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THE SPECIFIC STATUS OF THE GREATER SNOW GOOSE

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THERE always has been considerable uncertainty among ornithologists regarding the distribution and migration routes, as well as the specific status, of our American snow geese, and this uncertainty seems to have continued until 1925, when A. C. Bent described the distribution and migration routes of these two birds as he and I had together worked them out.[1]

Briefly, investigation proved that the distributions of the two are entirely distinct. The breeding range of the lesser snow goose extends across Arctic America, from Baffin Land to Point Barrow, and to northeastern Siberia; while the greater snow goose probably breeds only in northwestern Greenland and adjacent lands.

The winter range of the lesser snow goose, while a few birds may straggle east to the Atlantic, lies generally to the west of the Mississippi River, reaching, on the south, from Louisiana and Texas, where the birds winter in huge flocks, across to California, where again large numbers are to be found, and, we are told, along the Asiatic coast south to Japan. The

[1] Life Histories of North American Wild Fowl. Bulletin 130, United States National Museum.

greater snow goose, on the other hand, seems to winter only in the East, along the Atlantic coast of Maryland, Virginia and North Carolina.

While the lesser snow geese of the Northwest may migrate either down the Mississippi Valley or across to the Pacific Coast and California, the migration route of the more easterly breeding birds is down Hudson Bay and James Bay, where they occur during the fall in countless thousands, often in company with blue geese, and then down the Mississippi Valley to the Gulf of Mexico, returning in the spring by the same route. The greater snow geese, however, all the evidence shows, seem never to visit Hudson Bay, except perhaps as stragglers, but migrate directly south from their breeding grounds, apparently along the easterly side of Baffin Land, across Hudson Straits, and down the length of the Ungava Peninsula to the St. Lawrence River, where they rest for a while, going from there directly south, flying high, to their winter range, and return the same way in the spring.

While sportsmen and gunners along the Gulf Coast will tell you that both greater and lesser snow geese occur there, often in the same flock, these birds are all of them the lesser, which may vary a great deal in size. The writer has spent parts of two winters collecting along the Louisiana and Texas shores, and has had at other times the services of two professional collectors there, one of them for three years; but among the many thousands of snow geese assembled there, even the biggest always turned out to be the lesser, and no greater snow geese ever were discovered.

In all the many collections I have examined, both public and private, I never have seen a single specimen from the Gulf Coast, the Mississippi Valley, or anywhere in the Middle West, that was referable to the larger form. There is in the collection of the United States National Museum one ancient skin of an immature greater snow goose, labelled "Hudson Bay," but about which nothing further seems to be known. This bird may have been a straggler, collected somewhere in Hudson

Bay, or may have come from Hudson Straits, across which these birds migrate in the spring and fall.

Repeatedly specimens from the Hudson Bay Country and the Northwest, submitted to me as greater snow geese, have proved to be the lesser, and one lot, from James Bay, which the collector believed to be the greater, were not only the lesser, but were small ones at that.

It has been known for many years that a flock of four or five thousand greater snow geese wintered on the coast of Maryland, Virginia and North Carolina, and that an occasional straggler was taken during migration along the coast of the more northern Atlantic States, but the ornithologists of this Country seem not to have known where they came from until comparatively recently, when they learned[1]—what certain local sportsmen along the St. Lawrence River had known for generations—that a flock of about the same numbers spent some time every spring and autumn along the shores of the St. Lawrence River, between St. Joachim, just below Ste. Anne de Beaupré, and La Batture Island, about twenty-five miles farther down the river.

I have not ascertained definitely the southern limit of the breeding range of the greater snow goose, but there seem to be only a few thousand of these birds in existence, and I think their breeding grounds will be found to be comparatively restricted and probably too far to the north to touch the more extended range of the lesser snow goose.

Every year or so perhaps one blue goose (and once, I believe, there were two) is seen among the flock of greater snow geese along the St. Lawrence, and it seems reasonable to infer that lesser snow geese, wandering stragglers, probably similarly occur, picked up accidently by the greater in their migration south; but neither blue geese nor lesser snow geese in any numbers ever seem to occur with the greater.

The following measurements, taken from a large series, seem to show conclusively that the two birds are quite different, and even these do not show how very different they

[1] Les Oiseaux de la Province de Quebec, 1906, by C. E. Dionne.

really are. The greater snow goose is, apart from ordinary measurements, a much stockier and more heavily built bird, with a much larger head and bill, thicker neck and tarsi, and stouter body; and the plumage, while similar to that of the smaller bird, appears to be longer and thicker, with the collar striations consequently more conspicuous. Measurements of length, extent, wing and tail, being difficult to obtain with absolute accuracy, are given at the nearest 5 mm., while the finer measurements are given at the nearest half millimeter. The measurement for exposed culmen is the chord measured by dividers; while the depth of bill is the perpendicular at junction of forehead and culmen. The weights are in grams, other measurements in millimeters.

MEASUREMENTS OF LESSER SNOW GOOSE

	Weight	Length	Extent	Wing	Tarsus	Middle toe and claw	Exposed culmen	Depth of bill	Tail
Adult males									
No. of skins	17	12	4	45	35	34	45	31	34
Minimum	1815	720	1515	395	78	69	51	32.0	115
Maximum	2835	775	1545	460	91	85	62	36.5	165
Average	2425	750	1535	430	84	75	58	33.5	130
Adult females									
No. of skins	11	14	2	43	37	35	40	33	37
Minimum	1785	655	1415	380	75	65.0	50	28	115
Maximum	2720	750	1485	440	89	89.0	61	38	165
Average	2210	700	1450	420	82	74.5	56	33	130
Immature males									
No. of skins	1	5	1	24	24	24	24	21	23
Minimum		695		380	74	60.0	50.0	28.0	105
Maximum		750		430	92	83.5	61.0	37.0	165
Average	1900	715	1375	410	83	75.5	56.5	32.5	120
Immature females									
No. of skins	2	3	1	22	22	22	22	22	22
Minimum	1900	650		385	77	65	50	28	110
Maximum	2720	710		420	88	80	62	35	125
Average	2310	685	1355	405	82	72	55	31	120

MEASUREMENTS OF GREATER SNOW GOOSE

	Weight	Length	Extent	Wing	Tarsus	Middle toe and claw	Exposed culmen	Depth of bill	Tail
Adult males									
No. of skins	13	13	12	20	20	20	20	20	20
Minimum	3175	790	1475	430	86	75.0	59	34	135
Maximum	4735	840	1620	485	97	95.0	73	44	160
Average	3626	815	1555	450	92	83.5	67	38	140
Adult females									
No. of skins	5	5	5	10	10	10	10	10	10
Minimum	2835	750	1350	425	80.0	75	57.0	33	130
Maximum	3175	800	1595	475	91.5	83	68.0	38	150
Average	3065	780	1490	445	85.5	79	62.5	36	140
Immature males									
No. of skins	4	4	3	8	8	8	8	8	8
Minimum	2835	750	1450	420	84	78	62	35.0	120
Maximum	4420	805	1555	440	91	85	69	38.0	140
Average	3375	785	1515	430	88	80	65	36.5	130
Immature females									
No. of skins	9	9	9	15	15	14	15	15	15
Minimum	2440	715	1390	390	71.0	70.0	58	33	110
Maximum	3970	775	1525	445	89.0	85.0	69	39	130
Average	2720	740	1450	425	83.5	77.5	63	36	120

The measurements above, of weight, length and extent, are comparatively few in number, owing to the difficulty of obtaining from collectors and sportsmen such measurements, made in the flesh, of birds that later were sexed and saved as specimens. I have the weights of many unsexed birds not here recorded. Roughly speaking, and for the benefit of those unaccustomed to the metric weights, while adult lesser snow geese weigh generally from four to six and a quarter pounds, avoirdupois, males averaging less than five and a half pounds, the adult greater snow geese weigh from six to ten and a half pounds, males averaging eight pounds, and even the immature greater snow geese are usually considerably larger than the

largest of the lesser; though some measurements of the two forms may overlap. I had once an immature greater snow goose in captivity that weighed eight pounds when ten months old, while the largest adult lesser which I ever have known, weighed but six and a quarter pounds, although I have a record of one taken by Hamilton M. Laing on the Athabaska Delta in September, 1920, that weighed, with a spring balance, six and three quarters pounds.

It will be noted that among the measurements of the lesser snow geese, the maximum tail measurements of the adult males, females, and immature males, 165 mm. each, are larger than the maximum of the greater snow geese. These measurements were from birds taken by Dr. R. M. Anderson, along the Arctic coast, early in June, and are much larger than others collected elsewhere at any other season, and there are no specimens of greater snow geese taken at the same season with which they can be compared. Excluding these, the maximum tail measurements of the lesser snow geese should read as follows: adult male 140 mm., adult female 140 mm., immature male 125 mm., and the average measurements of each of these three should consequently be a trifle less.

The tarsus of the downy young of the lesser snow goose is black, and it seems to hold its color very well in dried specimens. In contrast with this is a skin of a downy young of the greater snow goose, collected by Langdon Gibson, of Peary's North Greenland Expedition, in Five-Glacier Valley in northwestern Greenland, on July 10, 1892, and sent me by Dr. Witmer Stone in 1923. Its tarsus was a 'mummy brown' in color, and, despite the age of the specimen, never could have been black.

On June 3, 1924, there were hatched in the National Zoological Park, at Washington, two young greater snow geese, and on June 4 Ned Hollister wrote me:

"We have just telegraphed you of the death of the two young greater snow geese. They seemed fine strong birds when the parents brought them off yesterday and I suspect from their condition that they were

killed by some of the other birds, probably the Canada geese. One of them had been mutilated beyond saving, but one was rescued and sent to the Museum for preservation as a skin.

"I made notes on colors of soft parts yesterday when the birds were only two hours from the nest, and have checked them up with the dead birds this afternoon.

"Legs and feet, including webs, were exactly the 'dark citrine' of Ridgway, except that all down the front of tarsus and extending along top of all toes and into a narrow border on webs, 2 mm. wide, each side of middle toe and all along inner sides of outer toes, they were glossy 'citrine'; that is, they were uniformly colored but lighter and brighter on the 'citrine' areas as described. The extreme tips of all toes, for about 2 mm., were sharply black; the claws were brownish. This small black spot at tip of each toe, just above base of claw, was very pronounced against the greenish color of the toes."

The 'dark citrine' of the Washington birds is very near the color still retained by the Greenland bird, which seems to prove that the tarsi of the downy young of the greater and the lesser snow geese are very different in color.

In the juvenal lesser snow goose the color of the tarsus, in the process of change from the black of the downy young to the 'purplish vinaceous' of the adult bird, becomes greenish: a very careful sketch of the foot and tarsus of a freshly killed juvenal bird, made and lent to me by O. J. Murie, shows the tarsus the 'dark greenish olive' of Ridgway. In the juvenal greater snow goose, on the other hand, the tarsus is quite different in color, a light drab, or 'drab gray,' as shown in a careful sketch of the tarsus and foot, which was lent me by P. A. Taverner and was made by C. Johnson from a specimen taken at St. Joachim in October, 1924.

All these facts, of the differences of build and size and color between the two snow geese, together with their separate ranges in the breeding season, in migration, and in winter, seem to necessitate their recognition as distinct species.

The first scientific name that can be recognized for a snow goose was *Anser hyperboreus*, given by Pallas in 1769 (Spicilegia zoologica, fasc. VI, pp. 31-32). The Asiatic source of his ma-

terial and his carefully stated measurements show that recent writers unquestionably have been right in assigning this name to the lesser snow goose.

Three years later J. R. Forster (An account of the birds sent from Hudson's Bay; etc., Phil. Trans., vol. LXII, pp. 413-440) applied the name *Anas nivalis* to two skins of snow goose sent to England from the Severn River on the southwestern side of Hudson Bay. According to Forster,

"These white geese are very numerous at Hudson's Bay, many thousands being annually killed with the gun, for the use of the settlements. They are usually shot whilst on the wing, the Indians being very expert at that exercise, which they learn from their youth; they weigh five or six pounds, are 2⅔ feet long and 3½ broad; their eyes are black, the irides small and red, the legs likewise red; they feed along the sea, and are fine eating; their young are bluish grey, and do not attain a perfect whiteness till they are a year old. They visit Severn river first in the middle of May, on their journey northward, where they breed; return in the beginning of September, with their young, staying at Severn settlement about a fortnight each time. The Indian name is *Way-way* at Churchill river. Linneus has not taken notice of this species."

Forster's formal description is:

"9. ANAS NIVALIS. Anas, rostro cylindrico, corpore albo, remigibus primioribus nigris. Habitat in America Boreali, per Sinum Hudsonis migrans. DESCR. *Corpus* totum album, magnitudine anseris domestici nostratis. *Rostrum* luteum, mandibulis subserratis. *Oculi* iride rubra. *Remiges* decem primores nigri, scapis albis: tectrices infimae cinereae, scapis nigris; pennae duae alulae, itidem cinereae, scapis nigris. *Pedes* rubri. *Longitudo* pedum duorum & unciarum octo. *Latitudo* pedum 3½. *Pondus* librarum 5 vel 6."

This is obviously insufficient to show which form he had. His references to previous writers, too, are quite inconclusive, for although apparently he had not seen Pallas's then recent work, his citations of other literature were so all-embracing as to include both the greater snow goose (Lawson, History of Carolina) and the swan goose, *Cygnus cygnoides*, (Marsigli, Danubius Pannonico-Mysicus, etc.). The disposition of his name therefore rests merely on the locality, and our present knowledge of the migrations of the two snow geese makes it

appear certain that Forster's specimens were of the lesser form. *Nivalis* consequently must become a synonym of *hyperboreus*.

Cassin in 1856 (Proc. Acad. Nat. Sci. Phila., vol. VIII, pp. 39-42) was the first to discriminate the two snow geese, but he strangely failed to comprehend Pallas's description of *hyperboreus*, and, assigning that name and Forster's *nivalis* to the greater form, he gave the name of *albatus* to the lesser. In 1884 (Proc. Biol. Soc. Washington, vol. II, pp. 107-108) Ridgway showed that Pallas's bird certainly was the lesser snow goose, and reduced *albatus* to the synonymy of *hyperboreus*. For the greater he erected Forster's *nivalis*, giving no reason for doing so, simply saying: "The larger race is the *Anas nivalis* of Forster." The explanation of Ridgway's action may be found in the fact that, even in 1884, but little was known of the ranges in migration of the two snow geese. Evidently both Cassin and Ridgway were misled by the belief that all the snow geese occurring in the Hudson Bay region were of the larger form. Indeed, Ridgway says (*loc. cit.*): "The habitat of this large race is the region about Hudson's Bay (the breeding ground unknown, however), and southward in winter chiefly along the Atlantic coast of the United States."

It appears to be unquestionable that *Anas nivalis* of Forster must be regarded as a synonym of *Anser hyperboreus* of Pallas, and consequently the greater snow goose is without a name. As a salt-water bird, a bird of the Atlantic and its adjacent waters, I propose to call it

Chen atlantica sp. nov.

Type, no. 6 in my collection, an adult male, taken at the Princess Anne Club, Back Bay, Princess Anne County, Virginia, between December 2 and 9, 1922. This bird, weighing 4675 grams, or over 10 lbs., and heavier than the average, was only 792 mm., or 31 3-16 inches, in length, but otherwise of approximately average measurements, as follows: extent, 1524; wing, 450; tail, 140; exposed culmen, 68; height of bill, 38; tarsus, 89; middle toe and claw, 85 mm.