

Herald Petrel new to the West Indies

**Michael Gochfeld, Joanna Burger, Jorge Saliva,
and Deborah Gochfeld**



Figure 1. Dark-phase *Pterodroma* landing among Laughing Gulls on Cayo Lobito, Culebra, Puerto Rico. Note the ashy gray under surface of the primary feathers, ending in long narrow "digital" extensions that are the pale areas of the inner webs of the primaries. The greater underwing coverts are pale with a narrow dark tip that shows as the faint wavy bar at the base of the primaries. The longish tail and shortish bill are apparent.

AS A GROUP THE GADFLY PETRELS (*Pterodroma*) are best represented in south temperate and subantarctic waters with a few species breeding on tropical islands in the Central Pacific, Atlantic, and Indian Oceans. In the West Indies, the only member of this genus is the Black-capped Petrel (*P. hasitata*), which breeds in the Greater Antilles and perhaps still in the Lesser Antilles. A close relative, the endangered Bermuda (*P. cahow*) breeds in Bermuda.

On July 12, 1986, while studying the breeding Laughing Gulls (*Larus atricilla*), Royal Terns, and Sandwich Terns (*Sterna maxima* and *S. sandvicensis*) on Cayo Lobito, in the Culebra National Wildlife Refuge, about 40 kilometers east of Fajardo, Puerto Rico, we flushed an all-dark petrel from a scrape among the nesting terns. As soon as the bird wheeled around we realized that it was a petrel, and not the familiar Sooty Shearwater (*Puffinus griseus*), a species which would itself be extremely unusual at Culebra. Compared to a shearwater, the petrel appeared to have a larger head and a longer and slightly wedge-shaped tail. It did not show the conspicuous pale wing linings of the Sooty Shearwater (Fig. 1). The bird circled rapidly, first low over the water and then wheeling high over the rocky islet, before returning to its scrape among the gulls and terns. At this point, we studied it at a distance of 15 meters and noted its short, stout black bill, with the prominent tubes (Fig. 2), which, with its characteristic shape or "jizz" and rapid, erratic, wheeling flight, identified it as a *Pterodroma*.

When the bird was flushed again it circled and was chased by a Laughing Gull, which provided a good size comparison by revealing its slightly smaller size (Fig. 3). Size eliminated the much smaller Bulwer's Petrel (*Bulweria bulwerii*), which has been recorded from the Gulf of Mexico (Taylor 1972) and southern Caribbean, and also the larger *Procellaria* petrels. We now faced the task of sorting among a variety of dark forms of *Pterodroma*.

We watched and photographed the petrel for about 30 minutes. It circled us at close range, and landed back in the same scrape three times. We ascertained that its bill and legs were entirely black, thereby eliminating several species, and that there was no hint of pale feathering on the face, a fact that eliminated several others. In the field we discerned that although there was no contrasting white wing patch, the primary region of the wing was distinctly paler than the dark underwing coverts, a feature shown clearly in Figure 1.

Although field identification of *Pterodroma* petrels is often uncertain, we were fortunate in being on *terra firma* rather than on a pitching boat, and having the petrel circle us and land repeatedly within 15 meters. After examining relevant species accounts in Harrison (1983), we focused our attention on the Herald or South Trinidad Petrel (*P. arminjoniana*) and Kermadec (*P. neglecta*) petrels. After examining the extensive petrel collection in the American Museum of Natural History, we have identified this bird as an all-dark phase of the South Trinidad Petrel, the first record, albeit only photographic, of the species for the West Indies. There follows a detailed discussion of the basis for our conclusion.

Taxonomy

The Trindade Petrel (*P. arminjoniana sensu stricto*) and the Herald Petrel (*P. heraldica*) of the Pacific, are currently treated as a single species, called the Herald Petrel, *P. arminjoniana* (Murphy and Pennoyer 1952; A. O. U. 1983; Harrison 1983). Although Murphy (1936) considered *P. a. arminjoniana* as an Atlantic representative of the Kermadec Petrel (*P. neglecta*) and stated that possibly "it should be regarded as a subspecies of the latter", and Hellmayr and Conover (1948) actually lumped *arminjoniana* with *neglecta*. Murphy and Pennoyer (1952) pointed

out that in the Pacific the Herald Petrel (*P. a. heraldica*) is widely sympatric with the Kermadec Petrel, indicating that the two are distinct species. Palmer (1962) argued that they are best treated as a superspecies, the position followed by the A. O. U. Check-list Committee (A. O. U. 1983).

Exclusion of most other petrel species

Firstly we narrow the identification to two closely related species, the Kermadec Petrel and the Herald Petrel, based on the following characters.

- 1) Size and all dark color
- 2) Absence of white feathering on head
- 3) Color of soft parts
- 4) Nesting habits

Size and all dark color

Many *Pterodroma* species are polymorphic, with light, intermediate, and dark phases. Our examination of specimens suggests that some of these species are probably not polymorphic at all, but show complete gradation from birds with all white to nearly all dark underparts (see illustrations in Murphy and Pennoyer 1952). However, relatively few of the dark phases are completely dark. Some dark *Pterodroma* petrels can be eliminated on the basis of a distinctive pattern; among these is the Kerguelen Petrel (*P. brevirostris*), which has a pale leading edge to the wing. Many species show a pale area on the head, throat, lower abdomen, or rump. Table 1 summarizes features of the dark-bodied petrels in *Pterodroma* and related genera (after Harrison 1983). Species of *Pterodroma* not listed in Table 1 are those with no known dark phase.

The Culebra petrel was slightly shorter-bodied and longer-winged than a Laughing Gull for which Harrison (1983) gives a body length of 40 centimeters and a wing span of 103 centimeters. It is readily apparent that the all-dark *Bulweria* petrels are much smaller and the all-dark *Procellaria* petrels are much larger than the bird in question. The *Puffinus* shearwaters, several of which are dark-bodied, are mostly larger (except *lherminieri* and *nativitatis*) than the Culebra petrel, and differ also in bill shape, tail shape, and flight behavior.

Accepting a body size in the range of 34–40 centimeters and a wing span of



Figure 2. The *Pterodroma* sitting on scrape in a colony of gulls and terns on Cayo Lobito. Note the all-dark head and short, stout black bill. The one whitish spot on the upper wing is and was noted occasionally in flight. The pale line along the folded left wing may be a photographic artifact that was not noted in the field nor in other photographs. Alternatively, it may be a pale feather from the underside of the wing, which is revealed as the wing was being extended.

90–110 centimeters, we find that virtually all *Pterodroma* species with a dark phase, except the larger Great-winged Petrel (*P. macroptera*) and smaller and rare Fiji or MacGillivray's Petrel (*P. macgillivrayi*), fall within this range. Thus size serves mainly to eliminate species in other genera.

Absence of White Feathering on Head

Among the *Pterodroma* species with an all-dark phase, most regularly show some white feathering on the head, lores, throat, or chin, or at the base of the bill. Many dark specimens of *P. arminjoniana* and almost all *P. neglecta* have such feathering, but some of the former show no white feathering. This absence of an area of white feathering helps rule out Solander's and Murphy's petrels (*P. solandri* and *P. ultima*). The latter, believed by Murphy and Pennoyer (1952) to be closely related to

Figure 3. The dark *Pterodroma* being chased by Laughing Gull. Note the slightly smaller body and longer wings of the petrel. The long, slightly wedge-shaped tail is prominent.



both *neglecta* and *arminjoniana*, is a Pacific species which otherwise could easily be mistaken for the Culebra bird.

Color of soft parts

We were able to watch the Culebra petrel at close range as it sat on its scrape and as it lowered its feet to land. The bill and legs and feet were obviously blackish, without a hint of flesh or bluish coloration. Murphy (1936) notes that pale and intermediate phases of the South Trinidad Petrel have pale or two-toned tarsi and feet. This two-toned appearance is characteristic of the Pacific form *P. a. heraldica* in all phases, of intermediate-phase *P. a. arminjoniana*, and also apparently of dark-phase *neglecta*. However, our examination of A.M.N.H. specimens reveals that the light phase as well as the dark phases of *P. a. arminjoniana* have all-black soft parts. Many other species of *Pterodroma* have pinkish legs (see Table 1).

Nesting behavior

Although the bird we observed on Cayo Lobito was not breeding, it consistently returned to the same scrape in the colony of gulls and terns (Fig. 2). There was neither egg nor mate, and the bird was not present two weeks later. Although July is not the breeding season for most South Atlantic species, Murphy (1936) points out that for the South Trinidad Petrel in tropical waters, breeding extends through much of the year. We are under no illusion that the bird was breeding, but we are impressed that this "pseudo-nesting" behavior was distinct from what would be observed in a burrow-nesting species that was merely resting on the surface. Murphy and Pennoyer (1952) emphasize the distinctiveness of surface-nesting, which is characteristic of *neglecta*, *alba*, *ultima* and *arminjoniana*. Mathews (1936) was sufficiently impressed with this behavior to utilize it as a major taxonomic character. Moreover, a healthy *Pterodroma* probably does not land except at its nest site. In any case, this circumstantial evidence, which points to nesting on the surface rather than in a burrow, focuses attention on the South Trinidad Petrel and Kermadec Petrels.

Range

Although range *per se* cannot identify such wide-ranging birds as petrels, it

must be invoked to balance the probabilities. There are two resident species of *Pterodroma* in the West Indies area (if one includes Bermuda), both of them blackish above and mostly white below. Both are rare, and neither has been recorded in the Culebra region. The Cahow breeds only in Bermuda, has a world population of less than 100 pairs, and has no known dark phase. Range alone would not exclude it, but rarity and pattern certainly would. The Black-capped Petrel breeds on some of the Greater Antilles and perhaps still on some Lesser Antillean islands. It has never been known to breed on Puerto Rico, but range and rarity are not sufficient to exclude it. Moreover, there was a well-known dark phase of this species, the "Jamaican" or "Blue Mountain" Petrel (*P. hasitata caribbaea*), which bred on Jamaica at least until the end of the 19th century (Scott 1891). Although recent expeditions to suspected colony areas have failed to find it, the recent rediscovery of petrel colonies on other Greater Antillean islands leaves open the possibility that the Blue Mountain form of the Black-capped Petrel survives. However, this dark-phase petrel was characterized by a pale rump as well as a hoary gray abdomen and a palish chin and throat area (Murphy 1936: 693), and therefore does not fit the description of the Culebra petrel.

For the sake of completeness, it is worth mentioning that melanistic Audubon's Shearwaters (*Puffinus lherminieri*) have been collected near a breeding colony off Martinique (Bond 1978). Such an "entirely sooty black" bird could be mistaken for the Culebra petrel at a casual glance, but would be smaller and would have a slender shearwater bill rather than the stout bill of a *Pterodroma* petrel. Light-phase Audubon's Shearwaters breed in burrows on some of the cays off Culebra, but significantly, we never saw this species during the day flying around any of the islets we visited.

Having excluded the other species which are likely to occur in the West Indies, it is important to recognize that among remaining species, the South Trinidad Petrel is one of the few forms of *Pterodroma* in the Atlantic. Although Murphy and Pennoyer (1952) considered it relatively sedentary, there are a number of North Atlantic records, particularly following storms.

In view of the possible occurrence of the Kermadec Petrel in the North Atlantic (Heintzelman 1960; Heintzelman

1961, see below) it would be premature to exclude that species on the basis of range. Based on the A. O. U. Check-list (1983) the only other *Pterodroma* petrel recorded in the northwestern Atlantic is a single specimen of the Mottled Petrel (*P. inexpectata*), a light-bodied species, taken in New York in 1880. Even though it breeds in the Eastern Atlantic and has a rarely collected dark phase, the Soft-plumaged Petrel (*P. mollis*) can be excluded because of its dark mask and white wing patches. The Great-winged Petrel could be expected in the western Atlantic, but can be excluded on the basis of size.

There are several dark-phase *Pterodroma* petrels that are not known from the Atlantic, but that nevertheless must be considered. Solander's Petrel could certainly be confused with dark *arminjoniana*, except for the distinctly pale cast to its breast and chin. However, it has a rather restricted range in the Pacific. Murphy's Petrel is also very similar to the Culebra bird, having the entire underwing surface dark. However, the pale base of the bill and white mottling on the face argue against this Central Pacific species. The recently discovered Mascarene Petrel (*P. aterrima*) is also all dark, lacking pale areas on the underwing, but it is known only from the Indian Ocean. The smaller MacGillivray's or Fiji Petrel (*P. macgillivrayi*), known only from one recent specimen and uncertain sight records, seems implausible as a visitor to the Caribbean.

Distinctions Between Herald and Kermadec Petrels

Having narrowed our quest to these two species and noting that the dark-phase Kermadec tend to have pink legs and white at the base of the bill, we proceeded to eliminate the Kermadec Petrel from consideration based on:

- 1) Range
- 2) Underwing pattern

Range

Range certainly favors the idea that the Culebra bird was *P. arminjoniana* rather than *P. neglecta*. The Herald Petrel breeds at Trinidad Island and the Martin Vaz Islands (about 20° S. Lat.), in the tropical Atlantic as well as off Mauritius in the Indian Ocean. It is one of the few *Pterodroma* that occur regularly in the Atlantic, and thus is a

prime candidate for wandering to the Caribbean. Moreover, it has been collected several times in the North Atlantic region. Lowe (1911) reported a Herald Petrel that struck the rigging of a ship on December 21, 1905, at 21°51'N, 43°35'W, a point in the mid-Atlantic equidistant from the Lesser Antilles and the Cape Verde Islands. Allen (1934) reported a dark-phase Herald Petrel captured alive at Ithaca, New York, on August 24, 1933, after a tropical storm. Lee (1979) collected a dark-phase bird 74 kilometers east southeast of Oregon Inlet, North Carolina, on August 20,

1978, the same season as our Culebra record, and reports a later August record (Lee 1986).

By contrast the Kermadec Petrel is a southwestern Pacific bird, which ranges widely across the South Pacific in the non-breeding season. Even the few reports from the Pacific coast of Mexico, accepted by Murphy and Pennoyer (1952), are treated as hypothetical (Friedmann *et al.* 1957). There are no generally accepted records from the Atlantic. However, on October 3, 1959, an all-dark petrel with white underwing patches was observed and filmed at

Hawk Mountain, Pennsylvania. The "Hawk Mountain petrel" elicited substantial debate. R. C. Murphy identified the bird as a Kermadec Petrel (Murphy 1959), and the record was duly published by one of the photographers (Heintzelman 1960; Heintzelman 1961). It was subsequently questioned by various authorities including Palmer (1962) and was considered "uncertain" by the A. O. U. (1983). We have not examined the original photographs, but on the basis of the published photographs (Heintzelman 1960; Heintzelman 1961), we think that Murphy's

Table 1. *Pterodroma* and related procellariids with dark-bodied phases (modified from Harrison 1983 and Murphy 1936)

| Genus/Species | Body Length (cm) | Wing Span (cm) | Probability of mistake ¹ | Distinctive Characters |
|---------------------------------------------------------------------------|------------------|----------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Pterodroma</i> Petrels | | | | |
| Great-winged <i>macroptera</i> | 47 | 97 | moderate | Large; all dark wings, black bill and legs. Often pale at base of bill, Atlantic. |
| Kerguelen <i>brevirostris</i> | 36 | 81 | slight | Slate gray and silver flashes in some light. Pale leading edge of wing. High latitudes. |
| Soft-plumaged <i>mollis</i> | 34 | 89 | moderate | White wing patches, dark mask. Dark phase rare. Breeds in e. North Atlantic. |
| Solander's <i>solandri</i> | 40 | 94 | moderate | Gray cast to mantle. Pale cast to breast and chin. Underwing similar to light <i>arminjoniana</i> . Head darker than body. Black legs. Pacific only. |
| Kermadec <i>neglecta</i> | 38 | 92 | high | White primary shafts visible above and below. Usually white-faced. Usually pink legs with black feet. Ranges widely in Pacific. |
| Herald <i>arminjoniana</i> | 37 | 95 | — | Dark phase may have white wing patch, or grayish primary webs with dark shafts. Dark bar on under wing. Often lacks white on head. May be all dark with no pale feathers on head. All black bill, and legs and feet. |
| Black-capped <i>hasitata</i> | 40 | 95 | moderate | Dark phase of Jamaica, probably extinct. Had a pale rump. a West Indian species. |
| Murphy's <i>ultima</i> | 39 | 97 | high | Wholly dark underwing, white mottling on face. Pale base to bill, pink legs. Central Pacific only. |
| Mascarene <i>aterimma</i> ² | 36 | ? | moderate | All dark, heavy black bill, round tail. Pink legs. No pale area on underwings. |
| Fiji <i>macgillivrayi</i> ³ | 30 | ? | slight | Small, no pale under wing. Pink legs. One specimen & few sight records. Fiji area only. |
| <i>Bulweria</i> Petrels [much smaller] | | | | |
| Bulwer's <i>bulwerii</i> | 26 | 67 | none | Pale diagonal wing bar, slender bill. |
| Jouanin's <i>fallax</i> | 31 | 79 | none | Like Bulwer's, no pale underwings. |
| <i>Procellaria</i> Petrels [much larger] | | | | |
| White-chinned <i>aequinoctialis</i> | 55 | 140 | none | Much larger, white bill and chin. |
| Westland <i>westlandica</i> | 51 | 137 | none | Much larger, two tone bill. |
| Black <i>parkinsoni</i> | 46 | 115 | slight | Larger, two tone bill, pale primary shafts. |
| <i>Puffinus</i> Shearwaters [most are slightly larger; long slender bill] | | | | |
| Flesh-footed <i>carneipes</i> | 43 | 103 | slight | Uniform underwing, pink legs. Browner wings and body. |
| Wedge-tailed <i>pacificus</i> | 43 | 101 | slight | Palish lower abdomen, wedge-shaped tail. |
| Sooty <i>griseus</i> | 44 | 99 | slight | Broad silvery underwing coverts. |
| Short-tailed <i>tenuirostris</i> | 42 | 98 | slight | Palish underwing coverts. |
| Christmas <i>nativitatis</i> | 36 | 76 | slight | Uniform underwing pattern. |
| Audubon's <i>lherminieri</i> | 30 | 69 | slight | Rare dark phase breeds in Lesser Antilles. Light phase breeds on Culebra. |
| <i>Fulmaris</i> Fulmars [larger] | | | | |
| Northern Fulmar <i>F. glacialis</i> | 48 | 107 | slight | Dark phase smoky gray. Pink legs. Acts like shearwater. Pale bill. |

¹ Refers to likelihood of mistaking bird for a dark-phase Herald Petrel. Several species, such as the Tahiti and Phoenix petrels (*P. rostrata* and *P. alba*) are very similar to intermediate Herald Petrels.

² Recently discovered at Reunion Island, not well known

³ Known from one specimen from Fiji, though there are recent sight records. Sometimes listed as *Pseudobulweria macgillivrayi*

identification of *neglecta* is most likely correct. Although those who doubt this record believe that it was more likely *arminjoniana*, the underwing pattern in published photographs is closer to *neglecta*, and we think this record merits reexamination.

In any case, the Herald Petrel is clearly a likely candidate to show up as a non-breeding visitor in the Caribbean, while the Kermadec, essentially absent from the Atlantic, is a highly unlikely visitor.

Underwing Pattern

A more decisive conclusion, however, can be based on a detailed examination of the underwing pattern. Murphy (1936) notes that "the most striking and constant distinction between these two highly variable birds being the fact that even the darkest examples of *neglecta* have white primary shafts and inner webs, while in all examples of *arminjoniana* these are relatively dark." Actually the shafts of *arminjoniana* are white at the base of the feather where it is obscured by the underwing coverts.

Murphy (1936) described the dark phase of the Kermadec Petrel as being generally grayish brown to brownish black, with mottled white areas appearing on the throat. The remiges and rectrices show white shafts. He described the dark phase of *arminjoniana* as "similar to the dark phase of *Pterodroma neglecta*, except for the wing characters", which include "under wing coverts dark brown, shaded with ashy, some of the inner median and greater coverts largely white; primary coverts white at the base; quills dusky brown below, more ashy on the inner web, which is white toward the base and margins of the primaries, and on the secondaries extends along most of the inner web." The pattern which Murphy describes is variable, but results in a wavy or "digital" pattern of pale gray as one moves outward to the tip of the wings. Some specimens of *arminjoniana* are completely dark, having dark ashy rather than white on the underwing coverts.

The Culebra bird (Fig. 1) shows dark underwing coverts, and uniformly gray remiges, with a slightly darker bar in the secondary area corresponding to the blacker tips of the otherwise dark ashy underwing coverts. The primaries and secondaries may have a darker outer

edge with most of the web being pale gray. There was no evidence of white or pale quills (either in the field or on photographs); rather the web of the remiges was pale.

Most A.M.N.H. specimens of the dark phase of the Herald Petrel, sometimes called "*trinitatis*", show the conspicuous white wing patch at the base of the primaries (described by Murphy 1936), but some individuals have only a more subtle, pale ashy gray pattern, formed by the paler webs of the primaries and extending irregularly along the primary shaft to create the pattern shown in Figure 1. Our examination of the literature and the A.M.N.H. specimens reveals that the Herald Petrel is the only *Pterodroma* in which the underwing pattern shown in Figure 1 occurs. *P. neglecta* does not show the ashy "digit-like" pattern. Moreover, in *neglecta* the indistinct, darkish bar formed by the dark-tipped coverts is broader. The white primary quills emphasized by Murphy (1936; Murphy 1959) are conspicuous on specimens, and would have been noted in the field or in the photographs. These differences are sufficient to eliminate *P. neglecta* from further consideration.

Conclusion

The weight of the above evidence leads us to conclude that the bird observed at Cayo Lobito was a dark-phased Herald Petrel (South Trinidad), representing the first occurrence of that species in the West Indies. We point out that in the dark phase of this species one finds some individuals with conspicuous white and others with subtly ashy underwing patterns. Significantly, it seems to be mainly dark-phase Herald Petrels that have turned up in the Northern Hemisphere. We concur with Lee (1979) that field students should be on the alert for this species in the northern Atlantic and Caribbean.

ACKNOWLEDGMENTS

Sean Furniss made possible our successful field work at the Culebra National Wildlife Refuge. We thank the late Eugene Eisenmann and Robert Cushman Murphy, who many years ago discussed the identification and provenance of the Hawk Mountain petrel, and Guy Tudor for his valuable discussions of petrel identification.

LITERATURE CITED

- ALLEN, A. A. 1934. A new bird for North America. Univ. State N.Y., *Bull. to the Schools* 20(13):134-135.
- AMERICAN ORNITHOLOGISTS' UNION. 1983. Check-list of North American birds. 6th Edition. Allen Press, Lawrence, Kansas.
- BOND, J. 1978. Twenty-second supplement to the Check-list of birds of the West Indies (1956). Acad. Nat. Sci. Philadelphia
- EISENMANN, E. 1960. Further comments on the Hawk Mountain petrel. *Linnaean News-Letter* 13(7):1-2.
- FRIEDMANN, H., L. GRISCOM, and R. T. MOORE. 1957. Distributional check-list of the birds of Mexico, Part II *Pacific Coast Avifauna* 33:1-436.
- HARRISON, P. 1983. Seabirds: an identification guide. Houghton, Mifflin, Boston.
- HEINTZELMAN, D. 1960. Further comments on the Hawk Mountain petrel *Linnaean News-Letter* 13(7):2-3.
- HEINTZELMAN, D. S. 1961. Kermadec Petrel in Pennsylvania. *Wilson Bull.* 73 262-267.
- HELLMAYR, C. E., and B. CONNOVER. 1948. Catalogue of birds of the Americas and adjacent islands. Part 1. No. 2. *Field Museum of Nat. Hist. Zool. Ser.* 13.
- LEE, D. S. 1979. Second record of the South Trinidad Petrel (*Pterodroma arminjoniana*) for North America. *Am. Birds* 33 138-139.
- LEE, D. S. 1986. Seasonal distribution of marine birds in North Carolina waters, 1975-1986. *Am. Birds* 40:409-412.
- LOWE, P. R. 1911. A naturalist on desert islands. Witherby, London.
- MATHEWS, G. N. 1936. Dove-like petrels of the genus *Pterodroma*. *Ibis* 6:376-377
- MURPHY, R. C. 1936. Oceanic Birds of South America, 2 vols. Amer. Mus. Nat. Hist., New York.
- MURPHY, R. C. 1959. Kermadec Petrel at Hawk Mountain. *Linnaean News-Letter* 13(6):4.
- MURPHY, R. C., and J. M. PENNOYER. 1952. Larger petrels of the genus *Pterodroma*. *Amer. Mus. Novitates* 1580 1-42.
- PALMER, R. S. 1962. Handbook of North American birds, vol. I. Yale Univ. Press, New Haven.
- SCOTT, W. E. D. 1891. Observations on the birds of Jamaica. II. *Auk* 8:353-365
- TAYLOR, J. W. 1972. Probable Bulwer's Petrel off Key West, Florida. *Wilson Bull.* 84:198.

—Department of Environmental and Community Medicine, UMDNJ—Robert Wood Johnson Medical School, Piscataway, NJ 08854 (M. Gochfeld); Department of Biological Sciences, Rutgers University, Piscataway, NJ 08855 (Burger and Saliva); Dept. of Zoology, University of Hawaii at Manoa, Honolulu, HI, 96822 (D. Gochfeld).