

MANX, AUDUBON'S, AND LITTLE SHEARWATERS IN THE NORTHWESTERN NORTH ATLANTIC¹

By PETER W. POST

Within that part of the North Atlantic west of 20° W. longitude and north of 37° N. latitude, the status of the Manx (*Puffinus puffinus*), Audubon's (*P. therminieri*), and Little Shearwaters (*P. assimilis*) is poorly known, but sufficient information now exists for an adequate analysis.

According to the A.O.U. Check-list (1957) the nominate subspecies of the Manx Shearwater breeds in Iceland, the British Isles, France, the Azores, Madeira Islands, the Salvages, and Bermuda. Bourne (1957b: 102) states that the species no longer breeds on Bermuda where the last definite breeding record was obtained in 1905. It is also questionable whether the Manx Shearwater still breeds on any of the Madeira Islands (Bannerman, 1959: 89) or has ever bred on the Salvages (Bourne, *in litt.*). Other than Bermuda, the Check-list mentions only three other North American records for this form: "New York (Long Island), Newfoundland (60 miles east of Cape Race), Greenland (Umanak)." The Newfoundland report is a sight record, and although it almost certainly refers to the present species it was not positively identified as such (Wynne-Edwards, 1935: 269). Winge (1898: 139) long ago showed the Umanak bird to be an albino Fulmar (*Fulmarus glacialis*).

This form apparently spends the nonbreeding season in the southern hemisphere, but the extent of its winter range is unknown. Through 31 December 1964, 37 birds banded in the British Isles were recovered from South American waters (Brazil, 34, Argentina, 2, Uruguay, 1). One bird banded at Skokholm, Wales, and recovered near Venus Bay on the south coast of Australia (Spencer, 1962: 503) may hold the all-time distance record for a banding recovery.

The Manx Shearwater has been reported regularly from North American waters since about 1950. Evidence also suggests that the species occurred as frequently in the mid-1800's though it went virtually unrecorded during the intervening years. Its occurrence in eastern North America in the mid-19th century is attested by several contemporary writers. Audubon's statement (1835: 604): "I have procured this species to the westward of the banks of Newfoundland, or between their soundings and the American coasts" undoubtedly refers to 1833, the year of his expedition to Newfoundland, Labrador, and adjacent waters (Herrick, 1938). Having drawn *P. therminieri* from life, Audubon presumably identified *P. puffinus* correctly. Furthermore, a specimen of *P. puffinus* from Audubon's collection formed the basis of Lawrence's description of the Manx Shearwater in Baird, Cassin, and Law-

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rence's (1860: 834) "Birds of North America." This volume gives the species' range as the "coast of New Jersey to Labrador," and states on Audubon's authority that it is "not uncommon off the coast of Maine during summer."

Dekay (1844: 289) gives the species' range as "Sable Island coast of Maine." In his "Birds of Long Island" Giraud (1844: 368) records the Manx Shearwater as "an accidental visitor."

At least three of the four 19th century specimens of the Manx Shearwater from North America are still extant:

1) A specimen from Greenland, apparently taken at Julianehaab, formerly in the Zoological Museum of Copenhagen, is no longer extant. According to F. Salomonsen (personal communication) this specimen was probably taken about 1820, as it was first reported by Reinhart in 1824.

2) A specimen H. E. Dresser collected "on the coast of Maine or New Brunswick," presented by G. A. Boardman in 1867 to the Boston Society of Natural History, is now no. 73408 in the Museum of Comparative Zoology, Cambridge, Massachusetts (Brooks, 1917). According to Boardman (1903), Dresser managed a lumber mill near St. John for a year in 1860 and 1861. This bird was probably collected at that time, although it may have been taken when Dresser re-visited New Brunswick in May 1862 or in August 1865.

3) Hellmayr and Conover (1948: 70) and Squires (1952: 22) list a bird in the Cory collection taken by an unknown collector at St. John, New Brunswick 18 May 1864, which is now no. 45270 in the Chicago Natural History Museum (Melvin A. Traylor, *in litt.*).

4) A bird G. A. Boardman collected in New Brunswick, at an unknown date is now no. 113660 in the United States National Museum. This record, so far as I am aware, has not been published previously, although it may have been the basis for his including the species in his "Catalogue of the birds found in the vicinity of Calais, Maine, and about the islands at the mouth of the Bay of Fundy" (1865: 130), which states it is "common on mackerel grounds" in summer. However, Brewer (1875) wrote: "Mr. Boardman has never been able to procure one and has no other reason to suppose it is found on our coast than that fishermen speak of a smaller kind of Hagdon, an authority altogether too vague." Nine years later (in Baird, Brewer, and Ridgway, 1884: 385) this same author wrote: "Mr. Boardman informs me that a single individual has from time to time been met with at sea off the coast of Maine and Nova Scotia; but he regards such an occurrence as extremely uncommon, and as purely accidental." He adds: "Audubon *did not* see Manx Shearwaters except at sea, several hundred miles from our coast."

The Manx Shearwater records given by these early authors and shown by specimens coincide fairly well with the present known range.

TABLE I. MANX SHEARWATER RECORDS FROM THE NORTH ATLANTIC WEST OF 20° W. LONGITUDE*

*Data is complete through 1964. Some more recent information is included. Records lacking dates or observers' names, as well as reports from the vicinity of the Azores, a major breeding area, have been omitted. This table is keyed to follow the discussion of seasonal movements. Abbreviations used are: CMNH, Chicago Museum of Natural History; USNM, United States National Museum; PMS, Peabody Museum of Science; MCZ, Museum of Comparative Zoology; BMS, Boston Museum of Science; AMNH, American Museum of Natural History.

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
22 Mar 1958	37°59' N. 66°09' W.	4	W. W. Ferguson	Ferguson, <i>in litt.</i>	
23 Mar 1958	39°44' N. 57°39' W.	2	W. W. Ferguson	Ferguson, <i>in litt.</i>	
25 Mar 1958	41°09' N. 39°07' W.		W. W. Ferguson	Ferguson, <i>in litt.</i>	
26 Mar 1958	44°44' N. 29°58' W.	1	W. W. Ferguson	Ferguson, <i>in litt.</i>	
29 Mar 1958	36°14' N. 63°13' W.	5	W. W. Ferguson	Bourliere, 1946: 53-54	reported as possibly Audubon's or Little Shearwaters, but probably refers to Manx (see text)
9 Mar 1946	40°52' N. 63°21' W.		F. Bourliere		
17 Mar 1945	44°43' N. 42°20' W.	1	E. M. Nicholson	Nicholson, 1946: 267	reported as possible Audubon's Shearwater, but probably refers to Manx (see text)
9 Apr 1963	48°00' N. 33°00' W.	2	K. D. A. Lamb	Borune, 1965: 22	
1 May 1955	48°00' N. 23°00' W.	3	K. D. Kallman	Kallman, <i>in litt.</i>	
12 May 1954	69°20' N. 43°50' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
18 May 1864	New Brunswick, Canada	1	unknown	Hellmayer and Conover, 1948: 70; Squires, 1952: 22; M. A. Traylor, <i>in litt.</i>	CMNH no. 45270. Specimen identified by Austin Rand.
24 May 1947	St. Anthony Newfoundland	1	S. M. Christian	Peters and Burleigh, 1949: 173; G. E. Watson, <i>in litt.</i>	USNM no. 395071
25 May 1957	Rockaway Beach, Queens Co., N. Y.	1	G. Carleton, P. Messing	Post, 1964	
27 May 1962	5 miles SE of Jones Beach, Suffolk Co., N. Y.	1	P. W. Post, <i>et al.</i>	Post, 1964	for a recognizable photograph see reference

TABLE 1. MANX SHEARWATER RECORDS FROM THE NORTH ATLANTIC WEST OF 20° W. LONGITUDE (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
ca. 31 May 1959	40°26' N. 73°48' W.	1	H. Ryan	Post, 1964	Ambrose Lightship, N. Y.
14-20 Jun 1957	Mecox Bay, Suffolk Co., N. Y.	1	P. A. Buckley, C. McKeever, et al.	Post, 1964	
11 May 1944	55°00' N. 23°00' W.	1	M. N. Rankin and E. Duffy	Rankin and Duffy, 1948: 10	
24 May 1933	51°00' N. 23°00' W.	3	V. C. Wynne-Edwards	Wynne-Edwards, 1935: 269	
4 Jun 1953	44°45' N. 69°20' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
8 Jun 1962	43°45' N. 69°20' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
10 Jun 1965	2 miles S. of Peggeys Cove, Halifax Co., N. S., Canada	1	T. F. T. Morland	Morland, <i>in litt.</i>	
13 Jun 1963	Bay of Fundy	1	P. A. Buckley	Buckley, <i>in litt.</i>	seen from the <i>Bluenose</i> ferry
14 June 1951	43°50' N. 69°20' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
23 Jun 1964	43°45' N. 68°15' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
20 Jun 1933	51°00' N. 21°00' W.	1	V. C. Wynne-Edwards	Wynne-Edwards, 1935: 269	
24 Jun 1960	50°00' N. 34°00' W.	1	S. E. Chapman	Bourne, 1961: 15	
30 Jun 1954	52°30' N. 35°00' W.	1	A. M. Thom	Thom, 1956: 82	
24 Jun 1933	"less than 60 miles east of Cape Race," Newfoundland	1	V. C. Wynne-Edwards	Wynne-Edwards, 1935: 269	
ca. 30 Jun 1954	Bonavista Bay, Newfoundland	1	Spencer, 1955: 468		found dead; banded as young (band no. AT11692) at Skokholm, British Isles, 26 August 1952
12 Jun 1926	60°00' N. 15°00' W.	3	F. Salomonsen	Salomonsen, 1926.	
13 Jun 1926	60°00' N. 20°00' W.	1	F. Salomonsen	Salomonsen, 1926.	
14 Jun 1926	60°00' N. 25°00' W.	1	F. Salomonsen	Salomonsen, 1926.	
15 Jun 1926	60°00' N. 30°00' W.	1	F. Salomonsen	Salomonsen, 1926.	
16 Jun 1926	60°00' N. 35°00' W.	1	F. Salomonsen	Salomonsen, 1926.	

TABLE 1. MANX SHEARWATER RECORDS FROM THE NORTH ATLANTIC WEST OF 20° W. LONGITUDE (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
18 Jun 1931	50 miles from Cape Farewell, Greenland	4	T. G. Longstaff	Longstaff, 1931: 156	not identified as to species, but could hardly be anything else.
25 Jul 1931	60°50' N. 29°00' W.	1	T. G. Longstaff	Longstaff, 1931: 156	
6 Jul 1958	52°30' N. 47°30' W.	1	F. M. Richards, <i>et al.</i>	Richards, <i>et al.</i> , 1960	
7 Jul 1958	54°40' N. 44°00' W.	1	F. M. Richards, <i>et al.</i>	Richards, <i>et al.</i> , 1960	
10 Jul 1958	100 miles NE of Cape Spear, Newfoundland	1		Spencer, 1959: 452; additional information from the Brit. bird-ringing office	shot; banded as young (band no. AT50166) at Skokholm, British Isles, 16 August 1957
24 Jul 1960	44°00' N. 49°00' W.	1	S. E. Chapman	Bourne, 1961: 15	
2 Aug 1957	47°45' N. 50°00' W.	1	David Seargeant	Bourne, <i>in litt.</i>	
19 Aug 1943	53°45' N. 24°50' W.	1	M. N. Rankin, E. Duffy	Rankin and Duffy, 1948: 10	
21 Aug 1963	48°44' N. 52°48' W.	1	G. E. V. Goodwill	Goodwill, <i>in litt.</i>	
22 Aug 1958	45°51' N. 54°12' W.	1	P. W. Post	Libby, <i>in litt.</i>	
4 Jul 1962	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
6 Jul 1962	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
8 Jul 1961	43°55' N. 67°55' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
11 Jul 1964	43°45' N. 69°20' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
16 Jul 1958	off Pemaquid Point, Lincoln Co., Maine	1	A. D. Cruickshank	Cruickshank, <i>in litt.</i>	
16 Jul 1962	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
17 Jul 1956	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
17 Jul 1962	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
26 Jul 1957	43°50' N. 69°20' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
31 Jul 1953	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
31 Jul 1965	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	

TABLE I. MANX SHEARWATER RECORDS FROM THE NORTH ATLANTIC WEST OF 20° W. LONGITUDE (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
2 Aug. 1964	Matineus Rock, Knox Co., Maine	1	A. M. Bagg, <i>et al.</i>	Bagg, <i>in litt.</i>	
5 Aug. 1962	off Pemaquid Point, Lincoln Co., Maine	1	S. and R. Higgenbotham	Emery, <i>in litt.</i>	
5 Aug. 1964	43°40' N. 69°20' W.	2	M. L. Libby	Libby, <i>in litt.</i>	
6 Aug. 1963	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
7 Aug. 1964	43°45' N. 69°05' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
11 Aug. 1958	43°45' N. 69°05' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
11 Aug. 1962	43°45' N. 69°05' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
13 Aug. 1962	43°45' N. 69°15' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
14 Aug. 1964	43°50' N. 69°20' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
15 Aug. 1962	43°45' N. 69°10' W.	3	M. L. Libby	Libby, <i>in litt.</i>	
15 Aug. 1964	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
18 Aug. 1961	43°45' N. 69°10' W.	3	M. L. Libby	Libby, <i>in litt.</i>	
19 Aug. 1964	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
22 Aug. 1957	Muscongus Bay, Lincoln Co., Maine	1	A. D. Cruickshank, J. Cadbury, <i>et al.</i>	Cruickshank, <i>in litt.</i>	
23 Aug. 1961	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
30 Aug. 1964	Bay of Fundy	1	Ralph O'Dell	Gochfeld, <i>in litt.</i>	seen from the Bluenose ferry
31 Aug. 1961	43°45' N. 69°15' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
5 Sep. 1955	43°40' N. 69°20' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
7 Sep. 1964	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
11 Sep. 1961	43°40' N. 69°20' W.	2	M. L. Libby	Libby, <i>in litt.</i>	
13 Sep. 1964	43°45' N. 69°35' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
14 Sep. 1964	43°45' N. 69°15' W.	2	M. L. Libby	Libby, <i>in litt.</i>	
17 Sep. 1964	43°40' N. 69°20' W.	2	M. L. Libby	Libby, <i>in litt.</i>	
18 Sep. 1961	43°45' N. 69°10' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
30 Sep. 1964	43°45' N. 69°15' W.	1	M. L. Libby	Libby, <i>in litt.</i>	
28 Jul. 1958	44°43' N. 63°10' W.	1	J. E. V. Goodwill	Goodwill, <i>in litt.</i>	15 miles E. of Halifax Harbor, N. S.

TABLE 1. MANX SHEARWATER RECORDS FROM THE NORTH ATLANTIC WEST OF 20° W. LONGITUDE (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
27 Jun 1962	40°33' N. 69°28' W.	1	D. H. Crompton	Emery, <i>in litt.</i>	Nantucket Shoals Lightship "too far to be identified as to species,"
2 Jul 1949	Smith's Point Opening, Nantucket, Nantucket Co., Mass.	1	E. Andrews	Andrews, <i>in litt.</i>	the photograph appears to be that of a Manx Shearwater.
9 Jul 1950	6 miles NW of Nantucket Harbor, Nantucket Co., Mass.	1	Richard Bowen	<i>Records New England Birds</i> , 6: 119, 1950	
19 Jul 1964	½ mile SSW Plum Is., Suffolk Co., N. Y.	1	P. W. Post, <i>et al.</i>	Post and Tudor, 1964: 239	
21 Jul 1940	15 miles SW of Nomans Land, Dukes Co., Mass.	1	Richard Bowen	<i>Bull. Mass. Aud. Soc.</i> , 25: 31, 1940	
24 Jul 1948	Nantucket Is., Nantucket Co., Mass.	1	E. Andrews	Andrews, <i>in litt.</i>	
28 Jul 1953	off Chatham, Barnstable Co., Mass.	1	D. E. Snyder, <i>et al.</i>	Snyder, <i>in litt.</i>	the photograph taken is almost certainly that of a Manx Shearwater.
6 Aug 1953	4 miles W. of Gay Head, Dukes Co., Mass.	1	M. S. Gordon	Gordon, 1955	
11 Aug 1956	at sea off Monomoy, Barnstable Co., Mass.	1	Elisha Atkins	Emery, <i>in litt.</i>	
11 Aug 1957	Stellwagen Bank, Essex Co., Mass.	3	F. Burnett	Emery, <i>in litt.</i>	
11 Aug 1957	off Monomoy, Barnstable Co., Mass.	1	N. Hill	Emery, <i>in litt.</i>	
18 Aug 1962	off Gloucester, Essex Co., Mass.	1	Brookline Bird Club	Emery, <i>in litt.</i>	
19 Aug 1957	Stellwagen Bank, Essex Co., Mass.	1	S. Robbins	Emery, <i>in litt.</i>	

TABLE I. MANX SHEARWATER RECORDS FROM THE NORTH ATLANTIC WEST OF 20° W. LONGITUDE (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
20 Aug 1956	off Monomoy, Barnstable Co., Mass.	1	L. Griscom	Emery, <i>in litt.</i>	
31 Aug 1956	off Monomoy, Barnstable Co., Mass.	1	Osbourne Earle	Emery, <i>in litt.</i>	
31 Aug 1957	off Chatham, Barnstable Co., Mass.	1	P. Mott	Emery, <i>in litt.</i>	
2 Sep 1957	Stellwagen Bank, Essex Co., Mass.	1	S. Robbins	Emery, <i>in litt.</i>	
7 Sep 1957	off Monomoy, Barnstable Co., Mass.	1	R. P. Emery	Emery, <i>in litt.</i>	
7 Sep 1959	Nauset, Barnstable Co., Mass.	1	Murry Gardlers, Charles Sutherland	Emery, <i>in litt.</i>	
19 Sep 1958	Nantucket Is., Nantucket Co., Mass.	1	R. P. Emery, D. E. Snyder	Emery, <i>in litt.</i>	
9 Aug 1957	Stellwagen Bank, Essex Co., Mass.	1	F. Burnett	Snyder, 1958	PMS no. 7977
13 Aug 1953	off Chatham, Barnstable Co., Mass.	1	A. H. Morgan	Snyder, 1958	MCZ no. 280747
18 Aug 1957	Stellwagen Bank, Essex Co., Mass.	1	D. E. Snyder	Snyder, 1958	PMS no. 7978
20 Aug 1955	off Chatham, Barnstable Co., Mass.	1	A. H. Morgan	Snyder, 1958	BMS no. 20805
4 Sep 1950	Katama Beach, Dukes Co., Mass.	1	Dr. and Mrs. J. H. Ludwig, Jr.	Ludwig, 1951	found dead; skull and photographs identified by R. C. Murphy; MCZ No. 2427
6 Sep 1957	Harding's Beach, Chatham, Barnstable Co., Mass.	1	Mrs. M. V. Maclay	Snyder, 1958	found dead in partly decomposed condition; specimen not preserved but identified by L. Griscom

TABLE I. MANK SHEARWATER RECORDS FROM THE NORTH ATLANTIC WEST OF 20° W. LONGITUDEZ (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
2 Aug 1957	Narragansett Bay, Newport Co., R. I.	1	J. Moran	Emery, <i>in litt.</i>	
ca. 10 Aug 1958	Jones Beach, Nassau Co., N. Y.	1	W. Sedwitz	Post, 1964	
30 Aug 1917	Ocean Beach, Fire Is., Suffolk Co., N. Y.	1	H. Thurston	Dwight, 1923	AMNH no. 349273
ca. 5 Sep 1950	Short Beach, Nassau Co., N. Y.	1	R. Ryan	Post, 1964	
5 Sep 1943	56°00' N. 23°40' W.	1	M. N. Rankin, E. Duffy	Rankin and Duffy, 1948: 10	
12 Sep 1935	49°25' N. 22°44' W.	1	G. Oliver	Oliver, 1950: 139	
13 Sep 1933	53°00' N. 34°00' W.	1	V. C. Wynne-Edwards	Wynne-Edwards, 1935: 269	
13 Sep 1935	54°16' N. 28°18' W.	2	K. B. Rooke	Rooke, 1936: 369	
14 Sep 1935	54°42' N. 23°20' W.	1	K. B. Rooke	Rooke, 1936: 369	
14 Sep 1935	47°26' N. 35°24' W.	1	G. Oliver	Oliver, 1950: 139	
14 Sep 1957	48°00' N. 32°35' W.	1	I. C. T. Nisbet	Nisbet, <i>in litt.</i>	
15 Sep 1957	45°10' N. 43°20' W.	1	I. C. T. Nisbet	Nisbet, <i>in litt.</i>	
19 Sep 1961	57°02' N. 31°15' W.	3	S. E. Chapman	Bourne, 1964: 20	
19 Sep 1963	54°00' N. 31°30' W.	1	S. E. Chapman	Bourne, 1965: 22	
1 Oct 1935	49°10' N. 23°51' W.	1	G. Oliver	Oliver, 1950: 139	
8 Oct 1959	41°00' N. 58°00' W.	1	I. C. T. Nisbet	Nisbet, <i>in litt.</i>	
8 Oct 1959	41°00' N. 59°30' W.	1	I. C. T. Nisbet	Nisbet, <i>in litt.</i>	
30 Oct 1960	Jupiter Inlet, Palm Beach Co., Fla.	1	Mrs. Dwight Green	Watson, <i>in litt.</i>	USNM no. 473608 specimen identified by A. Wetmore
30 Nov 1957	Nauset Beach, Barnstable Co., Mass.	1	R. Smart	Emery, <i>in litt.</i>	

Following these early reports the Manx Shearwater went unrecorded in North American waters until 30 August 1917 when Henry Thurston found a dead one (AMNH no. 349273) on Ocean Beach, Fire Island, Suffolk Co., New York—the basis of the Checklist's "Long Island" record. Dwight (1923) mistakenly reports this as the "first definite capture in North America of the Manx Shearwater" and, presumably because the bird was "a mere wreck of bones and feathers," questions the soundness of basing records on such stranded waifs that may have drifted for some distance. However, as the original label on the specimen states: "Found dead after storm in fair condition," the bird certainly did not drift from far offshore, much less all the way from Europe.

The next Manx Shearwater report from North American waters was a bird seen by Wynne-Edwards (1935: 269) on the Grand Banks "less than 60 miles east of Cape Race," Newfoundland 24 June 1933.

The Manx Shearwater really began to be reported again during the late 1940's and early 1950's, with records from Newfoundland (1947, specimen), Maine (1951), Massachusetts (1950, specimen), and New York (1950).

In the light of recent information several sight records of birds reported as Audubon's from southern New England during this time may well have been Manx (table 1). Through the kindness of Mrs. Edith Andrews I have been able to obtain a kodachrome of the bird seen at Smith's Point Opening, Nantucket. This photograph, examined by W. R. P. Bourne and myself, appears to be a Manx Shearwater.

Following these early reports the number of observations and specimens suddenly increased. Since about 1950 the species has been reported annually in New England waters (for exact locations and seasonal occurrence see below). Snyder (1958) reports as many as 12 from Massachusetts during 1957 alone. As the number of observations depends largely on the number of pelagic trips made, the Manx Shearwater is probably commoner in these waters than the reports indicate. From Maine the best indication of the bird's status are from the observations of Mark L. Libby, who spends the year round fishing offshore. Between the years 1951 and 1965 Libby has seen Manx Shearwaters on 47 occasions, with as many as three individuals in a day, and 14 in a season (Libby, *in litt.*).

SEASONAL MOVEMENTS OF MANX SHEARWATERS WITHIN THE NORTHWESTERN NORTH ATLANTIC (SEE TABLE 1)

January-March

The first Manx Shearwaters arrive at the Skokholm, Wales breeding grounds during February. Their numbers gradually increase until the end of March when thousands are present (Lockley, 1942: 19). We would therefore expect to find migrants at sea from January through March, and perhaps even well into May, as banding recoveries show Manx Shearwaters still present in South American waters during the second week of April. The almost

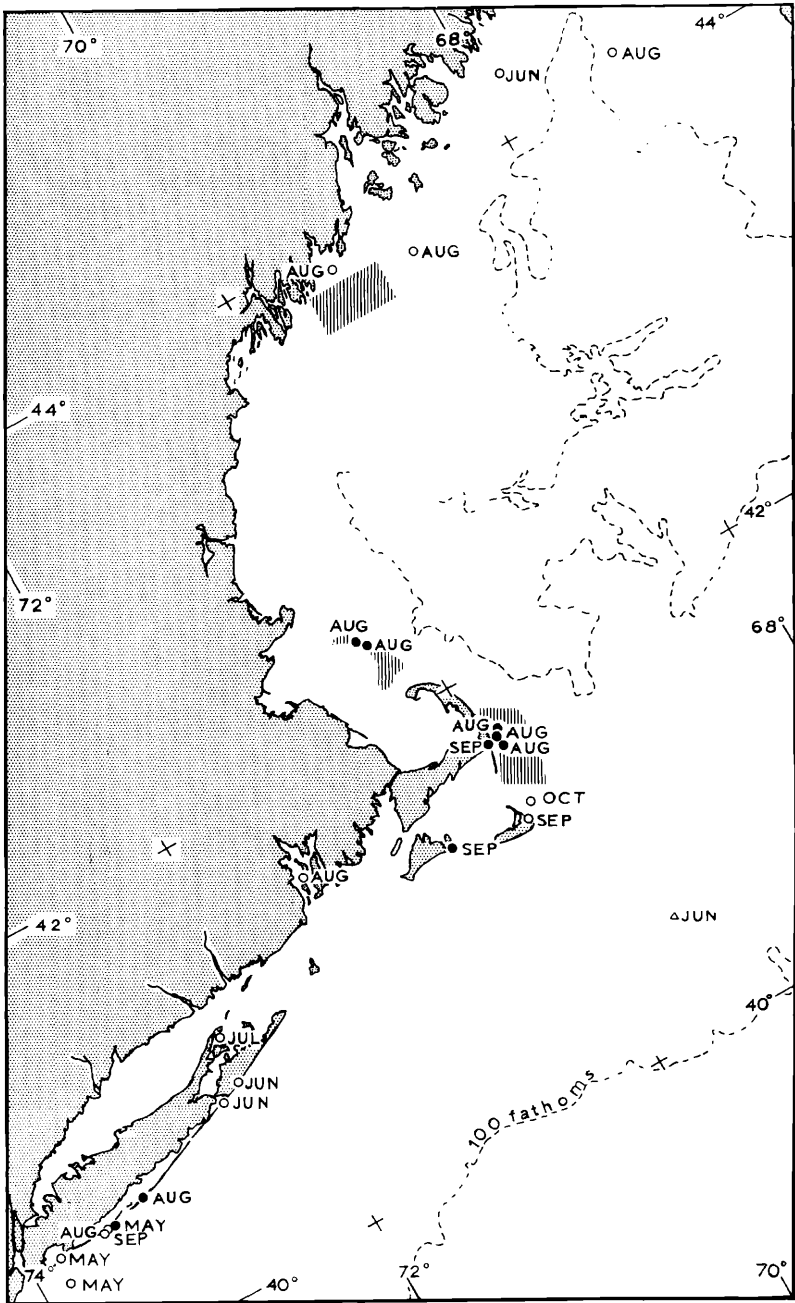


Figure 1. United States records of Manx Shearwaters. Solid circle = specimen record or recognizable photograph; open circle = sight record; vertical shading = areas of frequent observation (from north to south: observations of Mark L. Libby; Stellwagen Bank; waters off Cape Cod). A Florida specimen is not plotted.

complete lack of shearwater observations at sea during winter and early spring is undoubtedly due to the extreme scarcity of observers crossing the Atlantic at that time of year. Thanks to Walter W. Ferguson, the bird artist, however, we have data that indicate Manx Shearwaters are widely dispersed over the North Atlantic during late March. He encountered Manx Shearwaters on 5 of 10 days spent between New York and Gibraltar from the 21st to the 30th of March.

Also probably Manx were two March reports by Bourlière and Nicholson. The observers themselves were unsure of their identifications. Furthermore, at the time the observations were made (1945 and 1946) Manx Shearwaters were believed not to occur on the American side of the Atlantic. Bourlière's account suggests that both these European observers probably expected any small shearwater in the western North Atlantic to be Audubon's.

April-June

I know of only one Manx Shearwater report for April and of only one report for early May; both in the eastern sector of the area.

The lack of April and early May reports along the coast is almost certainly not due to the lack of observers. Manx Shearwaters arrive along the coast during mid-May: 12 May (Maine), 18 May (New Brunswick, specimen), and 24 May (Newfoundland, specimen) are the earliest records. The latter date heralds the start of the spring migration peak within North American waters. Four of the nine Long Island reports fall within the brief period 25 May to 1 June. A bird present on Long Island from 14-20 June also belongs here.

These birds are migrants to the cooler waters of the north. Their dates of occurrence coincide with the peak of another largely offshore, cold water species—the Sooty Shearwater (*P. griseus*)—with which Manx Shearwaters usually associate at this season. With the possible exception of a 19 July record, the remaining Long Island Manx Shearwaters are all well within the fall migration period. This late May movement is reflected by two reports of birds seen well out to sea on the 11th and 24th of May, respectively.

As birds must pass Cape Cod on their way from New York to Maine, it is surprising that there are no spring Massachusetts reports.

The six Manx Shearwater reports from Maine and adjacent Canadian waters suggest that the species may summer there. Actually, these birds were most likely still migrating. Five of them occur during the first half of the month, and "shearwaters work in

an easterly direction early in the season and then move west again in the fall" (Libby, *in litt.*).

A concentration of five oceanic reports, including Newfoundland, during the last 10 days of June apparently represents the completion of the spring migration.

As in most shearwaters the Manx apparently does not breed until it is 5 or 6 years old (Palmer, 1962: 191). As most prebreeders do not return to the breeding colony until they are 3 or 4 years old (Orians, 1958: 83), a considerable number of shearwaters must remain at sea during the breeding season. Judging from the dates of occurrence, the birds that appear along the North American coast must be nonbreeders. These apparently are birds that move north from their South American wintering grounds to summer in the North Atlantic. That the source of the North American birds is originally derived, at least in part, from the European population is shown by the two Newfoundland recoveries of birds banded as young in the British Isles.

The Manx Shearwaters seen along the 60th parallel during June and July probably represent birds from the Iceland colonies.

July-September

Although Manx Shearwaters are still present at sea and off Newfoundland until August they begin moving back inshore during July and remain in Maine waters until the end of September. There are 36 Maine reports scattered from 4 July through the end of September (11 in July, 17 in August, 8 in September). The only Nova Scotia record also falls within this period.

From the waters south of Maine small shearwaters have been reported in early summer seven times. Of these only the Long Island bird was identified positively as a Manx. The small shearwater seen on 27 June at Nantucket Shoals Lightship was too distant to be identified positively and may have been an Audubon's.

Both of the early July Massachusetts records were reported as Audubon's. Photographs of one of these and of the bird reported 28 July appear to be Manx Shearwaters.

From 2 August through the end of September there are at least 14 Massachusetts sight records of Manx Shearwaters (9 in August, 5 in September) and 6 specimens (4 in August, 2 in September), one sight record from Rhode Island, and three records (including one specimen) from New York.

During late summer and fall Manx Shearwaters associate with large numbers of Greater Shearwaters (*P. gravis*) off New England, particularly off Cape Cod and Cape Ann (Stellwagen Bank). These flocks include smaller numbers of Sooty and Cory's (*Calonectris diomedea*) Shearwaters, except north of Cape Cod where the latter warm-water species is extremely rare. Libby has never seen a Cory's Shearwater in Maine waters.

Breeding ends by late August and early September (Lockley, in Bannerman, 1959: 97). This is reflected in the relatively large number of oceanic reports west of 20° W. longitude, but east of

35° W.—except for one report at 43° W.—for September; seven of these ten reports fall in the brief period from the 12th to the 15th.

October-December

By October most birds have left the North Atlantic. R. H. Baker (1947: 252), who spent considerable time in the vicinity of the Azores, found that most Manx Shearwaters “moved south of 35° N. beginning in October.” Although he cruised as far north as 50° N., he saw no shearwaters north of 44° N. latitude during October.

Four Manx Shearwaters were reported seen in October well out to sea within the northwestern North Atlantic, and one was collected in Florida in October. This bird, the only United States Manx Shearwater record south of Long Island, was undoubtedly a migrant enroute to South American waters.

The only November Manx Shearwater report for the entire northwestern North Atlantic is a report of a bird seen with more than 3700 Greater Shearwaters and a Sooty Shearwater at Nauset Beach, Cape Cod.

There are no December records.

REASONS FOR THE CHANGE OF STATUS

Why this sudden increase in the number of Manx Shearwaters reported and collected along the Atlantic coast? Several explanations are possible: 1) birders have increased, have learned to identify the bird, and are watching for it; 2) the Manx Shearwater population has increased and is overflowing into the area under discussion; 3) climatic changes have affected the pelagic environment; 4) a combination of these.

The question always arises as to whether such increases represent an actual change of status or simply reflect an increased number of observers. The evidence suggests that the former is probably the case. Starting in 1929 the late Ludlow Griscom made 57 pelagic trips out of Chatham and more than 20 out of Gloucester, currently the two best known areas for finding the species. Though not all his trips were at the appropriate time of year, he did not observe a Manx Shearwater until 1953. The sudden increase of sight records, as well as specimens and banding recoveries, from the Northeastern States and Maritime Provinces, within a short period of a few years, also seems to suggest an actual change in status.

Although information on population changes of the Manx Shearwater is meager, nothing suggests any wide fluctuations in the population within historic times. Recent increases on Skokholm as a result of protection are probably not sufficient to be of any importance. The northern Scottish colonies, located on inaccessible cliffs and mountain tops, have always been relatively unmolested. A recent estimate by Bourne (1957a: 25) gives the number of breeding Manx Shearwaters in the Inner Hebrides as in “the order of hundreds of thousands.” What is probably the largest colony,

on the island of Rhum (Inner Hebrides), has been virtually undisturbed since the human population was forced to emigrate in the mid-19th century.

Pelagic birds are extremely specialized in their feeding habits, and are thus generally restricted to particular zones of surface water (Bourne in Palmer, 1962: 114; Bourne, 1963). It is now well established that climates have changed over the oceans as well as over the land (for a recent review see Vergard, 1963). Although sea (and air) temperatures of the North Atlantic have increased noticeably during the present century, these fluctuations have varied considerably over the area (Brown, 1963: 122). Rodewald (1963) has shown that the surface water temperatures along the Canadian coast, during the late 1940's and 1950's were climatically the warmest on record since 1874. Sea-surface temperatures for the decade 1951-60 started with the warmest years ever recorded in that area. This trend was fairly wide spread, recorded simultaneously by an oceanic weather ship some 1,000 miles east of Nova Scotia and in coastal surface waters off Eastport, Maine, New York City, and Atlantic City, New Jersey, but only to a slight degree at Baltimore, Maryland, and Charleston, South Carolina. This extreme warming had no parallel along the Atlantic coast of Europe.

Salomonsen (1948) has related the occurrence and distribution of a number of avian species, including some seabirds, in Greenland, Iceland, the Faroes, and Denmark to climatic changes. In this connection it seems more than a coincidence that the two Greenland records of Manx Shearwaters occurred during periods of climatic amelioration, and that the only two definite North American records of *P. assimilis* occurred during periods when the Manx Shearwater went unrecorded.

AUDUBON'S SHEARWATER

The nominate subspecies of Audubon's Shearwater (*Puffinus lherminieri lherminieri*) breeds on Bermuda and virtually throughout the West Indies (A.O.U. Check-list, 1957). It is rare on Bermuda with only two and three breeding pairs in 1956 and 1959, respectively (Wingate in Palmer, 1962: 200).

In contrast to the Manx Shearwater, Audubon's Shearwater is a warm water species (all the reports of Manx Shearwaters in the warm waters of the Gulf Stream are during the species' migration period), is more pelagic, and though it disperses widely, evidently has no regular migration as such. The records also suggest that in the cooler waters along the northeast coast of the United States it is a vagrant, chiefly after storms.

None of the early writers mention Audubon's Shearwater as occurring north of New York. Audubon (1839: 339) recorded it as being abundant in the Gulf Stream as far north as Georgia, and added that "some wander as far as Long Island," having seen the species himself off Sandy Hook, Monmouth Co., New Jersey. Giraud (1844: 370) also considered Audubon's Shearwater a "straggler" to Long Island, New York.

TABLE 2. AUDUBON'S SHEARWATER RECORDS FROM THE NORTH ATLANTIC NORTH OF 37° N. LATITUDE*

*Data is complete through 1964. Some more recent information is included. This table is keyed to follow the discussion of seasonal movements. Abbreviations used are: AMNH, American Museum of Natural History; ANSP, Academy of Natural Sciences, Philadelphia; BMS, Boston Museum of Science; MCZ, Museum of Comparative Zoology; PMZ, Princeton Museum of Zoology.

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
4 Aug 1960	47°33' N. 56°05' W.	1	E. I. S. Rees	Tuck, <i>in litt.</i>	Hermitage Bay, Newfoundland; seen after a tropical disturbance, see text
21 Aug 1953	"several miles off Cape Onion in the Strait of Belle Isle", Newfoundland	1	L. M. Tuck	Tuck, <i>in litt.</i>	seen after a hurricane, see text
3 Jun 1963	Ocean City, Worcester Co., Maryland	1	S. H. Dyke	Dyke, 1963	seen during a tropical storm
9 Jul 1952	Gardiner's Bay (about ½ mile off Orient Beach) Suffolk Co., N. Y.	9	I. Alperin	Alperin, 1953	although not specifically identified as to species the author gives the impression that he thinks they were Audubon's Shearwaters
14 Jul 1964	"just outside of Newport Harbor", Newport Co., R. I.	1	R. E. Woodruff	<i>Narragansett Nat.</i> , 7(3), 1965	
28 Jul 1951	12 miles northeast of Asbury Park, Monmouth Co., N. J.	1	D. A. Cutler, <i>et al.</i>	Cutler, 1953	
2 Aug 1953	near Tincicum Wildlife Refuge, Delaware Co., Penna.	1	John Mills, Charles Price	Cutler, <i>in litt.</i>	seen flying up the Delaware River
16 Aug 1958	Surf City, Ocean Co., N. J.	1	R. C. Conn	Conn, <i>in litt.</i>	
12 Sep 1960	Island Beach, Ocean Co., N. J.	3	B. Murray, M. Logte	Scott and Cutler, 1961: 20	seen during hurricane "Donna", almost certainly Audubon's Shearwaters
15 Sep 1963	Barneгат Bay, Ocean Co., N. J.	1	W. Russell	Russell, 1963	

TABLE 2. AUDUBON'S SHEARWATER RECORDS FROM THE NORTH ATLANTIC NORTH OF 37° N. LATITUDE (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
18 Sep 1951	"entrance to Point Judith Harbor," Washington Co., R. I.	1	R. C. Clement M. L. Mason	<i>Bull. Aud. Soc. R. I.</i> , 12(4): 4, 1951	
"early Oct" 1900	Virginia Beach, Princess Anne Co., Va.	"several"	W. C. Rives	Rives, 1901	
18 Jul 1952	Brigantine, Atlantic Co., N. J.	1	E. Finkle	Cutler, <i>in litt.</i>	found dead; wings and feet in the possession of Cutler
23 Jul 1953	Stone Harbor, Cape May Co., N. J.	1	N. C. Wyckoff, F. VanSant	Cutler, <i>in litt.</i>	found dead after a storm, wings and feet in the possession of Cutler, identified by J. Bond
24 Jul 1938	Long Beach, Nassau Co., N. Y.	1	R. Lind, R. Rorden	Lind, 1939	near Point Lookout, found dead "after an extremely rainy week accompanied by southerly winds," AMNH skeletal collection no. 4110. The date on the label is given as 25 July.
27 Jul 1938	Little Compton, Newport Co., R. I.	1	David L. Emerson	Hathaway, 1943; <i>Bull. Aud. Soc. R. I.</i> , 12(4): 4, Oct. 1951; Bonney, <i>in litt.</i> Garrey, <i>in litt.</i>	found dead, BMS no. 18797, references not seen, quoted by Woodruff, <i>in litt.</i>
28 Jul 1964	Woods Hole, Barnstable Co., Mass.	1	J. Tee Van	Post, 1964	"found alive as it landed in front of the house, by my dad and J. Tee Van, after several days of strong southeast winds" MCZ no. 285856
31 Jul 1951	Dix Hills, Suffolk Co., N. Y.	1	E. H. Costich	Post, 1964	found dead, formerly in the Tackapausha Museum; now AMNH skeletal collection no. 6590
1 Aug 1887	Great South Bay, Suffolk Co., N. Y.	1	Capt. J. Ketcham	Dutcher, 1888	captured alive opposite Bellport AMNH no. 64714
2 Aug 1926	Cape May, Cape May Co., N. J.	1	W. Stone	Stone, 1926	captured alive ANSP

TABLE 2. AUDUBON'S SHEARWATER RECORDS FROM THE NORTH ATLANTIC NORTH OF 37° N. LATITUDE (continued)

Date	Locality	No.	Collector or observer(s)	Source	Additional information or remarks
4 Aug 1959	Beach Haven, Ocean Co., N. J.	1	Stanley and Julian Dickerson		found dead AMNH no. 708114
13 Aug 1937	Chilmark, Dukes Co., Mass.	1	Oliney and Francis Minot	Richardson, 1938 Grissom and Snyder, 1955: 23	found dead BMS no. 18775
ca. 14 Aug 1955	Marine Park, Richmond Co., N. Y.	1	C. Redjives	Post, 1964	seen after hurricane "Connie", for a recognizable photograph see reference
20 Aug 1939	Mantoloking, Ocean Co., N. J.	1	R. W. Storer	Storer, 1940	found dead after a southeasterly storm PMZ no. 11893
1 Sep 1893	Cobbs Is., Northampton Co., Va.	1	Capt. C. H. Crumb	Rogers, <i>in litt.</i> Rives, 1901	found dead, apparently the same specimen examined by R. C. Murphy (Murphy, 1936: 685) present whereabouts unknown
4 Sep 1951	Cedar Beach, Suffolk Co., N. Y.	1	E. H. Costich	Post, 1964	found dead Tackapausha Museum skeletal collection
29 Jun 1961	41°25' N. 54°50' W.	1	D. Sonneborn	Sonneborn, <i>in litt.</i>	
29 Jun 1961	41°32' N. 52°50' W.	1	D. Sonneborn	Sonneborn, <i>in litt.</i>	
12 Jul 1957	40°00' N. 56°00' W.	3	R. H. Wiley	Wiley, 1959: 367	"appeared to be small enough for <i>P. herminieri</i> . . . since their flight was not noticed, there is a possibility that they were <i>P. puffinus</i> ."
18 Aug 1958	41°00' N. between 60°00' W. and 61°00' W.	5	R. H. Wiley	Wiley, 1959: 367	
25 Aug 1945	41°00' N. 57°00' W.	1	E. M. Nicholson	Nicholson, 1946: 268	
26 Aug 1945	41°44' N. 51°58' W.	2	E. M. Nicholson	Nicholson, 1946: 268	
11 Sep 1961	37°50' N. 65°00' W.	10	D. Sonneborn	Sonneborn, <i>in litt.</i>	
7 Oct. 1959	40°04' N. 61°30' W.	1	I. C. T. Nisbet	Nisbet, <i>in litt.</i>	
1-4 Jul 1933	see text		W. Sedwitz	Sedwitz, <i>in litt.</i>	see text
late Aug 1955	see text		M. S. Gordon	Gordon, 1955	see text
7 Sep 1961	150 miles SE of Nantucket, Nantucket Co., Mass.	8	D. F. Freeland	Bagg and Emery, 1961: 13	reported as Manx, but probably Audubon's — see text
21 Aug 1964	39°11' N. 72°26' W.	4	W. F. Curtiss	Bourne, <i>in litt.</i>	

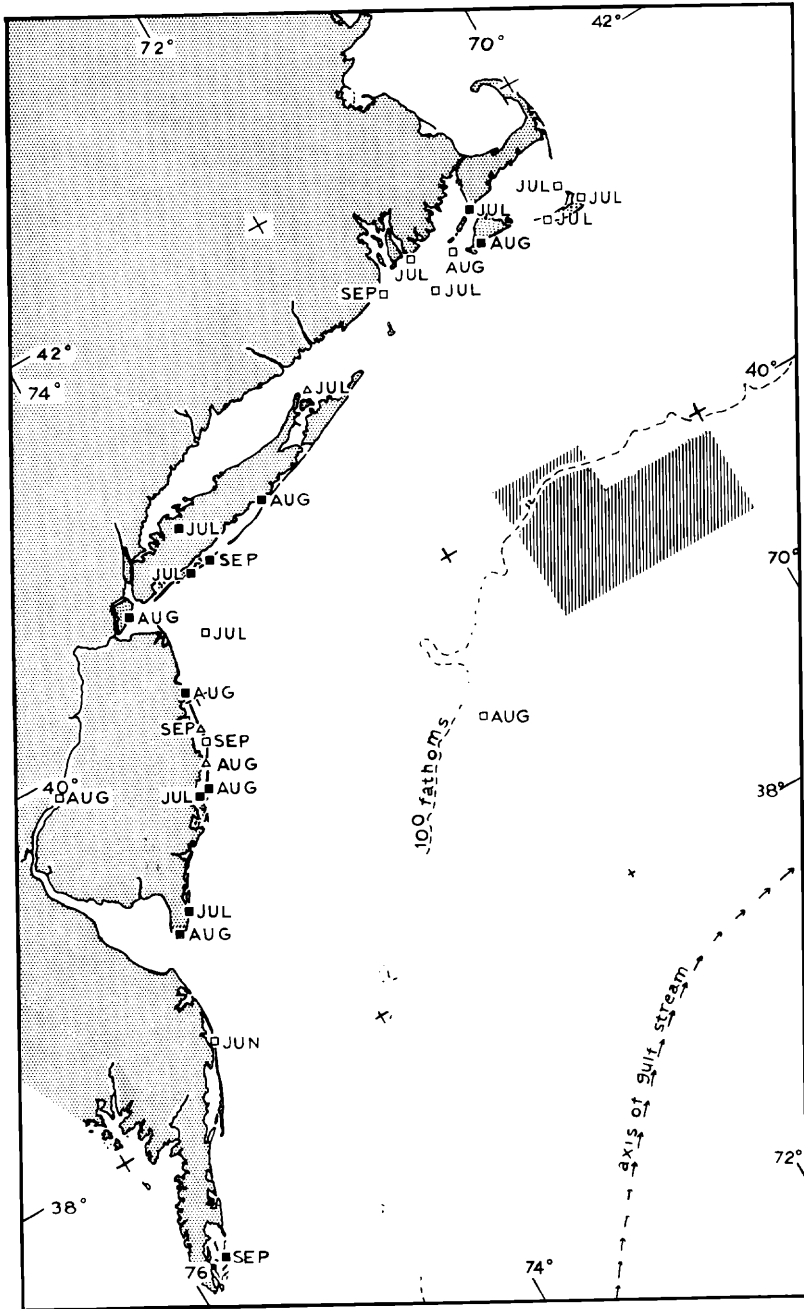


Figure 2. United States records of Audubon's Shearwaters north of 37° N. latitude. Solid square = specimen record or recognizable photograph; open square = sight record; open triangle = sight record reported as probable Audubon's; vertical shading = area of Malcolm Gordon's observations.

Within North American waters the species has never been reported definitely north of southern Massachusetts (table 2). Two reports from Newfoundland may have been Audubon's Shearwaters; though both are from an area of extremely cold water, one was seen shortly after a tropical disturbance and the other after a hurricane. The 21 August bird may have been a Manx Shearwater. Ree's experience with Manx and his description of the size and flight makes it fairly certain that the 4 August bird was either *P. herminieri* or *P. assimilis*. Some points suggest the latter species.

Aside from the one June record of an Audubon's Shearwater from Maryland, sight records along the coast of the northeastern United States north of 37° N. latitude range from 9 July to 15 September and "early" October. The 14 specimen records are distributed from 18 July to 4 September; 8 are in the brief period 23 July to 4 August.

Several factors acting in concert are apparently responsible for this distribution:

1) *Post-breeding dispersal*: Outside of the Caribbean the pelagic range of Audubon's Shearwater is poorly known. Along the southern Atlantic coast of the United States the reports are surprisingly few. As in the northeastern states, most records are of birds found dead or dying along the beaches, again, chiefly after storms. With very few exceptions all are restricted to July and August, a distribution very similar to that outlined for the northeastern states. What meager offshore observations exist indicate that very few Audubon's Shearwaters occur off the southeastern United States before breeding has ended and post-breeding dispersal starts in July. I have only been able to locate one April and two May reports from continental waters. The only reports of large numbers of Audubon's Shearwaters come from the North Carolina coast, of more than 100 birds on 25 July (Coles, 1925) and of up to 70 birds within one or two miles of shore on 29-30 July (Rankin, 1952). The first observation followed "several days of wind from the southeast, of almost storm velocity" and accompanied "vast schools of sardines, covering acres, and kept well up on the surface by great numbers of ocean mackerel (*Auxis thazard*)."

Away from the coast all the reports of Audubon's Shearwaters are from the vicinity of the Gulf Stream.

Stommel (1958) has shown that the Gulf Stream is not, as is popularly conceived, an ocean river of warm water, but a narrow band of fast flowing water not significantly different in temperature from the large mass of warm, saline, Sargasso Sea water to the right of its direction of flow. The Gulf Stream acts as a dam that keeps the warm Sargasso Sea from overflowing the cooler northern waters. It also seems to be a barrier against which Audu-

bon's Shearwaters pile up in much the same way western strays pile up along the Atlantic coast in fall. An alternate explanation more in line with known facts is that birds concentrate in the plankton-rich area where convergence of the warm and cold water takes place, i.e., slope water. An examination of fig. 3 shows that most of the records are actually north of the approximate central axis of the Gulf Stream, and lie directly over slope water. This distribution also closely follows the monthly mean sea-surface isotherm of 70° F. (see U.S. Hydrographic Office, 1947).

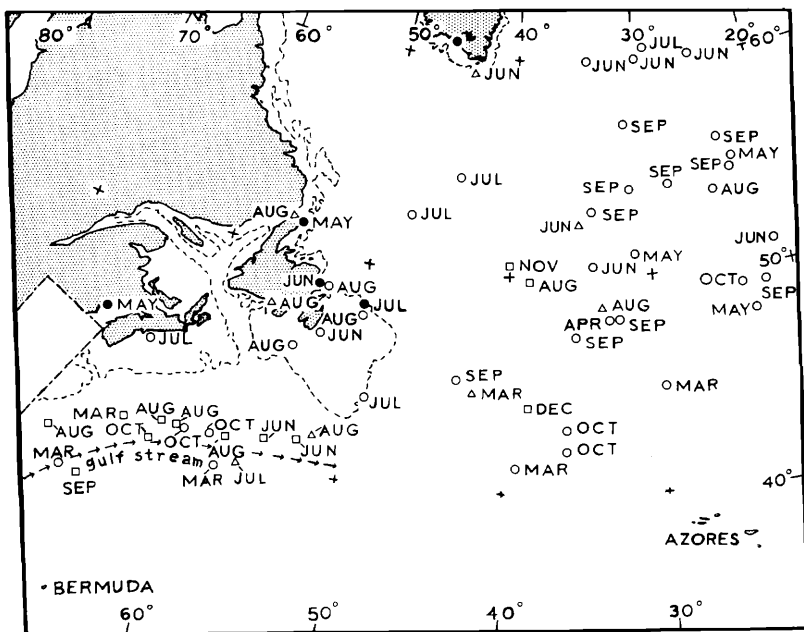
2) *Warming of surface waters during July and August.* North of Cape Hatteras the Gulf Stream curves rather sharply to the north and east until it becomes the North Atlantic Drift at approximately 40°30' N. 50°00' W. The cold surface waters north of the Gulf Stream undergo a marked warming during July and August (Fuglister, 1947). On a trip from 16-18 June 1951 from New York to Havana, Cuba, Grayce (1952: 195) first encountered Audubon's Shearwaters south of Cape Hatteras. On a similar trip from New York to Miami, Florida, from 1-4 July 1933, Walter Sedwitz (*in litt.*) first encountered Audubon's Shearwaters off Virginia. Still farther to the north, in an area about 120 miles south of New England, Gordon (1955) observed what he believed to be Audubon's Shearwaters on 15 occasions between 18 and 26 August 1953 where he had seen none earlier in the season. That "there was no significant change in the surface temperature covering the area during the summer" (p. 142) indicates that surface temperature may not, in itself, be the limiting factor. There was, however, an influx of sargassum weed, as is usual in the area during that time of year.

D. F. Freeland reported 8 *Manx* Shearwaters on 7 September 1961, 150 miles southeast of Nantucket. This location, slightly farther north and east of Gordon's birds, near the edge of the continental shelf, and the number of individuals suggest these birds were really Audubon's Shearwaters. Almost all other *Manx* Shearwaters reports within the northwestern North Atlantic are of single individuals, sometimes two, and very rarely three or four individuals. Audubon's Shearwaters, however, occasionally occur in larger groups.

On 21 August 1964 W. F. Curtis saw four Audubon's Shearwaters near the area of Gordon's 1953 observations, giving excellent details of flight and size. Gordon (*op. cit.*) stressed that the greatest density of pelagic birds occurred near the 100 fathom line. Curtis' observation, likewise, was near the edge of the continental shelf.

3) *Storms:* Most of the Audubon's Shearwaters reported along the Atlantic coast, as already pointed out, are the result of storms. These are at their peak during the summer months, particularly September and August. As we have seen, Audubon's Shearwaters are off the southeastern United States during this time, and they may come regularly within 120 miles of New England during late August.

Figure 3. Oceanic and Canadian records of small "black and white" shearwaters west of 20° W. longitude and north of 37° N. latitude. Solid circle = Manx specimen record or banding recovery; open circle = Manx sight record; open square = Audubon's sight record (a few possibly *P. assimilis*); open triangle = sight record reported uncertain as to species. Manx Shearwaters in the vicinity of the Azores (a major breeding area) are not plotted.



4) *Molt*: After breeding Audubon's Shearwaters go into molt. These birds are probably poor flyers and are thus more susceptible to the influence of storms.

Of all the Audubon's Shearwaters records from the North Atlantic north of 37° N. latitude, one stands apart from all the others: a bird supposedly taken in the British Isles, and included in the British Ornithologists' Union Check-list (1952). For details see Harrison, 1936. The January date is in itself extremely suspicious. At that time of year the species is breeding and there are no definite winter records for the entire North Atlantic north of Bermuda (32°20' N.). As we have seen, the species is restricted to a specific zone of surface water and does not wander as much as is often claimed. No others have been reported within about 2,000 miles of the British Isles. Upon checking further, we find that the bird was taken within the area of the infamous Hastings frauds, and was sent to Mr. G. Bristow, the taxidermist, who was one of its perpetrators. The editors of *British Birds* devoted an entire issue to this disclosure.

Although there is an Audubon's Shearwater in the Gould col-

lection of the British Museum, "the record . . . has never been confirmed and is not accepted currently" (Bannerman, 1959: 109). According to this same author, the specimen labeled in Gould's handwriting reads: "said to have been killed in Devonshire." In addition, Gould himself did not include it in his *Birds of Great Britain*.

Clearly, Audubon's Shearwater should be deleted from the British list.

LITTLE SHEARWATER

Perhaps the most interesting observations are the four shearwater reports from roughly along the 40th meridian.

- 1) 13 Aug 1951 at 48°34' N. 33°38' W. (Denham, *in litt.*)
- 2) 15 Aug 1943 at 49°53' N. 38°43' W. (Rankin & Duffy, 1948: 10)
- 3) 23 Nov 1948 at 50°30' N. 40°00' W. (Grayce, 1950: 34)
- 4) 8 Dec 1943 at 44°07' N. 38°43' W. (Rankin & Duffy, 1948: 10)

All four are in an area of cold surface water, and two of these are in winter.

The experience of Rankin and Duffy with Manx Shearwaters and their description makes it fairly certain that the December bird was either *P. herminieri* or *P. assimilis*. The winter date, the cold surface-water, and the fact that it was "closely compared with a Leach's Petrel (*Oceanodroma leucorhoa*) and noticed to be a 'little larger' than the petrel" seems to indicate *P. assimilis*. The late November date, location, and the cold surface-water makes Grayce's report of an Audubon's Shearwater in company with hundreds of Fulmars doubtful. This report is not too far distant from Rankin and Duffy's August observation of a bird they took for either *P. herminieri* or *P. assimilis*. In addition, there is another report, from the same general area, of a "small shearwater probably Madeiran" (= *P. assimilis*). In short, a new pattern seems to be forming, and although we have no way of being certain, these four reports may be of Little Shearwaters.

Aside from these reports only two other Little Shearwaters have been recorded from the northwestern North Atlantic, both substantiated by specimens, and both belonging to *P. assimilis baroli*, the subspecies that breeds on the Canary Islands, Salvages, Madeira, and the Azores (A.O.U. Check-list, 1957).

- 1) 1 Sep 1896; Sable Island, Nova Scotia, Canada; struck the West End Lighthouse (Dwight, 1897). AMNH no. 407683.
- 2) Aug 1883; Sullivans Island, Charleston Co., South Carolina; found alive after a storm (Peters, 1924); MCZ no. 22051 (Paynter, *in litt.*).

SUMMARY

The Manx Shearwater occurred along the North American coast during the early and middle part of the last century, but subsequently went unrecorded until about 1950. Today the species is a regular visitor off our coast. This apparent change in status is thought to be largely a result of climatic change, although increases in the number of bird watchers may also have been a contributing factor.

The Manx Shearwaters that appear off our coast are nonbreeders. These birds, derived at least in part from the British Isles, apparently winter off South America and move north during late May and early June, following the same pattern as the flocks of Sooty Shearwaters. Manx Shearwaters disperse eastward, possibly to summer on and near the Grand Banks, and move back inshore off New England, as do Greater Shearwaters, during July, August, and September. This migration is traced in detail.

Audubon's Shearwaters occur off our coast chiefly after breeding, during late July, August, and September. Birds follow the Gulf Stream north almost to the North Atlantic Drift. These individuals feed mainly over slope water north of the Gulf Stream. The warming of the surface waters along the coast to the north and west of the Gulf Stream during late summer may regularly bring Audubon's Shearwaters to within 120 miles of New England. These individuals feed mainly along the edge of the continental shelf. Storms seem largely responsible for their appearance along the coast; the birds, being then in molt, are easily storm driven.

The possible occurrence of the Little Shearwater within the northwestern North Atlantic is also discussed.

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ADDENDUM

Since this paper was written a substantial amount of additional data has come to light. Space permits only the most important of this information to be presented here.

Manx Shearwater

Bryan Sage, the British Seabird Group representative aboard *H. M. S. Vidal*, saw three Manx Shearwaters on 24 August 1966 within sight of St. John's, Newfoundland. Five days later, on 29 August, he saw five more "just outside of St. John's," and one at 48°22'N 52°08'W (Sage, *in litt.*) On the later date Pierre Devillers, after having seen some 1650 Manx on the eastern side of the Atlantic a few days before, saw a flock of five Manx, in addition to six individuals, between ca. 47°00'N 52°30'W and 46°15'N 53°00'W, and one within sight of land at ca. 46°00'N 53°30'W (Devillers, *in litt.*). These reports of 17 Manx Shearwaters on the same day, by two experienced observers, in the rarely "birded" offshore zone of the southeast Newfoundland coast, is more than the total number of all previous Canadian reports combined, and is more than the total number of North American reports for any one year! All three North American banding recoveries are from the same area; two resulted from birds being shot by Bonavista Bay fishermen who, according to Leslie Tuck (*vide* Bourne, *in litt.*), know the species well and refer to them as "skirwinks." Clearly indications are that the Manx Shearwater is commoner in these waters than previously realized.

A chick banded on 30 August 1965 (band no. EC 69450) at Skokholm was shot ca. 10 August 1966 in Bonavista Bay, ca. 49°00'N 53°30'W (R. Hudson, *in litt.*). Thus far all three Newfoundland recoveries are of birds in their second autumn, lending support to the hypothesis that North American Manx are non-breeders which had spent the previous winter in the southern hemisphere.

Among recent observations by Mark Libby, off the Maine coast, is the largest flock of Manx Shearwaters thus far reported from North American waters: six, circling over a Finback Whale and a school of Bluefin Tuna on 5 July 1966 at 43°45'N 69°10'W (Libby, *in litt.*).

Investigations by Harris at Skokholm (*Bird Study*, 13: 84-95, 1966) confirms the suspicion that the majority of Manx do not breed until their fifth year. Only one each was found breeding in its third and fourth year, whereas none was found breeding in its first year. "Very few Manx Shearwaters return to European waters until the second year of life when they visit the colonies mainly in June and July. They return to Skokholm slightly earlier in their third year and are present from the start of the fourth year" (p. 93).

A substantial gap in our knowledge of these birds has recently been filled in by David B. Wingate. I am indebted to him for allowing me to use this information which he is preparing to publish in full elsewhere. For several years Wingate has been observing Manx Shearwaters migrating past Bermuda in "substantial" numbers between early February and very early April. Peak numbers occur somewhere between 20 February and 16 March. On 24 February 1966 from a Bermuda headland, for example, he counted 35 birds moving in a northeasterly direction during an hour and a half. He collected one during a similar flight on 3 March 1964. Most important is a distinct gap between the heavy flight ending in April and a smaller but pronounced flight during late May. There can now be little doubt that the early movement consists of *adults* returning to Europe, to breed, from their southern hemisphere wintering grounds. Such an adult, banded as a chick at Skokholm on 4 September 1958 (band no. 3063230), was caught on board a boat 175 miles northeast of Bermuda (ca. 34°00'N 62°30'W) on 23 April 1966 (R. Hudson, *in litt.*). The late May movement ties in exactly with the dates young non-breeders turn up at Skokholm and along the American coast. For a recent analysis of South American recoveries see Thompson (*L'Oiseau*, 35: 130-140, 1965).

James B. Johnson, Jr. (*in litt.*) reports seeing two Manx Shearwaters 33 and 30 miles east of Port Canaveral, Brevard Co., Florida on 11 July 1965 and on 21 July 1959, respectively. On both occasions the birds circled close to the boat allowing the white undertail coverts to be seen.

On the eastern side of the Atlantic an additional report of seven Manx Shearwaters at 57°40'N 26°30'W on 7 September 1966 (Sage, *in litt.*) is within the peak of the fall migration.

Audubon's Shearwater

Additional information on the occurrence of Audubon's Shearwaters off the southeastern United States comes from the unpublished notes of James B. Johnson, Jr. (Johnson, *in litt.*), who spends about 200 days a year fishing offshore, and

has recorded the species annually from 1958 to the present. Except for a bird seen on 13 October 1966 all his observations are restricted to July, August, and September. Bad weather greatly limits the number of trips during the latter two months. In the two years when weather permitted offshore trips during August and September, Audubon's Shearwaters appeared to be most numerous during September.

Johnson has encountered Audubon's Shearwaters on 31 occasions between 1958 and 1966 in an area from 18-38 miles SSE of Port Canaveral, Brevard Co., Florida. He has seen single individuals 21 times, two birds on five occasions, from 5-12 birds four times, and on 13 September 1963, 22 miles east of Port Canaveral, he saw 40-50 individuals.

Little Shearwater

Bourne (*Ibis*, **109**: 152, 1967) documents an apparent late summer movement of Little Shearwaters to the British Isles.

There appears to be no basis for the extreme western extension of the marine range of this species as shown by Palmer (*Handbook of North American Birds*, **1**: 197, 1962).

Ryan reports seeing a possible Little Shearwater about five miles off Jones Beach, Nassau Co., New York on 2 January 1967 (*Kingbird*, **17**: 86, 1967).

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