

Moult migration of Emperor Geese

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Salomonsen (1968) reviewed the data on moult migration in waterfowl but he makes no mention of the Emperor Goose *Anser canagicus* in this context. Kistchinski (1971) reports a moult movement of this species in NE. Siberia. Observations made in western Alaska in 1960 suggest, especially when taken together with the remarks of Fay and Cade (1959), that in this part of its range also the Emperor Goose has, like many other geese, an approximately northern moult migration.

The author, along with R. G. B. Brown and D. J. T. Hussell, spent the period from 8th May to 28th July 1960 in the Hooper Bay area of the Yukon-Kuskokwim delta in western Alaska. The main object of study during this period was Sabine's Gull *Xema sabini* (see Brown, Blurton Jones and Hussell 1967) but we separately gathered data on various other topics of interest to ourselves, for example wader distraction displays (Brown 1962), breeding of passerines (Hussell 1970), and distribution and breeding biology of geese.

The Hooper Bay area, and its rich avifauna, has been well described by Brandt (1943) and Fisher and Peterson (1956). It is mostly flat, waterlogged, and less than 15 metres above sea level. Prominent habitats include mudflat, expanses of pond-strewn grass and sedge flats just above high tide level, rolling hillocks with grass, sedge and *Empetrum*, and still more ponds. Nearby Cape Romanzof, the seaward end of the Askinuk mountains, and Dall Point in the lowland near our base camp are two of the westernmost parts of Alaska's west coast. Emperor Geese were extremely common nesting birds all over the lowland areas near the sea, and on average were pleasantly tame.

Our base camp from mid-May to July was at the base of Panowat Spit on the south shore of Igiak Bay. Our normal daily routine consisted of a walk about one and a half kilometres inland to the Sabine's Gull colony from our camp near the coast, interspersed with occasional walks for supplies to the village of Hooper Bay 13 km. to the south. Although I regularly recorded the direction of travel of any geese seen in flight, purely local flights, easily seen in this open landscape, were not often recorded. Flight directions were estimated in relation to the local landmarks.

The spring arrival of geese was not conspicuous, although the data in Table I show the effects of one day of abundant

movements (27th May). But towards the end of June a brief but very large scale movement of Emperor Geese occurred. The numbers, directions and dates of the flocks recorded are summarised in the tables. Table I shows the number of Emperor Geese flying past in each week during our stay in the area. Table II shows the number of birds flying in each direction.

It is evident from the tables that large numbers of Emperor Geese were passing over Igiak Bay and out to sea, well clear of Cape Romanzof which is approximately NNE. of our base camp, during 19th-25th June. The biggest movement was on 20th June (1,059 birds recorded). Most of the birds involved (they flew low and could be clearly seen) had unstained white

Table I. Numbers of Emperor Geese recorded, (1) flying past, and (2) stationary or moving locally. (Period from 5th-24th July was spent away from base camp.)

Week	No. flying	No. stationary or local
May		
8-14	2	2
15-21	17	23
22-28	160	95
29-4	0	11
June		
5-11	15	82
12-18	0	90
19-25	1186	412
26-2	263	252
July		
3-9	(0)	(110)
10-16	(0)	(200)
17-23	(0)	(0)
24-28	0	100

Table II. Directions of flying flocks of Emperor Geese during the two major movements.

Direction	May 27	June 20-July 1
ENE	0	0
NE	0	0
NNE	59	17
N	29	54
NNW	45	234
NW	8	660
WNW	0	428
W	0	0
WSW	4	0
SW	0	0
SSW	3	0
S	0	0
SSE	0	0
SE	0	0
ESE	0	56
E	0	0

heads and a dark spot near the beak, described as immature plumage in Delacour (1954). After this time pairs with goslings were abundant in the area and were not accompanied by immatures. This was in contrast to the position before hatching when pairs were often accompanied by immatures. We could not exclude the possibility that failed breeders also left. This would have to be checked in any study of breeding success of territory-owning pairs.

Examination of a map of the Bering Sea shows the direction of most of the flying flocks to be approximately towards St. Lawrence Island. Fay and Cade (1959) describe large numbers of moulting, non-breeding, immature Emperor Geese along the southern shore of St. Lawrence from 20th June-15th August, about half of them leaving again by early September. Consequently it seems highly likely that there is a large scale moult migration of Emperor Geese to St. Lawrence Island. This migration resembles that of most of the geese mentioned by Salomonsen (1968), in that it is approximately northward and predominantly concerns non-breeders. Fay and Cade (1968) report that the

moulting Emperor Geese were mostly among the lagoons of the south coast. This would be a very safe area compared to the expanses of albeit wet and boggy mainland from which the larger ponds are disappearing at this stage in the summer. Salomonsen made the important suggestion that the removal of competition for food with parents and the new generation of siblings is a major survival value of the northward moult migration of geese. But in addition it is tempting to suggest the value of a good refuge as another selection pressure favouring the northward moult migrations of geese.

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Summary

Observations on Emperor Geese *Anser canagicus* in western Alaska indicate a northward moult migration probably to St. Lawrence Island.

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