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THE MIGRATION OF THE CACKLING GOOSE

WITH THREE ILLUSTRATIONS

By FREDERICK C. LINCOLN

WRITING in 1887, Dr. E. W. Nelson said that *Branta canadensis minima* was "the most common and generally distributed goose found breeding along the Alaskan coast of Bering Sea" (Report upon Natural History Collections Made in Alaska between the Years 1877 and 1881, p. 86). This diminutive *Branta* is essentially a coastal species during the nesting period and is not known at any season to extend the limits of its range far into the interior. The breeding range extends from the westernmost Aleutians (Attu Island) east to the northern shores of the base of the Alaska Peninsula (Bristol Bay and Nushagak River), thence northward along the coast of Alaska to the delta of the Yukon River, to Norton Sound, Kotzebue Sound, and probably to Point Barrow. The two last-named regions are included on the authority of Doctor Nelson (*loc. cit.*), who stated that "they were found in abundance about the head of Kotzebue Sound, and were seen at various points along the Arctic coast to the vicinity of Point Barrow", and of A. M. Bailey (Condor, xxvii, 1925, p. 203), who reports the collection of specimens at Wainwright, near Point Barrow, in July.

It is peculiarly significant that practically no observers report *Branta c. hutchinsi* along the immediate coastal areas, always stating that *hutchinsi* is found farther inland although the actual distance from the coast may be relatively short. Accordingly, while *minima* appears to enjoy its breeding grounds without the admixture of any considerable numbers of a closely related form, it is nevertheless true that its breeding range is met and to a certain degree overlapped by that of the larger form. The writer has no desire to enter into the controversy as to the validity of *hutchinsi* as a subspecies of *Branta canadensis*, but it seems to him that there are perfect conditions for the occasional crossing of *minima* with the more eastern birds, whether they be called *hutchinsi* or *canadensis*. Not only is the breeding range of *minima* restricted to the Aleutian Islands and the coast of Alaska bordering on Bering Sea and the Arctic Ocean, but, as will be noted later, the main winter range is to a still greater extent restricted.

The investigations of Doctor Nelson, recently supplemented by additional work in the Territory, have indicated that the center of abundance for the Cackling Goose is the tundra region of the delta of the Yukon, and it is with the movements of these birds that the present paper is chiefly concerned.

During the spring and summer of 1924 a coöperative expedition, by O. J. Murie, of the Biological Survey, and Herbert W. Brandt, of Cleveland, Ohio, was engaged in extensive ornithological work in the area about the mouth of the Yukon, chiefly in

the vicinity of Hooper Bay. In the course of the season (between July 14 and July 31, 1924) about 250 specimens of *Branta c. minima* were marked with Biological Survey bands. From these, 39 return records are now available. The birds were banded at a point on the north shore near the head of Igiak Bay, at another point a few miles to the east on the Kokechik River, and at a third near the Eskimo village of Kashunuk (see figs. 39 and 40). At the last-named point a "drive" was made, with the help of the natives, which resulted in gathering into a net corral a large number of young birds not yet capable of flight. Fully adult birds rendered helpless by the molting of their primaries also are caught for food by the Eskimos in this same manner, but Mr. Murie told the writer that their 1924 drive included only one or two adults.

Before considering the 39 returns received from these banded birds it will be of interest to refer to their spring arrival and departure as reported by Doctor Nelson and Mr. Murie.

According to Doctor Nelson (*loc. cit.*) the Cackling Geese are the first geese to arrive at St. Michael and at the mouth of the Yukon River, usually making their appearance from April 25 to 30; the fall migration occasionally starts as early as August 20 but usually takes place in September. Mr. Murie states that the birds were later in arriving in 1924, as they were first noted by his party on May 1, when a flock of about one hundred was seen. From then on, there was a gradual infiltration,



Fig. 39. DRIVING CACKLING AND EMPEROR GEESSE TOWARD THE NET AT KASHUNUK SLOUGH, ALASKA, ON JULY 31, 1924.

Photo by O. J. Murie, Biological Survey.

but it was not until May 20 that the geese were actually common. Another flight was observed from June 24 to 26. These were associated with the larger Emperor Geese, and Mr. Murie gave it as his opinion that these late arrivals were yearling birds. From the observations of several students, the Alaska Peninsula and the Aleutian Islands constitute a natural autumn rendezvous for birds preparing to migrate. Luxuriant crops of berries, mostly the crowberry (*Empetrum nigrum*), grow in these places and are largely fed upon by the geese. The birds will remain to feast upon the berries occasionally until the middle of November.

The accompanying map (fig. 41) shows the apparent course pursued by the Cackling Geese from Hooper Bay to their winter feeding grounds. The northernmost recovery of a bird in the southward flight was no. 302058, killed at Moresby

Island, British Columbia, on October 25, 1924. In the light of this single record it might be construed that the flight from the base of the Alaska Peninsula is southeast across the Gulf of Alaska, the birds reaching the coast in the vicinity of the Queen Charlotte Islands; but while such a course would be obviously shorter, it seems more probable that there is a rather close adherence to the coastline. Records of banded birds from this sparsely settled region will always be few, and it would be unwise to draw definite conclusions from isolated reports.

At the time that the bird was killed at Moresby Island, others banded at the same time had already reached the United States, for on October 15, no. 5055 was killed at Copalis Beach, Washington, and no. 303027 at Tule Lake, Modoc County, California, from which it might be concluded that the southward movement of this species, even of birds from a common breeding ground, is not made en masse, but rather as a series of "waves" consisting of small flocks.



Fig. 40. CACKLING AND EMPEROR GEESE IN THE TRAP READY FOR BANDING AT KASHUNUK SLOUGH, ALASKA, JULY 31, 1924.

Photo by O. J. Murie, Biological Survey.

From the data obtained, the flight follows the coastline southward to near the mouth of the Columbia River. No. 302083 was taken at Fort Stevens, Oregon, on October 28; and no. 302092 four and one-half miles south of Hillsboro, Oregon, on October 24, indicating that after reaching the mouth of the Columbia, the direction of flight, at least for a part of the birds, is eastward and follows that stream for a short distance and then continues the north and south line by way of the Willamette River Valley.

No. 303055 was killed two miles east of Tillamook, Oregon, on October 27; this suggests the probability of a further coastwise flight south of the Columbia River for a part of the birds. This supposition is given strength through the recovery of no. 303072, at Evans Creek, within fifteen miles of the Rogue River, Jackson County,

Oregon, on April 30, 1925, a late date for geese to be in that region. The bird was probably then on its way north, for it was evidently not a crippled bird, as it was one of a flock of fifteen.

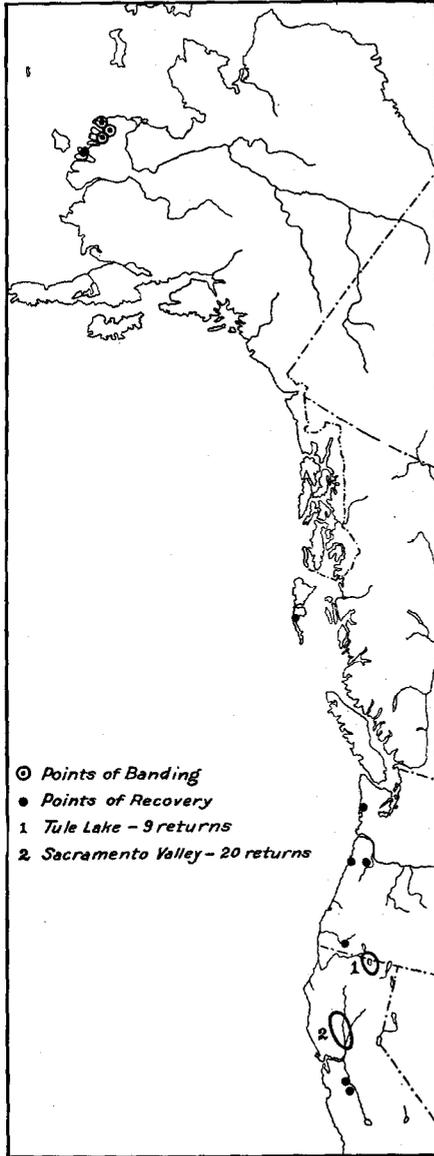


Fig. 41. LOCALITIES FROM WHICH BANDS HAVE BEEN RETURNED THAT WERE ATTACHED TO CACKLING GEESSE IN THE VICINITY OF HOOPER BAY, ALASKA, DURING THE PERIOD JULY 14 TO JULY 31, 1924.

latter case the bird was taken within a relatively short distance of the place where it was banded a year previously.

As shown by the returns received, the winter range of these birds is in the region of Tule Lake (Oregon and California) and in the Sacramento Valley, California. The former area is represented by the records of nine birds taken between October 24 and December 15. The points of capture are well distributed around the shores of the lake. In the Sacramento Valley twenty recoveries have been reported in an area extending from near the city of Sacramento on the south to Willows, Glenn County, on the north. The records are grouped principally in the vicinity of Willows, Williams, Colusa, and Arbuckle, in the western part of the valley, with a few from southwestern Butte County (Biggs), western Yuba County (Marysville), and Sutter County (Sutter and Meridian). The earliest record for this region is that of no. 303022 taken at Willows on October 23. There are six records of recoveries for November, nine for December, and two for January, the latest being for no. 302034, taken at the Orland Gun Club Preserve, in Glenn County, on January 7. All these returns come from a restricted territory not exceeding 75 miles long and 30 miles wide, and this, together with the still smaller area around Tule Lake, forms, if the evidence may be so interpreted, the principal winter range of the Cackling Goose at the present time. Two of the banded birds, killed at Los Baños and Newman on October 19, 1924, and January 4, 1925, respectively, represent the points farthest south. Occasionally, but very rarely, this species has been detected wintering as far south as Ventura and San Diego counties.

The northward flight of the banded birds furnishes no information other than the record previously referred to, from Evans Creek, Oregon, April 30, 1925, and another (no. 303073) killed by a native at Nelson Island, Alaska, on June 1, 1925. In the

In conclusion it is proper to refer to two "short time" returns obtained by Mr. Murie: the remains of the birds that carried nos. 5054 and 5056, banded at Igiak Bay on July 14, and which were found a few hours later at the nest of a Snowy Owl.

United States Bureau of Biological Survey, Washington, D. C., March 20, 1926.

ANGLES AND SPECULATIONS ON MIGRATION

By J. T. NICHOLS

PRIMARILY the line of bird migration is north (in spring) and south (in fall). It does not flow over the entire country as a uniform sheet of moving birds, but gathers in channels which tend to follow coastlines, river valleys, and sometimes ridges of high land. These channels are spoken of as fly-ways or migration routes. There is a main migration route along the ocean shore of Long Island, New York, not north and south but approximately east and west, following the trend of the coast. Such routes may be spoken of as *deflected* routes. Southbound this route joins that down the Hudson valley to continue down the Atlantic coast; and furthermore, northbound, the main Atlantic coast stream, whereas the larger part of it probably follows up the Hudson valley, sends a branch, though less strong than in autumn, eastward along the coast of Long Island. It is the purpose here to call attention to the branching character of migration routes and differentiate between the two types of branching, *afferent* in the first and *efferent* in the second case.

The writer's home lies in central Long Island, sufficiently back from the shore and away from any migration route to give it a minimum number of transient individual birds. Here, during the southward migration just passed, he noticed one morning a considerable number of Myrtle Warblers flying north. He explains this peculiar phenomenon as *distributional* movement away from the concentration in the migration route a few miles to the south. That such distributional movement is sufficiently general to entitle it to a place in the nomenclature of migration is not yet satisfactorily proved, but the probabilities are that it is. It is only reasonable to suppose that a converse *collective*, or *afferent* movement also exists tributary to each migration route and is equally, or more, general.

Here, at this particular point, in central Long Island, as has been said, the number of transient individuals is at a minimum. The Barn Swallow does not breed nearby and one sees but a few each spring, scattered birds flying steadily, slightly north of east in active migration, parallel with the main stream off to the south but too far removed to be in direct touch with it, visual or otherwise. The direction being east rather than north, these birds can not be classified as part of the primitive northward migratory drift. They are entitled to special classification as *parallel* migrants. The accuracy with which they keep the direction of the migration route they are paralleling is one of the details which leads one to question how far the travelers on such a route are dependent on the visual guides which would enable them to follow the same.

Shorebirds migrate very largely by day, and their passage along the aerial highway which follows the south shore of Long Island is therefore readily observable. Southward bound, the direction of flight is from east to west, but a minority of birds of the same species fly from west to east. This leads to an hypothesis that in concluding a migratory journey birds may retrace their course for a short space, perhaps seeking