MEDDELELSER OM GRØNLAND
UDGIVNE AF
KOMMISSIONEN FOR VIDENSKABELIGE UNDERSØGELSER I GRØNLAND
Bd. 92 · Nr. 5.

THE STATUS OF THE GREENLAND SNOW GOOSE, ANSER CAERULESCENS ATLANTICA (KENN.)

(MISCELLANEOUS NOTES ON GREENLAND ORNITHOLOGY I)

BY

FINN SALOMONSEN

KØBENHAVN
C. A. REITZELS FORLAG
BIANCO LUNOS BOGTRYKKERI A/S
1933

Only few arctic birds have in such a degree been discussed as are the different nearctic Blue and White Geese, which are separated in the genus or subgenus *Chen* by the American ornithologists. To get the right impression of the taxonomy of these geese it is necessary to make some historical remarks.

In 1758 LINNAEUS described his *Anas caerulescens*[1]) on the basis of an earlier description of specimens from Canada of the Blue Goose. As the oldest name thus *Anas caerulescens* must be the designation for this species. Some years later the white form, the Snow Goose, was described by PALLAS[2]) on eastasiatic specimens and the name *Anser hyperboreus* bestowed on them. At the same time also FORSTER[3]) described the Snow Goose, on specimens from Hudson Bay, calling it *Anas nivalis*, which name therefore became a synonym to *hyperboreus*. In 1856 CASSIN[4]) called attention to the fact, that the eastern Snow Goose seems larger in its proportions than the western which he called *Anser albatus*. As PALLAS' *Anser hyperboreus* was given to western, asiatic birds, that also were belonging to the small race, the name *Anser albatus* has to be dropped to the benefit of *Anser hyperboreus*[5]). The greater eastern form has to be called *Anser nivalis* (FORST.), as shown by RIDGWAY[6]), who, after FORSTER, chose Hudson Bay as terra typica for the eastern race, saying: "the habitat of this large race is the region about Hudson's Bay", and he adds about the distinctive characters of the two species: "while the length of the wing is by no means decisive, *nivalis* always has a much larger bill", the same fact stated by recent examiners.

---

[1]) LINNAEUS, Syst. Nat., Ed. X, 1758, p. 124. (ex EDWARDS, Nat. Hist. Birds.)

[2]) PALLAS, Spicil. Zoolog., I, 1769, p. 25.

[3]) FORSTER, Philos. Transact., LXII, 1772, p. 413.

[4]) JOHN CASSIN, Notes on North American birds in the collection of the Acad. of Natural Sciences, Philadelphia, and Natural Museum, Washington, Proc. Acad. Nat. Sci. Philadelphia, VIII, 1856, p. 41.

[5]) This reduction was first maintained in BAIRD, BREWER and RIDGWAY, Water Birds of North America, Mem. Mus. Comp. Zoöl. Harvard Coll., XII—XIII, 1884.

[6]) ROBERT RIDGWAY, Note on the *Anas hyperboreus*, PALL., and *Anser albatus*, CASS., Proc. Biol. Soc. Washington, II, 1884, p. 107.

RIDGWAY and after him the greater part of the American ornithologists were interpreting the two forms as geographical subspecies while the European ornithologists as a rule were separating them into two species, so SALVADORI[1]) etc. — In 1861 CASSIN[2]) described a new Snow Goose from the Great Slave Lake under the name *Anser Rossii*. The systematical status of this and especially this of the Blue Goose (the Linnaean *Anas caerulescens*) has been much discussed, but I am sure they both belong to the same species ("Formenkreis", Kleinschmidt) as do the *A. hyperboreus* and *nivalis*[3]). For this species we have to adopt the oldest name, *Anas caerulescens*. Regarding *Anser Rossii*, now standing as *Anser rossi*, I am inclined to assume that it forms a geographical subspecies of *A. hyperboreus*, but before the breeding-places are exactly known[4]) and before it has been prooved that it does not breed in the same area as *hyperboreus*, the questionis im possible to determine with the satisfactory surety. Concerning the Blue Goose, this bird and the Snow Goose without the least doubt can be considered as dimorphic forms of the same species, as proposed by several ornithologists. *Anser caerulescens* is the primitive phase originated from other species of *Anser*, and perhaps nearest allied to *Anser canagica* (Sevast.). From the *caerulescens*-phase has later on by mutation the white *hyperboreus*-phase developed. Most American investigators and before all RIDGWAY[5]) are separating the two forms as distinct species. Deciding for this interesting matter is, however, the mutual behaviour of the two geese when meeting under natural conditions in a free state, i. e. it is a question of sexual affinity[6]), and we

[1]) T. SALVADORI, Cat. Birds Brit. Museum, Vol. XXVII, 1895, p. 87.

[2]) CASSIN, Proc. Acad. Nat. Sci. Philadelphia, XIII, 1861, p. 73.

[3]) The generic (or subgeneric) terms *Chen* and *Exanthemops* proposed for these birds, based only on differences in the rostral structure, seem quite unneccesary to me.

[4]) The breeding-places of *A. rossi* are probably to be found in the region east of Coronation Gulf, north of Backs river. Cfr. A. O. U., Check-list North Am. Birds, Ed. IV, 1931, p. 41.

[5]) In his paper, Remarks upon the close relationship between the white and scarlet Ibises (*Eudocimus ruber* and *E. albus*), The Auk, 1884, p. 239, RIDGWAY is discussing the question, alluding (p. 240) to "the absolute similarity of size and proportions, involving all structural details, in these supposed species, notwithstanding the great difference of colors, . . . as a fact which suggests the mere possibility of their being white and colored phases of one species, as in some Herons", but in, A Man. North Am. Birds, 1887, RIDGWAY had changed his mind, saying about *Anser caerulescens* (p. 115), that "it is, beyond question, a good species".

[6]) In this connection it has but little interest that Blues and Snows by experiments, in captivity are hybridizing, (cfr. Blaauws results of experiments in Holland, Journ. f. Ornith., 1907, p. 623, STRESEMANN (Journ. f. Ornith., 1926, p. 381), results of exp. in the Zool. Garden in Berlin), it does show nothing, as we know that anatid bastards are very easily produced in captivity from digen and up to pentagen origin. Cfr. BONHOTE, Some notes on the Hybridizing of Ducks, Proc.

are now knowing the two forms to interbreed regularly. From his visit to the breeding-places of the Blue Geese on Southampton Island SUTTON[1]) speaks of 20 mixed pairs among the several hundred birds observed. He also states that hybrids with the under-parts blotched and mingled with white were not uncommon. In its winterhome at the coast-districts of Louisiana in the same way MCILHENY[2]) very often found intermediate specimens, and "there are only two parts of the plumage of adult Blue Geese that never vary; the head, which is always white and the wings which have always the same marking. I have seen Blue Geese without a dark feather on the entire body, but the wings were like all other Blue Goose wings" (p. 297). Owing to this apparently constant colorpattern of the wing MCILHENY separates the Snows and Blues as distinct species, as also SUTTON does. For the interpretation of the Blue Goose as color-phase, it is, however, only of secondary, interest that no intergradations in the wing-color is to be found. We know from the results of experiments in inheritance that many genes, the so-called multiple allelomorphs, are transmitted alternatively without forming intermediate links[3]). In the case with the Blue Goose the difference in wing-color may be due to such alternative genes that are inherited hypostatically, i. e. the gene is only effecting white wing-color by pure white *hyperboreus*-individuals.

HESSE[4]), however, speaks about specimens of the Snow Goose from Baffins Land with "Kopf, Hals und Flügeldecken bräunlichgrau meliert, eine Zone längs des ganzen Oberhalses genau so braun wie bei *caerulescens*. Um Reste des Jugendkleides kann es sich nicht handeln, da Schnabel- und Fussfärbung die der Alten sind, der Vogel im übrigen z. T. sehr stark abgenutztes Alterskleid trägt und am 27. Juli 1910 erlegt ist, also mindestens im zweiten Jahre steht . . . Auch der unten angeführte alte Vogel weist an genannten Gefiederstellen, wenn auch

IV. Intern. Orn. Congr., 1905, p. 235. The primary criterion for genetical consanguinity is the regular interbreeding at absolutely free conditions; this conduct, but not morphological characters, must be the best indicator. Cfr. STRESEMANN, Zur Frage der Entstehung neuer Arten duch Kreuzung, Club van Nederland. Vogelkund. 9, 1919, p. 24. SALOMONSEN, Systematiske Principer indenfor den moderne Zoologi, Naturens Verden, 1931, p. 197.

[1]) G. M. SUTTON, The Blue Goose and Lesser Snow Goose on Southampton Island, Hudson Bay, The Auk, XLVIII, 1931, p. 335.

[2]) E. A. MCILHENY, The Blue Goose in its Winter Home, The Auk, 1932, Vol. XLIX, p. 279.

[3]) Alternative inheritance is very common among the mutants of birds, for instance: *Poëphila mirabilis* (*mirabilis-gouldiae*), *Lanius fuscatus* (*fuscatus-shach*), *Clamator serratus* (*serratus-jacobinus*), *Accipiter leucosomus* (*leucosomus-etorques*), *Uria grylle* (*grylle-motzfeldi*), etc.

[4]) E. HESSE, Bernhard Hantzschs ornithologische Ausbeute in Baffinland, Journ. f. Ornith., 1915, p. 137.

sehr viel schwächer, braungraue Färbung auf, die braune Oberhalszone fehlt" (p. 159). — This proves that also intergradations regarding the wing-color are to be found, but probably owing to difficulties by field-observations McILHENY has not noticed such birds, perhaps only recognizable in skin.

We may thus summarize, that the fact that *Anser caerulescens* and *A. hyperboreus* are regarded as dimorphic phases of the same species is satisfactorily established through their hybridization and their entirely identical ecology at the breeding places, whereas the inheritance of the two phases is not yet perfectly set out, neither in the field (HESSE, McILHENY, SUTTON) nor by experiments (BLAAUW, Zool. Gard. Berlin).

The breeding-range of the dark, primitive phase lies in the centre of the distribution of the species, *caerulescens* lacking in both the West (East-Siberia, Western North America) and the East (Greenland)[1]), and it is only found breeding on Southampton Island in the Hudson Bay[2], and at Bowman Bay on the southwestern part of Baffin Land[3]), but is also stated from the central part of this island[4]), though in a small number.

Regarding the division of the white phase in a western (*A. hyperboreus*) and an eastern subspecies (*A. nivalis*) there has also been much confusion. — ROBERT RIDGWAY, having suppressed the *Anser albatus* CASS., says about the lesser form, that it "has by far the most extensive distribution, . . . and is decidedly the more common one in most collections"[5]). Owing to the authority of RIDGWAY the form *A. h. nivalis* (*Hab.* Hudson Bay) was maintained for many years, but most ornithologists were standing in doubt whether this race was distinguishable from the typical race or not. Already SALVADORI[6]) gives that he must confess "that it appears to me that the distinction of an eastern form from a western one is not yet satisfactorily established". The four specimens of "*Chen nivalis*" in the Brit. Mus. mentioned by SALVADORI were indistinguishable from *hyperboreus*, but "from their locality they ought to belong to *C. nivalis*". Also SCHALOW[7]) mentioned the greater form very sceptically, especially because birds captured in the most

[1]) Noticeable is, that every year one or two Blue Geese are seen among the flock of Greater Snow Geese along the St. Lawrence. (KENNARD, 1927).

[2]) SUTTON, l. c., p. 335.

[3]) J. DEWEY SOPER, The Blue Goose (*Chen caerulescens* (LINNAEUS)). An account of its' Breeding Ground, Migration, Eggs, Nests and General Habits, Ottawa 1930, pp. 1—64.

[4]) HESSE, l. c., p. 159.

[5]) Proc. Biol. Soc. Washington, II, 1884, p. 107.

[6] l. c., p. 87.

[7]) H. SCHALOW, Die Vögel der Arktis, Fauna Arctica, von F. Römer und F. SCHAUDINN, Vol. IV, 1. Jena 1904.

eastern parts of North America appeared to belong to the lesser, western form, viz: "so ist es schwer verständlich, dass sich die Beobachtungen und Mitteilungen von KUMLIEN (Cumberland), WINGE (Grönland) u. a. auf die kleine, typische Art beziehen soll" (p. 173). — Some years later HESSE, after having studied a great series from Baffin Land, speaks, that "es scheint also hervorzugehen, dass die kleinere nordwestamerikanische (und nordostasiatische) *hyperborea* typ. allmählich in die grössere nordostamerikanische *hyp. nivalis* übergeht, dass eine von West nach Ost fortschreitende Reihe vorliegt, von der man nur die Extreme sicher unterscheiden kann, und demzufolge wohl auch nur diese letzteren benennen darf als die beiden Endglieder einer durch Zwischenglieder verbundenen Kette"[1]). At the same time HARTERT[2]) says "Fernere Untersuchungen über die beiden Formen sind dringend erwünscht; die Unterscheidbarkeit ist durch Serien von den Brutplätzen zu bestätigen". — So late as 1925 SCHIØLER[3]) after having studied the Greenland specimens of the Snow Goose, i. e. one of "die beiden Endglieder" (HESSE), is very uncertain as to the validity of the subspecific differences of the greater Snow Goose. The following remark is instructive: "noticing the many differences existing in the shape, length, height and breadth of the bill of the Grey Lag Goose (*Anser anser*) from the same breeding-place, or of the Bean Goose (*Anser fabalis*) in the same company, one would rather be apt to doubt about the distinction of two forms." Still 1926 TAVERNER[4]) is expressing his doubt, also especially on account of the slight and varying difference in size between the two forms.

In 1927, however, KENNARD[5]), in a very valuable paper, united all American Snow Geese under the name *Chen hyperboreus*, only leaving Greenland and adjacent islands as breeding-range for the great form, for which he proposed the name *Chen atlantica*, FORSTERS name, *Anser nivalis*, based on Hudson Bay birds, being synonymous to *A. hyperboreus*. On the breeding-area of the Snow Geese he gives, that "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 wintering-places of the two forms seem to be quite separated, "the Greater Snow Goose winters only in the East, along the atlantic coast of Maryland, Virginia and North Carolina",

[1]) l. c., p. 164.

[2]) Vög. d. pal. Fauna., Vol. II, 1915, p. 1292.

[3]) E. LEHN SCHIØLER, Danmarks Fugle, Vol. I, 1925, p. 491.

[4]) P. A. TAVERNER, Birds of Western Canada, Canada Dep. Mines, Victoria Memorial Mus., Bull. no. 41, 1926, p. 103.

[5]) F. H. KENNARD, The Specific Status of the Greater Snow Goose, Proc. New Engl. Zool. Club, Vol. IX, 1927, p. 85.

while "the Lesser winters from Mississippi reaching Louisiana and Texas, across to California and along the asiatic coast to Japan". Of the Greater Snow Goose only few thousand individuals are existing, forming the great flock of geese that every year on the migration is resting along the St. Lawrence, before the departure for the South. The breeding-places of this form must be comparatively restricted, probably only in North Greenland, corresponding with the fact that birds from Baffin Land seem to be true *hyperboreus*[1]).

KENNARD gives the following measurements of the two races:

	wing	tarsus	middle toe	culmen	height of bill
♂♂: *Ch. hyperb.*	395—460 (430)	78—91 (84)	69—85 (75)	51—62 (58)	32—36.5 (33.5)
Ch. atlant.	430—485 (450)	86—97 (92)	75—95 (84)	59—73 (67)	34—44 (38)
♀♀: *Ch. hyperb.*	380—440 (420)	75—89 (82)	65—89 (74.5)	50—61 (56)	28—38 (33)
Ch. atlant.	425—475 (445)	80—92 (86)	75—83 (79)	57—68 (62.5)	33—38 (36)

As already pointed out by RIDGWAY (l. c.) it is especially with regard to the proportions of the bill that the two forms are differing.

The paper of KENNARD constitutes a considerable progress in our knowledge, but it is still left to examine breeding-birds of the great race, as it is yet uncertain where they do breed. My examination of Northgreenland Snow Geese proves that the Greater Snow Goose is breeding in the most northern region of Westgreenland, and I think therefore, that the enduring discussion on the Greater Snow Goose will end now.

WINGE in 1898[2]) only mentions the Lesser Snow Goose, and SCHIØLER in his "List of Greenland Birds"[3]) both forms, remarking that "the relation between the two subspecies is not yet cleared up". Neither of the two students possessed geese from the breeding-places in the northern parts of Greenland[4]). On account of the fact that only birds from the breeding-places are capable to determine the question on the validity of the Great Snow Goose, I secured two birds from Thule, at about $76^1/_2{}^\circ$ n. latitude, coll. HANS NIELSEN, both adult birds from breeding-place.

It is now possible to give the following on the distribution of the Snow Goose in Greenland:

[1]) HESSE, l. c., p. 163, gives the following measures on Baffin Land Snow Geese: ♂♀: length of bill: 49—64 mm, tarsus: 73—86 mm. Cfr. KENNARD: ♂♀ of *Ch. hyperboreus*: length of bill: 50—63 mm, tarsus: 75—91 mm.

[2]) H. WINGE, Grønlands Fugle, Medd. om Grønland, Vol. XXI, 1., 1898, p. 118.

[3]) In Danmarks Fugle, Vol. II, p. 45.

[4]) SCHIØLER possessed a cranium of a Snow Goose from the Thule breeding-place.

Anser caerulescens caerulescens (L).

Anas caerulescens, LINNAEUS, Syst. Nat., Ed. X, 1758, p. 124. (Canada).

Greenland records:

Anser hyperboreus PALL. *typicus*, WINGE, Medd. Grønl., XXI, 1., 1898, p. 118.

Anser hyperboreus hyperboreus PALL., SCHIØLER, Danmarks Fugle, I, 1925, p. 486; id. ibid., II, 1926, p. 45.

A rather uncommon, occasional guest, probably from Baffin Land breeding-places. Occurs at the northern parts of western Greenland (Upernivik, seldom Sukkertoppen, Godthaab). 9 records. FENCKER[1]) gives that male and female were shot end of June 1885, at Upernivik[2]), both were also observed the preceding year; the female contained pea-formed eggs and was possibly breeding. Six birds were seen in the environment of Upernivik 29th June 1887, in the same place two were observed in the first days of June, and besides one was recorded from Tasiusaq, a little more northern. In 1890 one individual was several times observed at Prøven. Some few stragglers have been recorded from more southern parts of Westgreenland. In 1859 and again in 1886 the Zool. Museum received a young bird from Godthaab and in 1910 SCHIØLER obtained a young and an adult male belonging to this form, collected 17. 6. 1910 at Sukkertoppen. The material of *Anser c. caerulescens* in the Zool. Mus. Copenhagen, kindly put to my disposal[3]), measures:

sex	age	date	wing	tarsus	middle-toe	culmen	height of bill	breadth at base	phase	coll.	locality
Greenland specimens:											
♂	ad.	17.6.1910	426	82	71	57	37	26	white[4])	BISTRUP	Sukkertoppen
?	ad.	20.6.1885	387	75	70	52	30	24	white	FENCKER	Upernivik
?	ad.	20.6.1885	400	72	62	56	34	25	white	FENCKER	Upernivik
♂	vix. ad.	17.6.1910	415	81	67	57	37	26	white	BISTRUP	Sukkertoppen
?	juv.	20.10.1859	406	79	68	55	32	24	white	?	Godthaab
?	juv.	20.10.1886	410	77	70	55	29	24	white	HOLM	Godthaab
American specimens:											
♂	ad.	29.4.1901	433	79	76	56	34	26	white	WORTHERN	North Dakota
♂	ad.	8.3.1904	437	80	71	52	34	26	white	WORTHERN	Louisiana
♂	ad.	1.1.1908	446	88	82	57	35	26	blue	WORTHERN	Louisiana
♀	ad.	13.12.1925	428	74	67	56	34	25	white	?	California
♀	ad.	3.1.1908	432	82	76	58	34	25	blue	WORTHERN	Louisiana

These measurements correspond very well with those given by KENNARD.

[1]) The ornithological journal of Governor FENCKER is published in the work of WINGE, l. c.

[2]) The specimens are kept in the Zool. Mus. Copenhagen.

[3]) I am greatly indebted to the ornithological curator, Dr. HØRRING.

[4]) All Greenland specimens of Snow Geese belongs to the white phase, the blue phase never being recorded from the country.

Anser caerulescens atlantica (KENN.).

Chen atlantica, KENNARD, Proc. New Engl. Zool. Club, IX, 1927, p. 93. (Virginia).

Greenland records:

Chen hyperboreus nivalis (FORST.), STONE, Proc. Acad. Nat. Sci. Phil., 1895, p. 503.
Anser hyperboreus nivalis FORST., SCHIØLER, Danmarks Fugle, I, 1925, p. 490; id. ibid., II, 1926, p. 45.

Only breeding in the far North of Westgreenland (Thule[1]) and Inglefield Gulf[2])) and only a single time met with on the migration in more southern regions (Umanaq, 10. 9. 1919, coll. BERTELSEN). From the breeding-place at North-star Bay by Thule the Zool. Museum now possesses: a juvenile, coll. KNUD RASMUSSEN 1907, a cranium of an ad. ♂, coll. PETER FREUCHEN 24. 8. 1911, and two skins, obtained by me from Governor HANS NIELSEN, Thule, probably male and female, collected in the summer 1931.

The adult specimens measure:

sex	age	date	wing	tarsus	middle-toe	culmen	height of bill	breadth at base	phase	coll.	locality
Greenland specimens:											
♂?	ad.	summ. 1931	451	90	80	68.5	39	29	white	NIELSEN	Thule
♀?	ad.	summ. 1931	440	80	69	63	36	27.5	white	NIELSEN	Thule
♂	ad.	10.9.1919	431	80	71	64	39	26	white	BERTELSEN	Umanaq
♂	ad.	24.8.1911				72[3])				FREUCHEN	Thule
American specimens:											
♂	ad.	7.5.1925	440	74	73	62	38	27	white	LANGELIER	Quebec
♂	ad.	19.5.1925	452	84	79	64	35	28	white	LANGELIER	Quebec

By means of these measurements it is to be seen that the proportions are greater than those of *Anser c. caerulescens* especially regarding the bill as already noticed by RIDGWAY.

The differences in the structure of the bill of the adult birds thus are as follows:

	culmen	height of bill	breadth at base
A. c. caerulecens			
specimens above	52—58	30—37	24—26
After KENNARD	50—62	28—38	
A. c. atlantica			
specimens above	62—72	35—39	26—29
After KENNARD	57—73	33—44	

[1]) PETER FREUCHEN, Fuglelivet i Nordvestgrønland, Iagttagelser fra mit Vindue, Dansk Ornith. Foren. Tidsskrift, XV, 1921, p. 101.

[2]) WITMER STONE, List of Birds collected in North Greenland by the Peary Expedition of 1891—2 and the Relief Expedition 1892, Proc. Acad. Nat. Sci. Philadelphia, 1895, p. 502.

[3]) After SCHIØLER, l. c., 1926.

Also in the number of teeth at the side of the upper mandible there is a remarkable difference, *A. c. caerulescens* possessing 20—23 teeth, *A. c. atlantica* 22—24.

The measurements of the Thule specimens prove that the Snow Geese breeding in the far North of Greenland belong to the great form *A. c. atlantica*. Certainly other breeding colonies of this rare bird are to be found on other places of the Greenland north-coast or at Ellesmere Land.