

## NOTES ON THE MIGRATION OF THE WILSON'S STORM PETREL *Oceanites oceanicus* NEAR ENIWETOK ATOLL WESTERN PACIFIC OCEAN<sup>1</sup>

By LAWRENCE N. HUBER<sup>2</sup>

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The status of Wilson's Storm Petrels in the Atlantic and Indian Oceans is fairly well known (Roberts, 1940; Bourne, 1960; Bailey, 1968), but our knowledge of them in the Pacific is restricted mainly to along the west coast of South America (Murphy, 1936) and in Australian waters (Serventy, 1952; Oliver, 1955). Recently, Crossin (in preparation) found them to be "extremely widespread and sporadic" in the Central Pacific, but for the most part their status in the remainder of the Pacific is virtually unknown. Amerson (1969) reported none in the Marshall & Gilbert Islands, through 1967, but evidence which will be discussed later, suggests his reportings may have been in error. However, from 7 August 1968 to 30 May 1969, while making an ornithological survey of Eniwetok Atoll (11° 30'N, 162° 15'E) in the Marshall Islands for the Pacific Ocean Biological Survey Program, Smithsonian Institution (POBSP), I collected specimens and data that indicate a northward migration of Wilson's Storm Petrels through that area in April and May.

This species was first recorded in the Eniwetok area on 3 September 1968 with the collection of a lone bird feeding over a garbage slick behind a ship anchored in the lagoon. No other storm petrels were seen. The sea outside the atoll was not systematically checked until 17 April 1969 when another was taken outside the atoll about three miles southwest of Eniwetok Island (code name "Fred"). It was feeding with four other white-rumped storm petrels over a garbage slick dumped from a passing ship. Although I could not secure the remaining birds, their feeding behaviour was characteristic of Wilson's. During the remainder of April and through May, eight more trips were made to the same area. On each visit an oil slick was made with two to three gallons of cooking oil and about ten pounds of ground beef fat. The slicks, in moderately rough seas, attracted storm petrels for up to three hours and appeared to be most productive between 0700 and 1000 hours, and especially from 1700 hours to at least dusk.

Table 1 lists white-rumped storm petrel sightings. Working from an 18 foot skiff in rough seas precluded watching the birds and as the various species with white rumps are similar in appearance, positive identification was made only after the birds were collected. Collections included 63 Wilson's Storm Petrels, 3 Leach's Storm Petrels *Oceanodroma leucorhoa*, and 1 Harcourt's Storm Petrel *O. castro*.

<sup>1</sup> Paper No. 41. Pacific Ocean Biological Survey Program, Smithsonian Institution, Washington, D.C. 20560.

<sup>2</sup> 6832 East 38th Street, Tucson, Arizona 85710.

TABLE 1 — Abundance of "white-rumped storm petrels" over artificial oil slicks three miles southwest of Eniwetok Island, Eniwetok Atoll, April and May 1969.

Date	April 17	April 25	May 6	May 8	May 14	May 22	May 27	May 28	May 29
Birds seen	5	9	8	16	13	13	15	14	4
Hours observed	2	4.5	3.5	3	2	5	2	3	2
Birds per hour	2.5	2.0	2.3	5.3	6.5	2.6	7.5	4.7	2.0

Data on the Leach's and Harcourt's Storm Petrels will be included in a forthcoming paper on the avifauna of Eniwetok Atoll (Huber and Bushman, in preparation).

Comparisons of measurements of the Eniwetok Wilson's specimens with those given in Murphy (1963) for the two races of Wilson's, indicate that the Eniwetok specimens are of the larger race, *Oceanites o. exasperatus*, which breeds in the Antarctic Zone rather than the smaller subantarctic *oceanicus* (Table 2). This also agrees with the findings of Falla, Sibson and Turbott (1967: 53-54) for New Zealand specimens and Ozawa (1968) for his Japan specimen.

There was a marked change in sex ratios during the collection period (Table 3). Females were more prevalent than males in the April collections, but in the May samples the ratio reversed and by late May males were predominant.

Examination of the gonads revealed that only 10 of the 25 female specimens had bred. The gonads of these 10 birds were granular, with obvious old ruptured follicles, and their oviducts were loose and convoluted. The ovaries of 10 of the remaining 13 females were smooth in appearance, with all ova minute, and their oviducts were straight and thin. The gonads of the remaining 3 birds were too damaged to determine if they had or had not bred.

The average weight of subcutaneous fat deposits scraped from 45 May specimens was 6.7 grams (range 3.0-9.5) and its average percentage of body weight was 19.9 percent (range 8.3-22.7). Little subcutaneous fat was found on the September bird.

Their faded and worn upper wing coverts indicate that all April-May specimens were in definitive basic plumage for as Murphy (1918: 118) noted juvenile birds "have fresh, black, unworn quills and body feathers, and gray, white-edged greater coverts, at a time of year when the feathers of old birds show the maximum effects of wear and fading." My examination of known adult and immature specimens in the U.S. National Museum does not confirm the con-

TABLE 2—Measurements (in mm) of the two recognized races of *Oceanites oceanicus* from Murphy (1936), and from Eniwetok specimens.

	No. of specimens	Wing		No. of specimens	Tail	
		Mean	Range		Mean	Range
<u>O. o. oceanicus</u>	51	137	130-146	51	59	55-63
<u>O. o. exasperatus</u>	30	152	142-159	30	67	59-73
Eniwetok Specimens	49	154	143-162	55	70	65-75

TABLE 3—Sex ratios of Wilson's Storm Petrels taken offshore, Eniwetok Atoll, April-May 1969.

	<u>April 17-25</u>		<u>May 6-14</u>		<u>May 22-29</u>	
	No.	Percent	No.	Percent	No.	Percent
Males	1	14	17	61	21	75
Females	6	86	11	39	7	25
Total	7	100	28	100	28	100

clusiveness of Murphy's other two characters of immaturity in this species (e.g., the "conspicuous white edgings on the feathers of the belly, and . . . a whitish spot in the lores").

The September specimen had just begun moulting both the contour and flight feathers, and its older plumage was so worn that one can only wonder how the bird could fly.

Only one of the April or May birds, taken on 28 May, had begun a normal remigial moult; another May specimen which had lost many of the feathers of one wing probably had had an encounter with a predator.

There is little doubt that most April and May birds were migrating north. Most had large deposits of subcutaneous fat and only one of the 63 had begun wing moult which normally takes place on the non-breeding grounds. A further indication that there was movement through the area was the change in the sex ratios of the specimens. Since studies of well known northward migrations of this species show that they continue through June, it is reasonable to assume that these west-central Pacific Wilson's follow similar cycles. If this is so, it adds new importance to the growing list of records in Japanese waters (Serventy, 1952; Ozawa, 1968).

Since the area outside the atoll was not systematically surveyed from June through March, it is not known whether significant numbers of these storm petrels were then present. However, since several specimens had very small subcutaneous fat deposits, and one had just begun wing moult, possibly some Wilson's spend their entire non-breeding season in the Eniwetok area. The September specimen, with little subcutaneous fat and with worn plumage and in complete moult, shows that at least one Wilson's was in the area during the previous non-breeding season.

Even though the sea was not surveyed during the non-breeding season, 12 white-rumped storm petrels seen between Makin and Maiana Atolls during a November 1964 POBSP survey in the Marshalls suggest the possible presence of Wilson's. The birds were reported as possible Leach's by Amerson (1969), but the field notes of the survey team, of which I was a member, and the survey report indicate the birds were not Leach's. They were described as having "more white on rump and tail than the similar Leach's," and "the tails were noticeably straight across" or "squarish," unlike the often deeply forked tail of Leach's. The birds were tentatively identified as Harcourt's, mainly because Wilson's were not expected in the area. Since Harcourt's and Wilson's appear identical in the field, the birds may have been Harcourt's or Wilson's or both. Since October and November lie within the expected months for the southward prebreeding migration of the Wilson's (Roberts, 1940; Serventy, 1952; Bourne, 1940), the 12 may have been returning from the north. It is interesting that nearly all the Central Pacific Wilson's specimens were taken in October and November (Crossin, in preparation).

There are three possible explanations for the absence of first year birds in the Eniwetok collection: (1) first year birds leave the nesting area after the adults and the collection period did not last until their arrival in the area; (2) they migrate to a different area; or (3) they migrate by a different route. Since Roberts (1940) states he found no indication that adults and immatures leave the breeding ground separately, the first explanation seems unlikely. However, it cannot be excluded as Roberts did not mark his study birds. It is far more probable however, that first year Pacific birds may spend their first winter in a different area from the adults. Murphy (1936) suggests that first year Atlantic birds tend to migrate not as far north and nearer the coasts. If Pacific first year birds are coastal in migratory habits they would probably pass well to the west of Eniwetok.

Presumably the females which had not bred were 2 to 3 years old for studies on other species of storm petrels indicate that most breed by the time they are four years old (Gross, 1947; Davis, 1957; Allan, 1962).

From the Eniwetok specimens, the sightings during many hours of observations, and the well known regularity of the Wilson's migrations in other parts of the world, it appears that there is a regular northward migration of Wilson's Storm Petrels through the northwestern Marshall Islands in April through at least May. Analysis of moult and subcutaneous fat data taken from specimens indicates that Eniwetok may lie in the non-breeding range of this species.

I wish to express my appreciation to A. Binion Amerson, Jr., Philip C. Shelton and George E. Watson for their helpful criticism and suggestions. I also wish to thank A. Binion Amerson, Jr., Thomas F. Dana and the many Eniwetok Island personnel who assisted me in the collection of the specimens.

#### LITERATURE CITED

- ALLAN, R. G., 1962: The Madeiran Storm Petrel *Oceanodroma castro*. Ibis 103b: 274-295.
- AMERSON, A. B., Jr., 1969: Ornithology of the Marshall and Gilbert Islands. Atoll Res. Bull. 127: 1-348.
- BAILEY, R. S., 1968: The Pelagic distribution of seabirds in the western Indian Ocean. Ibis 110: 493-519.
- BOURNE, W. R. P., 19( ): The Petrels of the Indian Ocean. The Sea Swallow 13: 26-39.
- CROSSIN, R. S. (In preparation): Pelagic studies of seabirds in the central and eastern Pacific Ocean: VI. Storm petrels (Hydrobatidae).
- DAVIS, P., 1957: The breeding of the Storm Petrel. British Birds 50: 85-101, 371-384.
- FALLA, R. A., SIBSON, R. B., and TURBOTT, E. G., 1967: A Field guide to the birds of New Zealand. Houghton Mifflin Company, Boston. The Riverside Press, Cambridge, 254p.
- GROSS, A. O., 1947: Recoveries of banded Leach's Petrels. Birdbanding 18: 117-126.
- KING, W. B., 1967: Preliminary Smithsonian identification manual. Seabirds of the Tropical Pacific Ocean. Smithsonian Institution Press, Washington, D.C.
- MURPHY, R. C., 1918: A Study of the Atlantic *Oceanites*. Bull. Am. Mus. Nat. Hist. 38: 117-146.
- MURPHY, R. C., 1936: Oceanic Birds of South America. American Mus. of Nat. Hist., New York.
- OLIVER, W. R. B., 1955: New Zealand birds. A. H. & A. W. Reed, Wellington, 661 p.
- PALMER, R. S., 1962: Handbook of North American birds. Volume I. Yale University Press, New Haven and London.
- ROBERTS, B., 1940: The life cycle of the Wilson's Petrel *Oceanites oceanicus*. (Kuhl). British Graham Land Expedition, 1934-37. Science Rep. 1 (2): 141-194.
- SERVENTY, D. L., 1952: Movements of the Wilson's Storm-Petrel in Australian Seas. Enn: 105-116.
- STRESEMANN, E., and V. STRESEMANN, 1966. Die Mauser der Vogel. Journal fur Ornithologie. 107: 1-445.
- OZAWA, K., 1968: wo records of Wilson's Storm Petrel *Oceanites oceanicus* in Japanese waters in 1967. Miscellaneous Reports of the Yamashina Institute for Ornithology. 5: 411-413.