American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, N. Y. 10024

NUMBER 2262 AUGUST 18, 1966

Bats in Iceland

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There are no well-substantiated records of bats from Iceland prior to 1943. Since then five specimens have been obtained. Although three of these have been reported previously (Gudmundsson, 1943, 1944, 1957; Hayman, 1959; Ryberg, 1947, pp. 49, 50), the fact that all five specimens seemed to represent North American species made it desirable to compare them with material of similar species in both North America and Europe. Because it seems certain that there is no resident bat population, we also discuss the origin of the specimens.

Myotis lucifugus

A single immature male (in alcohol, skull not removed, in the Museum of Natural History, Reykjavik) from Reykjavik, obtained on August 23, 1944, seems definitely referable to this species. Because the genus *Myotis* occurs in both North America and Europe, a careful comparison was made with similar species on both continents. The measurements of the Reykjavik specimen (in alcohol) are as follows: forearm, 33 mm.; tibia, 14 mm.; hind foot (including claws), 9 mm.; ear (from notch), 14 mm. The immaturity of the specimen makes comparison difficult with adult specimens and published measurements of the four northeastern North American species. Nevertheless, identification as *Myotis subulatus* can be

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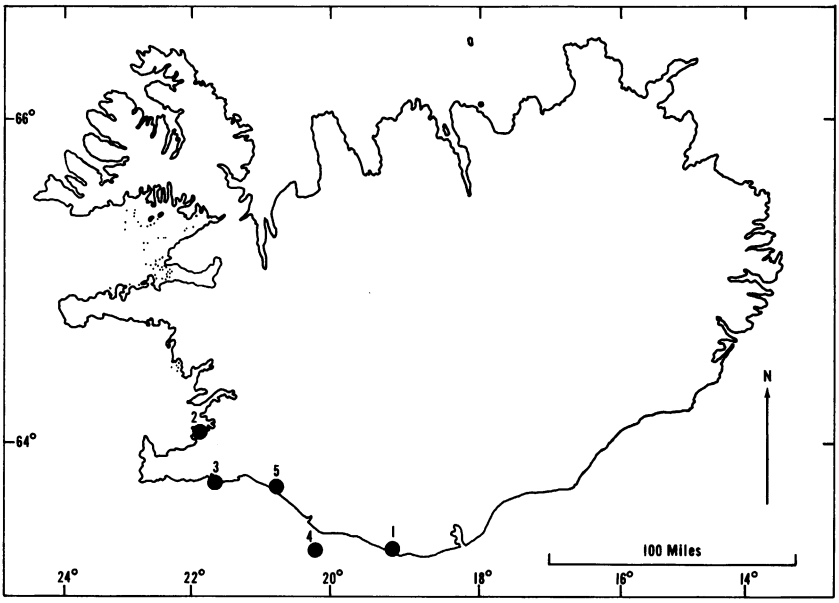

FIG. 1. Map of Iceland, showing the localities mentioned in the text where bats have been found: 1, Hvoll, Mýrdalur, West Skaftafellssýsla; 2, Reykjavik; 3, Bjarnastadir, Selvogur, Árnessýla; 4, Heimaey, Vestmannaeyjar (Westman Islands); and 5, Ragnheidarstadir, Flói, Árnessýla. 2 is the locality for *Myotis lucifugus;* the others are for *Lasiurus cinereus.*

clearly ruled out because of its definitely shorter foot and ear. *Myotis sodalis* has a longer forearm and a post-calcaneal lobe on its interfemoral membrane, which the Reykjavik specimen definitely lacks. The two species remaining for consideration, *Myotis lucifugus* and *Myotis keenii,* are readily distinguished from each other by the longer ears and longer, more slender tragus of the latter. In these characters, the Reykjavik specimen clearly agrees with *M. lucifugus* and indeed shows no characters by which it can be distinguished from *M. lucifugus.*

In northwestern Europe, there are six species of *Myotis.* Of these, *M. myotis, M. dasycneme, M. nattereri,* and *M. bechsteini* all have much longer forearms than has the Reykjavik specimen. The two remaining species, *M. mystacinus* and *M. daubentoni,* differ conspicuously from each other in the size of the hind foot, which is much smaller than that of *M. lucifugus* in *M. mystacinus* and considerably larger than that of *M. lucifugus* in *M. daubentoni.* The Reykjavik bat agrees with *M. lucifugus* in having an intermediate-sized foot, Incidentally, the size of the foot is one of the important characters separating the subgenera *Selysius* (small) and *Leuconoe*

(large), so widely used by European chiroptologists, whereas the intermediate size of the foot in many of the North American species of *Myotis* has caused these subgenera to be little used by North American workers. There seems, therefore, to be little doubt that the Reykjavik specimen is an individual of *M. lucifugus* which somehow reached Iceland from North America.

Such a probability raises certain problems, since *Myotis lucifugus,* unlike *Lasiurus cinereus* (see below), does not make long seasonal migrations, though individuals may travel distances of more than 100 miles between summer roosting sites and suitable hibernation caves (Davis and Hitchcock, 1965). There are also no records from remote oceanic islands or records of outlying accidental occurrences except for one from Texcoco in south-central Mexico (Davis, 1944; Hall and Kelson, 1959). Therefore, while it is possible that a young *Myotis* of the year, on migration from its summer roost to a hibernation cave, was blown to Iceland, this seems much less probable than an alternative assumption that the bat was transported by human agency. In the years 1940 through 1945, during the second World War, there was steady sea traffic from St. John's, Newfoundland, to Reykjavik. Cameron (1958) listed only two species of bats from Newfoundland, one of which is *Myotis lucifugus.* This species frequently roosts in buildings during the summer and on migration (Davis and Hitchcock, 1965). Probably an immature bat making its first fall migration flew aboard a ship at St. John's and was carried to Reykjavik.

Lasiurus cinereus

Four specimens are known from Iceland, and all have been compared with North American material of the species. The first is a female (in alcohol, skull not removed, in the Museum of Natural History, Reykjavik) obtained at Hvoll, Mýrdalur, West Skaftafellssýsla, on October 9, 1943; the second (an unsexed skin and skull, in the Museum of Natural History, Reykjavik) was found at Bjarnastadir, Selvogur, Árnessýsla, on October 8, 1957; the third (an unsexed skin with skull inside, in the local school museum of the Westman Islands) was obtained at Heimaey, Vestmannaeyjar (Westman Islands), on December 9, 1957; the fourth (an unsexed skin, with skull inside, in the private collection of Mr. Olafur Sigurdsson of Vestmannaeyjar) is from Ragnheidarstadir, Flói, Árnessýsla, and was obtained on October 1, 1964. As seen from the map (fig. 1) all these localities are along the southern coast of western Iceland. The forearm lengths of the four specimens range from 51 to 54 mm. The measurements of the single skull are as follows: condylobasal length,

16.9 mm.; zygomatic width, 12.4 mm.; interorbital width, 4.9 mm.; maxillary tooth-row length, 6.2 mm.; and width across last upper molars, 8.6 mm.

Neither on the basis of the measurements nor in any other way can the Icelandic specimens be distinguished from *Lasiurus cinereus cinereus* of North America. Unlike the specimen of *Myotis,* the *Lasiurus* specimens were all obtained from small, remote settlements visited at most by fishing boats. Human transport seems highly unlikely, especially because *Lasiurus cinereus*, unlike *Myotis lucifugus*, is not a house bat but roosts mainly in trees (Allen, 1939, p. 215). Human transport need not be invoked to explain the presence of *Lasiurus cinereus.* This species regularly makes extensive migrations (Findley and Jones, 1964) and has been recorded from several other localities distant from its usual range, including Southhampton Island in northern Canada (Hitchcock, 1943), Bermuda (Van Gelder and Wingate, 1961), and the West Indian island of Hispaniola (Findley and Jones, 1964). The *Lasiurus* of the Hawaiian Islands is now regarded as a subspecies of *L. cinereus* (Sanborn and Crespo, 1957) and must have reached these distant islands across water. There is also a record from the Orkney Islands, north of Scotland (Barrett-Hamilton, 1910–1911). While there has apparently been some confusion of specimens supposedly documenting this record, the original description of the specimen (Wolley, 1850) is clearly the North American *L. c. cinereus* rather than *L. c. semotus* of Hawaii, a specimen of which now bears Wolley's label. Van den Brink (1956) recorded (in German) *Lasiurus cinereus* from "Irland" (=Ireland), but an earlier edition of the same work (Van den Brink, 1955) has the same text (in Dutch) but with Iceland instead of Ireland mentioned, so "Irland" is surely a misprint. We would expect accidental dispersal by winds across the north Atlantic to result in a pattern such as the four records from Iceland and the record from the more distant Orkney Islands. Mr. Jónas Jakobsson of the Meteorological Office in Reykjavik has prepared for us meteorological charts of storm tracks just before each of the October records of 1957 and 1964, and these show winds quite suitable for carrying *Lasiurus* from eastern Canada to Iceland. Mr. Jakobsson also believes that there are no difficulties in interpreting the other two records of October and December as drift migrants. There are numerous records of the occurrence of small North American land birds as drift migrants in Iceland. There are many individuals of *Lasiurus cinereus* in northeastern North America in September and October. Most have left the northeast by December (see Findley and Jones, 1964), but, as shown on their map, a few still remain, a record from Long Island, New York,

being known as late as December 2 (Van Gelder and Wingate, 1961). It therefore seems possible that a bat of this species could still be in the northeastern United States in early December and could be blown to Iceland.

Thus we see that, although additional finds of *Myotis* in Iceland are unlikely, additional *Lasiurus* probably will turn up on the southwestern coast. They should be looked for after southwest storms during the autumn (and perhaps also in the spring), because migration occurs in North America at these times. Possibly the two other migratory bats of northeastern North America, *Lasiurus borealis* and *Lasionycteris noctivagans*, may occur though their smaller size makes them less likely to survive such a long journey. All three species, however, are known from Bermuda (Van Gelder and Wingate, 1961).

There are two possible explanations of why no *Lasiurus* were recorded in Iceland before 1943. First, the increasing human population and better means of communication in recent years may have made bats more likely to have come to the notice of naturalists. Second, the general warming of climates may have caused *Lasiurus* to extend farther north and to remain longer in the north before migrating southward, as has been suggested by Mr. Jakobsson.

We are very grateful to Mr. Thorsteinn Víglundsson and Mr. Olafur Sigurdsson for the loan of specimens of *Lasiurus cinereus*, and to Mr. Jónas Jakobsson of the Meteorological Office in Reykjavik for information on meteorological conditions.

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