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THE YELLOW-BILLED LOON: A PROBLEM IN MIGRATION

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THE MIGRATION route of the Yellow-billed Loon (*Gavia adamsi*) is probably the most incomprehensible problem of migration on the North American continent. The species breeds on the Arctic coast from Franklin Bay, just east of the mouth of the Mackenzie River, along the whole of the Arctic coast of Alaska, and on the Siberian side west certainly to the Chukchi Peninsula and probably to the mouth of the Kolyma River.

The only place where the species has been found in numbers during the winter season is on the coast of Norway. Here, on the northwest coast in the neighborhood of Tromso, it was common the winters of 1892-3 and 1893-4, and many specimens were taken from September to January. It also ranged along the whole west coast even to the southern end. In addition it is known in winter in Japan and China and as a rare spring and fall migrant around the Sea of Okhotsk. It is unknown in winter anywhere in the Western Hemisphere and there are no records of its occurrence in this half of the world between November and May. It is known to breed in the Mackenzie Valley along the seacoast, and during the summer visits Great Slave Lake, arriving at the western end in May and being present at the eastern end until late October. It is common here in August and early September, and is still more common on Clinton-Colden and Aylmer lakes. The problem is as to whence come the early May birds and whither go the late fall birds.

Since the species is unknown anywhere in the Western Hemisphere in winter, it follows that the breeding birds of the Mackenzie coast winter somewhere in the Eastern Hemisphere, presumably in Japan and China, though the numbers reported from anywhere in eastern Asia in the winter are very small compared with the multitudes recorded throughout the great extent of the summer home. Apparently the real winter home of the great bulk of the species has not yet been discovered.

But assuming that the winter home is somewhere in eastern Asia, then the birds in spring must go on the Asiatic side to the Arctic Ocean and then eastward

to the Arctic coast of Alaska. The earliest birds were noted at Point Barrow May 15, 1882, and May 25, 1883. But already by this date the species has appeared on the Mackenzie near the mouth of the Liard. By what route do these birds reach their destination? They do not come from the south, for the species is unknown in southern Canada at any time of the year. The nearest part of the Pacific Ocean is to the southwest near Sitka, but the birds do not come by that route, for the birds of this part of the country have been closely watched for several years, and the only spring record of the Yellow-billed Loon is that of a straggler seen on Admiralty Island May 25, 1911.

They do not come up the valley of the Yukon, for this species is not known anywhere in the interior of Alaska. The only possibility left is that they come from the Arctic Ocean to the northward. But all the lakes between Great Slave Lake and the Arctic Ocean are still covered with ice and so is the delta of the Mackenzie River. Thus apparently the only solution of the problem is a migration at a single flight from the open waters of the Arctic Ocean across 700 miles of frozen country to the open water near Great Slave Lake. This supposition also requires that the birds pass Point Barrow off-shore many days before they were noted at that place. Thus the spring route from eastern Asia would be first a 2000 mile trip *northeast* to Bering Strait, then 500 miles still *northeast* to round Point Barrow, then 500 miles east to the coast of Mackenzie, and then finally 700 miles *south*—in the spring—to Great Slave Lake. Truly a most remarkable route, but who will suggest a route more plausible?

The route is apparently reversed in the fall. The species is common on Great Slave Lake until the middle of September, and Sir John Franklin says that near there at Fort Enterprise this species was the last water bird to leave, October 26, 1820. By this time the smaller lakes and streams were closed by the ice, but there would still remain enough open water in the larger lakes and the Mackenzie River for the birds to work their way *north* in the early winter the 700 miles to the open Polar Sea. Then there would still remain a 3000 mile trip to their winter home and they would be passing Point Barrow in November weeks after the last of the birds which nested there had disappeared, for the latest fall date at this place is September 25, 1897. And so this article closes with a reiteration of the opening paragraph: The migration route of the Yellow-billed Loons which visit Great Slave Lake is the most incomprehensible problem of migration on the North American continent.

Washington, D. C., August 18, 1915.

NOTES ON THE NESTING OF THE WHITE-TAILED PTARMIGAN IN COLORADO

By W. C. BRADBURY

WITH FIVE PHOTOS

ON MAY 7th of this year (1915) I sent out a party of four young men, with team, camera, camping outfit and equipment, for the purpose of collecting the rarer varieties of eggs and birds nesting at high altitudes, this in the interests of the Colorado Museum of Natural History, Denver. Commencing at the foot-hills near Morrison, Colorado (altitude 5750 feet above sea-