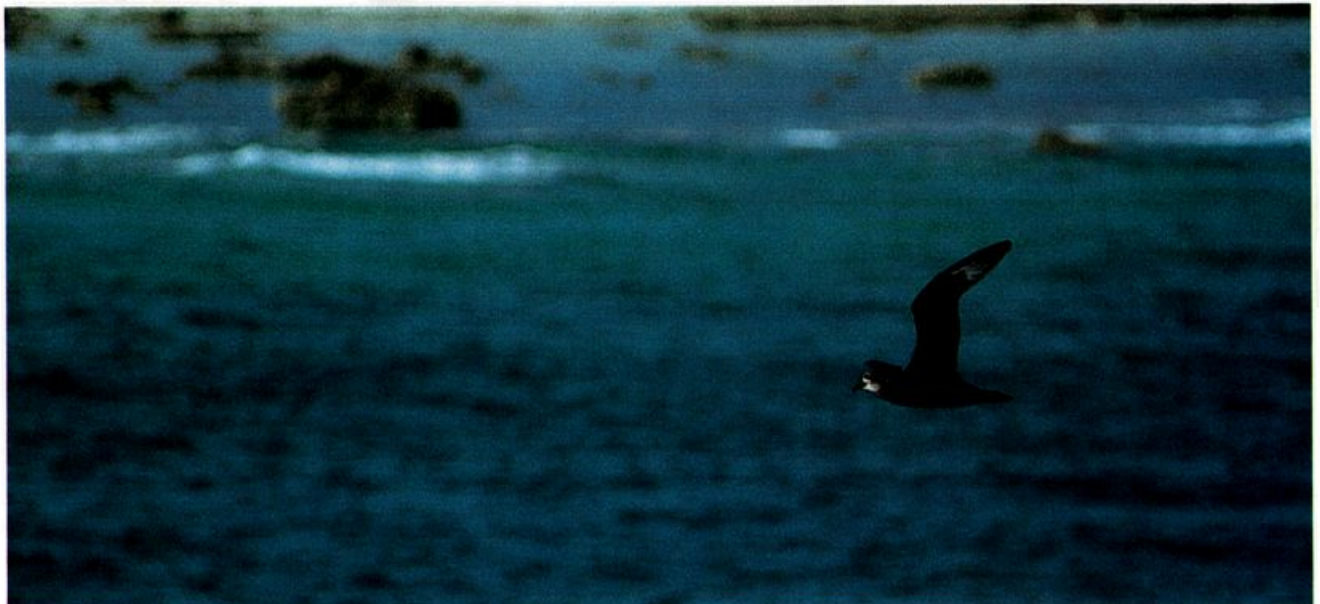
ACKNOWLEDGMENTS

Many thanks are due Peter Harrison and Arnold Small. Any discoveries or noteworthy observations are also theirs. Stephen Bailey of the California Academy of Sciences was most helpful in providing me with some difficult-to-obtain references, in addition to sharing his own experiences and thoughts on *Pterodroma* identification. Finally, I must thank Victor Emanuel Nature Tours, Inc., for providing me with the opportunity to experience Ducie Atoll and the many other memorable stops on our voyage.

Literature Cited

- BAILEY, S. F., P. PYLE, AND L. B. SPEAR. 1989. Dark *Pterodroma* petrels in the North Pacific: identification, status, and North American occurrence. *Am. Birds* 43: 400-415.
- HARRISON, P. 1983. Seabirds: an identification guide. First Edition. Houghton Mifflin, Boston.
- 1987. A Field Guide to Seabirds of the World. Viking Penguin, New York.
- MATHEWS, G. M. 1936. Dove-like petrels of the genus *Pterodroma*. *Ibis* 6: 376-377.
- MURPHY, R. C. 1949. A new species of petrel from the Pacific. *Ornithol. Biol. Wissenschaftl.* 89-91
- , AND J. M. PENNOYER. 1952. Larger petrels of the genus *Pterodroma*. *Amer. Mus. Novitates* 1580: 1-42.

—1665 Garcia
Atascadero, CA 93422



Note especially the subdued under-primary flash and the steep rise to the forehead.