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HOMING OF LAYSAN ALBATROSSES

By KARL W. KENYON and DALE W. RICE

While conducting studies of Laysan Albatrosses (*Diomedea immutabilis*) on Midway Atoll in 1957, we had opportunities to test their homing ability. Rapid transportation to distant points was provided by navy aircraft using the Midway Islands Naval Station as a refueling stop during trans-Pacific flights. So far as we know, no homing experiments have previously been reported for any species of albatross.

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The homing ability of pelagic birds has been demonstrated by a number of experiments. The most notable of these involved a Manx Shearwater (*Puffinus puffinus*) which was transported 3200 miles from the island of Skokholm, Wales, to Boston, Massachusetts. It returned to its nest on Skokholm in twelve and one-half days (Mazzeo, Auk, 70, 1953:200–201).

METHODS

Eighteen Laysan Albatrosses captured on Sand Island, Midway Atoll, were transported by air and liberated at six points around the North Pacific Ocean. All were of undetermined sex and were taken while on eggs or newly-hatched young, most of which survived the temporary absence of one parent. The birds were removed from their nests one or two hours before plane departure. Each was banded with a United States Fish and Wildlife Service numbered aluminum band that bore a distinctively shaped and colored polyethylene plastic tag. An additional distinctive mark was made on the white body plumage of each bird with DuPont red alcohol-soluble dye. These marks facilitated the recognition of the birds when they returned to their nesting territories.

In the first shipment, two birds were placed in each large fiber box. Of six thus shipped, five returned. The sixth bird received a broken wing as a result of a fight with its box-mate; this injured bird is not mentioned in the accompanying table. Following this occurrence, birds were shipped separately in fiber box containers 20×16×16 inches. For ventilation a small window, covered with hardware cloth, was cut into one side, and numerous small holes were punched in the remaining three sides. All birds shipped in these containers were reportedly liberated in satisfactory condition.

The albatrosses taken to Japan and to Hawaii were carried on Navy P2V Neptune bombers and were released on land. All others were transported in Navy P5M Marlin seaplanes and were released on the water. The elapsed time between capture at Midway and release at Kwajalein was 11 hours; at Guam, 34 hours; at Sangley Point, 60 hours; at Iwakuni, 78 hours; at Barbers Point, 11 hours; and at Whidby Island, 105 hours.

Since albatrosses are capable of long periods of fasting, no food or water was provided while in transit.

Following release, the nest sites were checked several times daily for returned birds. Most of the return times are accurate to within a few hours; in several cases, the actual arrival was observed.

RESULTS

Of the eighteen birds released at distant points, fourteen returned to their nests. The places of release, distances travelled, lapsed time, and the average daily speeds of these birds are summarized in table 1. The greatest distance was covered by the bird which returned from Sangley Point, Philippine Islands, a rhumb line distance of 4120 statute miles. The fastest return was from Whidby Island, Washington, 3200 statute miles away, in 10.1 days, at an average speed of 317 miles per day.

Table 1

Homing of Laysan Albatrosses to Sand Island, Midway Atoll, in 1957

Band no.	Locality	Released		Returned		Distance in statute miles	Days enroute	Average miles per day
		Date	Time[1]	Date	Time			
597–38008	Marshall Ids.	Jan. 26	5:50 p.m.	Feb. 4	6:15 p.m.	1665	9.0	185
597–38009		Jan. 26	5:50 p.m.	Feb. 3	2:00 p.m.	1665	7.9	211
597–38010		Jan. 26	5:50 p.m.	Feb. 5	12:00 p.m.	1665	9.8	170
597–38011		Jan. 26	5:50 p.m.	Feb. 4	6:15 p.m.	1665	9.0	185
597–38023		Jan. 29	6:00 a.m.	Feb. 10	12:24 p.m.	1665	12.3	135
597–38020	Marianas Ids.	Jan. 30	4:00 a.m.	Feb. 18	6:30 p.m.	2625	19.6	134
597–38021	Luzon, P. I.	Jan. 31	6:00 a.m.	Mar. 4	8:00 a.m.	4120	32.1	128
597–38028	Japan	Feb. 15	12:30 p.m.					
597–38029		Feb. 15	12:30 p.m.					
597–38030		Feb. 15	12:30 p.m.	Apr. 16	8:20 a.m.	3075	59.8	51
597–38031	Washington	Feb. 23	3:00 p.m.					
597–38032		Feb. 23	3:00 p.m.					
597–38033		Feb. 23	3:00 p.m.	Mar. 7	6:10 p.m.	3200	12.1	264
597–38034		Feb. 23	3:00 p.m.	Mar. 5	6:00 p.m.	3200	10.1	317
597–38035	Oahu	Feb. 25	4:30 p.m.	Apr. 10	7:00 p.m.	1315	44.1	30
597–38036		Feb. 25	4:30 p.m.	Mar. 9	12:00 p.m.	1315	11.8	111
597–38037		Feb. 25	4:30 p.m.	May 8	10:00 a.m.	1315	71.7	18
597–38038		Feb. 25	4:30 p.m.	Mar. 4	6:00 p.m.	1315	7.1	185

[1] Dates and times given are Midway Time (Greenwich Time minus 11 hours).

It appears that the homing instinct is stronger during the incubation stage than after the young have hatched. The minimum return speed for birds shipped away while incubation was in progress (prior to February 1) was 128 miles per day, and all birds returned. Although two of the birds sent to Whidby Island, Washington, returned most rapidly, the majority of birds sent after the eggs had hatched (after February 1) were slow in returning and averaged as low as 18 miles per day from places as near as Barbers Point, Oahu. Only seven out of 11 birds in this latter group were known to have returned. However, it is possible that some of the birds which had young in the nest arrived several days prior to the recorded date and returned to sea before being observed. A parent albatross may come ashore, feed its nestling, and return to sea within 20 minutes.

Of the four birds which failed to return, only one has been accounted for. The albatross bearing band number 597-38031, released at Whidby Island, Washington, was recovered 20 miles inland on the Fraser River, British Columbia, on the day following

its release. It was said to have been seriously injured, evidently as a result of the high winds which prevailed on that day and on the previous day.

DISCUSSION

Although no birds were sent beyond the equator or beyond the rim of the North Pacific Ocean, several were sent to areas outside of the known range of the Laysan Albatross. We have found no specific record to indicate occurrence of this species south of about 15° north latitude. Kwajalein Atoll is about 9° north latitude, and all five birds released there returned rapidly.

Information is not available to indicate that albatrosses occur in the Philippine Sea. The only bird liberated in this area, at Sangley Point near Manila, journeyed through the South China Sea and the Philippine Sea before re-entering the North Pacific Ocean proper at a place that was still some distance from the usual range of the species.

Likewise, Laysan Albatrosses have seldom been recorded near the Washington coast (Kenyon, Condor, 52, 1950:97–103) and they have never been found within the Strait of Juan de Fuca, which extends nearly 100 miles from the point of release to the sea.

Ten Laysan Albatrosses banded on Midway Atoll have been recovered at sea. Two of these were recovered in the eastern Pacific, and eight were recovered in the western Pacific (table 2). Even between shifts during incubation, these birds apparently travel

Table 2

Pelagic Recoveries of Laysan Albatrosses Banded at Midway Atoll

		Banded		Recovered		
Band no.	Age	Date	Locality	Date	Locality	
36–814925	nestling	July, 1937	Sand Island	Dec. 12, 1937	36°00′N, 147°00′E	Off Kingkasan, Honshu, Japan
37–713309	adult	Nov. 25, 1938		Feb. 25, 1951	29°50′N, 157°40′E	Halfway between Midway and Japan
39–716243	adult	Dec. 26, 1939		Apr. 8, 1956	36°00′N, 142°10′W	Halfway between Seattle and Honolulu
40–735702	nestling	July 10, 1948		Jan. 6, 1949	32°20′N, 157°20′E	Off Japan
41–724259	adult	June, 1946		Sept. 7, 1948	59°20′N, 146°50′W	15 miles west of Middleton Island, Alaska
44–725254	nestling	July 3, 1949		Jan. 9, 1951	36°50′N, 144°00′E	Off Japan
527–00045	nestling	June 17, 1951	Eastern Island	Dec. 11, 1951	37°10′N, 149°00′E	Off Japan
587–51729	adult	Dec. 3, 1956	Sand Island	Dec. 26, 1956	42°30′N, 144°00′E	Off Kushiro, Hokkaido, Japan
597–36122	adult	Nov. 22, 1956		Mar. 3, 1957	31°45′N, 159°05′E	Halfway between Midway and Japan
587–52502	adult	Jan. 28, 1957		May 2, 1957	40°17′N, 147°05′E	Off Honshu, Japan

great distances. One banded on the nest on December 3, 1956, was recovered 23 days later over 2000 miles away off Hokkaido, Japan. The abundance of small fishing vessels off Japan increases the probability of albatrosses being taken there. Unlike Black-footed Albatrosses (*Diomedea nigripes*), Laysan Albatrosses do not habitually follow ships or congregate about them. They are therefore infrequently seen at sea in spite of their greater total population. More data on their pelagic distribution are needed (see Bailey, Museum Pictorial, Denver Mus. Nat. Hist., 6, 1952:1–80). It is perhaps significant

that some of the birds released near the periphery of their known range made better time than those released where the species has not been recorded.

The rapid return of two of the birds released at Whidby Island, Washington, becomes increasingly interesting when viewed in conjunction with meteorological conditions in the North Pacific between February 23 and March 7. In this period, low pressure areas moving from west to east created many headwinds along the most direct route between Whidby Island and Midway Atoll. If the birds had flown into the face of such winds, their progress would have been slow. However, if after reaching the sea, the birds had swung southwest until they were approximately halfway to Midway, then north to the vicinity of the Aleutian Islands, then west to a point almost due north of Midway before heading south, they would have had an average 5 knot component of wind toward Midway (S. W. Betts, letter, June 1, 1957). Knowing the meandering, soaring nature of albatross flight at sea, the two birds undoubtedly covered far more than 3000 miles in the course of their homeward flight, and they must have done so in a nearly continuous manner without aimless wandering.

The birds returning from Manila and from Whidby Island presumably came home indirectly. They probably threaded their ways, to begin with, through strange waters dotted with islands, and finally returned over vast stretches of open sea through shifting wind conditions to their mid-Pacific nesting ground. The birds released at Whidby Island may have deviated considerably from the great circle route in order to utilize optimum wind conditions. Although the routes by which the released albatrosses returned to Midway are a matter of conjecture, we believe that some of the birds may have travelled through weather conditions which obscured the sky; and if they utilized optimum wind conditions, their routes were not necessarily direct. We suggest that existing theories of bird navigation do not fully explain their homing behavior.

SUMMARY

Eighteen adult Laysan Albatrosses were removed from their nests on Sand Island, Midway Atoll, and sent by air to distant parts of the North Pacific Ocean. Localities of release were: Kwajalein, Marshall Islands; Guam, Marianas Islands; Luzon, Philippine Islands; Honshu, Japan; Oahu, Hawaiian Islands; and Whidby Island, Washington. Fourteen birds, representing all six localities, subsequently returned to their nests. The bird covering the greatest distance returned from the Philippine Islands, 4120 statute miles in approximately 32 days. The most rapid return was accomplished by a bird liberated at Whidby Island, Washington, which covered a rhumb line distance of 3200 miles in 10.1 days at an average speed of 317 miles per day.

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