

from Vera Cruz, Mexico. It is highly improbable that this bird crossed from the Pacific Coast over the elevated, mountainous, semi-arid Mexican plateau with its evidently scanty food supply and infrequent resting places for such birds. Two other possible routes suggest themselves at once. Some birds may depart from the main route in Utah and move southeast into the Rio Grande Valley, or a part of the group breeding on Yellowstone Lake may follow a route, as yet unmarked, which would bring them into the Missouri Valley and ultimately onto the Gulf Coast. One good observer in the Park told me that some birds approach and leave the Lake from the north along the Yellowstone River. This may mean a migration route via the Missouri.

Both in 1923 and in 1924 the pelicans approached the Lake directly from the south, having been reported at Jackson Lake about May 1. In 1923 the only birds reported stopped a while on Polecat Creek, a good fish stream tributary to the Snake River and about three miles west of the latter in the Park. In 1924 some birds were on the Upper Yellowstone River on May 10, and a group of about 40 was reported from West Yellowstone on May 4. These records conform to the view that the birds approach the lake in the spring by two diverse routes, one up the Snake River and the other from the westward along the route followed in migrating south in the fall. They do not enter the lake until the ice disappears, about June 1, or earlier in some years. Further evidences of the movements of these birds will be awaited with great interest.

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## VIGOR, DISTRIBUTION, AND PIGMENTATION OF THE EGG

By CHARLES K. AVERILL

IN Chapman's *Handbook of Birds of Eastern North America* it is stated (revised edition, 1912, p. 79) that "fully adult, vigorous birds probably lay larger and more heavily pigmented eggs and more of them than their younger or weaker fellows." Without considering the origin of this belief it seems possible to put it to test as far as pigmentation is concerned by applying it to seasonal migration; for those birds that have acquired breeding ranges well to the north and are forced to make long migrations would be likely to have more vigor than non-migrants or those making short migrations, and would have eggs with more pigment.

A little reflection shows that the distance traveled in their annual journeys is not the only factor to be considered. Not only would the most vigorous push farthest north but they would spread out east and west. We may best express what the statistics will show by saying that pigmentation is related to distribution. It will be seen that in birds of the same family or genus, in a large number of cases the egg with the least pigment belongs to the bird with the restricted range. Since western North American birds have shorter migrations than eastern, and southern birds shorter than northern, it will be seen that the great majority of paler or whiter eggs in the following statistics will be found in the southwestern United States, a region where migration is at a minimum among North American birds.

A number of families of birds have nothing but unpigmented eggs, as swifts, kingfishers, woodpeckers, owls and hummingbirds, and are therefore not available

for our study. Still others of strong flight that wander over wide areas, as swallows, terns, gulls, plovers, sandpipers and a host of sea-fowl, present no cases of very restricted ranges, or if they do are closely related to forms of wide distribution. The majority of examples are from passerine birds.

Of the three decidedly distinct species of North American ptarmigans, one is circumpolar, one breeds in the Arctic regions from Alaska to Ungava, the third is restricted to the mountains of the west. The first two are noted for the most heavily pigmented eggs of all our birds; but the eggs of the White-tailed Ptarmigan, quoting from Coues "is very different, minutely dotted over the whole surface with burnt sienna, few of the markings exceeding a pin's head in size and not thick enough to obscure the ground color." According to Coues the eggs of the Dusky Grouse are "less heavily colored than those of the Spruce Grouse." The second, including its subspecies, extends its range from New Brunswick to Alaska, while the first is a bird of the western mountains.

In the goatsucker family the Nighthawk and all its genus have strongly marked eggs. According to Reed the Western Nighthawk has lighter colored eggs. The Chuck-will's-widow and the Whip-poor-will have well spotted eggs, but those of the Stephens Whip-poor-will of Arizona and New Mexico are nearly immaculate. The Poor-will of the west and all its genus have white or creamy, nearly or quite unmarked, eggs. In the goatsucker family it is seen that the unmarked eggs are of the west and southwest.

Among diurnal birds of prey occur in *Buteo*, *Accipiter*, and some other genera, eggs either unmarked or marked, but the falcons, famed for their dash, speed and spirit have only marked eggs and these are usually dark colored and handsome. Baird, Brewer and Ridgway note that the Cuban Sparrow Hawk's eggs are much lighter in color and less marked than the North American bird's. The Golden Eagle soaring over two continents has marked eggs, but the emblem of our great republic, confined to one continent, therefore with less vigor, has white unmarked eggs.

Among the vireos the only white egg belongs to the Black-capped Vireo of Texas and Mexico.

Coming to the warblers: In the genus *Vermivora*, the most southerly ranging, the Bachman Warbler, lays a pure white egg; the Blue-winged, more northerly, lays an egg sometimes unmarked; the Golden-winged Warbler's is always marked; the Nashville's is well spotted and speckled; the Orange-crowned's egg is speckled chiefly at the larger end; while that of the Tennessee is sometimes speckled all over and has large spots in addition. Here is a somewhat regular increase in pigmentation as the range becomes more northerly. The Virginia's of the southern Rocky Mountains and the Lucy's of the southwest are wreathed with spots at the larger end.

Another white egg is contributed by the Swainson Warbler of the southern states.

The genus *Dendroica* has no white unmarked egg, but those of the Blackpoll, Bay-breasted, Yellow and Blackburn appear to be more heavily marked than the others. According to Chapman the Yellow Warbler's is "thickly marked with cinnamon and olive brown," the Blackpoll's "speckled and generally heavily blotched at the larger end," the Blackburn's "spotted, speckled and blotched with cinnamon-brown and olive," the Bay-breasted's "finely marked chiefly at the larger end;" but Reed notes the Bay-breasted's as heavily blotched, and Coues' Key to North American Birds says they are "profusely spotted." These four birds do not breed south of the Canadian Zone and they reach South America in winter, thus being the long-distance travelers of the genus. Another, the Cerulean Warbler, has eggs decidedly well marked. This bird although southerly in distribution migrates well into the tropics—Panama to Peru in winter—and therefore comes into the same category as the Worm-eating and

Prothonotary warblers which although of southerly breeding range migrate to the tropics and have strongly marked eggs. The second winters from Nicaragua to Colombia, the first winters from Chiapas to Panama.

In the finch family the eggs of the Lapland Longspur are heavily marked. According to Reed those of the Smith Longspur are paler and we may infer from Maynard that the Chestnut-collared's and McCown's are also less marked, as he says "the abundant markings (of Lapland Longspur's) are characteristic." Of the juncos the one unmarked egg is that of the Arizona Junco, whose name indicates its limited distribution. *Spizella* has bluish eggs all marked save that of the Black-chinned Sparrow of Mexico and the southwest border of the United States. *Amphispiza*, a southwestern genus, contributes one bluish-white unmarked egg (Maynard and Davie). The genus *Peucaea* with several species of the south and southwest has nothing but unmarked white eggs. Among the several species of goldfinches, the one white egg is contributed by the Lawrence Goldfinch, breeding in California, the rest of the genus having bluish tinted eggs.

Evidently from the description of towhees' eggs the Arctic Towhee's is the most heavily marked. "Some specimens are so densely marked that the ground color is hardly distinguishable" (Davie). According to Davie both the House Finch of the west and the Guadalupe House Finch of Guadalupe Island frequently have unspotted eggs, the eggs of the Purple, and California and Cassin Purple finches being spotted.

The only northerly birds of this family to lay a white unmarked egg are the Rosy Finches. Here the distribution is limited to the northwest, and the migrations do not extend far south. No doubt the principle that birds breeding in holes and crevices tend to lay unpigmented eggs has an influence here since these birds nest in crevices in rocks.

Among the titmice, the Mountain Chickadee of the western mountains and the Bridled Tit of the southwest furnish the only unspotted eggs.

The bush-tits, a family of the far west and southwest, contribute only white unmarked eggs.

The family Icteridæ, with its numerous orioles, blackbirds and grackles, has but one unmarked egg of a "pale bluish green" (Davie). As usual this is laid by a bird of the southwest, *Callothrus robustus*, the Red-eyed Cowbird.

The numerous thrashers have but one unmarked egg, that of the Crissal Thrasher of the southwest.

We may conclude our statistics with the thrushes. The Hermit, Wilson and Song thrushes have tinted but unspotted eggs. The Olive-backed, Gray-checked and their allied races have well spotted eggs, and their breeding range extends into the Hudsonian Zone.

Since the form of the egg is also an indication of vigor (see Condor, xxv, p. 163) it follows that in most cases the more heavily marked egg is more elongate. Thus the eggs of the Blackpoll, Bay-breasted, Yellow and Blackburn, the most heavily marked in *Dendroica*, are also most elongate. The numerous white eggs laid by the southerly and southwesterly finches are much less elongate than the northerly breeding finches, as figures before me show. The same is true of the egg of the Black-capped Vireo, and again it is seen in the thrushes mentioned above. The egg of the Nighthawk is the most elongate of its family, as it is also the most heavily marked. The data for extending this line of research satisfactorily are lacking, however, as not enough of the eggs under consideration have been measured.

Another correlation is that of length of wing and pigmentation, for since the longer winged make the longer migrations, it follows that the egg with the more pig-

ment is generally laid by the longer winged bird. This can be made out by taking the wing lengths from Ridgway, when it will be found that the more heavily marked eggs alluded to above are laid by the longer winged. But in most cases no measurements are necessary; for the southerly and southwesterly birds we have been dealing with are so much shorter winged that they can be distinguished at a glance. The wing is of the rounded form which indicates a bird of inferior power of flight. The members of the vireo family and of the finch family that are confined to the southwest are of this round winged form. So, too, we can mark the long wing of the falcon and of the nighthawk and be sure these birds have pigmented eggs in a more marked degree than their fellows.

*Bridgeport, Connecticut, February 23, 1924.*

## THE COMMON LOON IN ALBERTA

(WITH TWO PHOTOS)

By A. D. HENDERSON

**T**HE Common Loon (*Gavia immer*) is a rather common summer resident on the numerous small lakes in the vicinity of Belvedere, Alberta. It is a solitary species, one pair of birds only breeding on the small lake chosen for the site of the nest. A pair of Loons will return year after year to the same lake to nest, even though its eggs are repeatedly taken. On other lakes in the vicinity, apparently quite as suitable, they appear during the breeding season only as visitors.



Fig. 43. NEST OF COMMON LOON NEAR BELVEDERE, ALBERTA, MAY 28, 1923.