

# Observations of Pink-footed and Barnacle Geese in the Kong Oscar Fjord region of north-east Greenland, 1974

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## Introduction

The 1974 Joint Biological Expedition to north-east Greenland was based at Mestersvig Station in northern Scoresby Land (72°14'N, 23°55'W) during the period 25th June to 16th August. On 6th July, members of the Wader Study Group section of this expedition were taken by helicopter to three additional sites along Kong Oscar Fjord, returning to Mestersvig in the second week of August. These sites were Holms Bugt, Traill Ø (72°31'N, 23°55'W), Antarctic Havn (72°00'N, 23°06'W) and Ørsted Dal (71°47'N, 23°15'W). Although the prime objective was the study of wading birds on the breeding grounds, detailed records were kept of all birds seen, including geese, and these observations provide an interesting comparison with those of previous expeditions to the area (Marris & Ogilvie, 1962; Hall, 1963; Hall & Waddingham, 1966; Marris & Webbe, 1969). The map (Figure 1) shows the places mentioned.

## Pink-footed Goose *Anser brachyrhynchus*

Twenty-six freshly constructed nests were found in the Mestersvig region—17 in the Tunneelve gorge, four in the Nyhavn hills, three in west Lemmingdal and two at Langdyssen. The Tunneelve colony has been occupied regularly for at least 12 years and probably much longer. The nests in 1974 were situated on slopes at the top of the gorge and on rocky promontories and bluffs projecting into it, all of these sites being readily accessible from the top. The colony was well spaced out over a length of about 150 m and beneath the nests the sides of the gorge fell almost vertically to the river 50 m below. The nest sites had obviously been clear of snow for some time, for they were covered with green vegetation, mostly *Salix arctica*, though in the immediate vicinity of the nests this had turned brown. The nests were constructed almost entirely of down and several had the large bases characteristic of nests used for many years. Two of the other nest sites near Mestersvig were on flat areas at the top of small crags whilst the third was at the foot of a slope close to a frozen lake; so close in fact that the eggs at one nest floated away when the lake thawed.

Despite the persistence of snow cover in

1974 (90% in late June), incubation was almost complete when the nests were first examined on 26th June. Ten of the 17 Tunneelve nests had already been vacated by this date, only one showing any obvious signs of fox predation. Six nests still had eggs and one had three 2-day-old chicks. Further clutches were observed hatching on 30th June and 7th July. The indications are that the peak date of hatching occurred towards the end of June. At the largest known colony of the species at Thjórsárver in central Iceland, the peak hatching time was deduced to have been 22nd June in 1951 (Scott *et al.* 1953) and directly observed to be 17th–22nd June in both 1971 and 1972 (J. B. Sigurdsson, unpublished report), despite the fact that the snow cleared about 20 days later in 1972. The birds at Mestersvig, even in a late season, therefore seem capable of breeding almost as early as those in Iceland. Cliff and gorge nesting sites are of great importance in this respect, since they are clear of snow much earlier than the surrounding country. The average clutch size (Table 2) was within the range of values recorded at Thjórsárver, where it was 4.5 in 1951 (Scott *et al.* 1953), 3.9 in 1970 (Kerbes *et al.* 1971) and 4.4 at the end of laying, declining to 3.4 at hatching, in 1972 (J. B. Sigurdsson, unpublished report).

Twenty-five eggs at Mestersvig were measured by the two Danish members of the expedition (S. Asbirk and N-E. Franzmann). The mean length was 80.4 mm (range 74.6–84.5) and the mean width 51.5 mm (range 48.7–55.2). The average dimensions of Pink-footed Goose eggs from Iceland are

Table 1. Clutch size of Pink-footed Geese at Mestersvig.

Clutch size	No. of clutches
1	1
2	1
3	1
4	6
5	0
6	0
7	1

Mean clutch size = 3.7

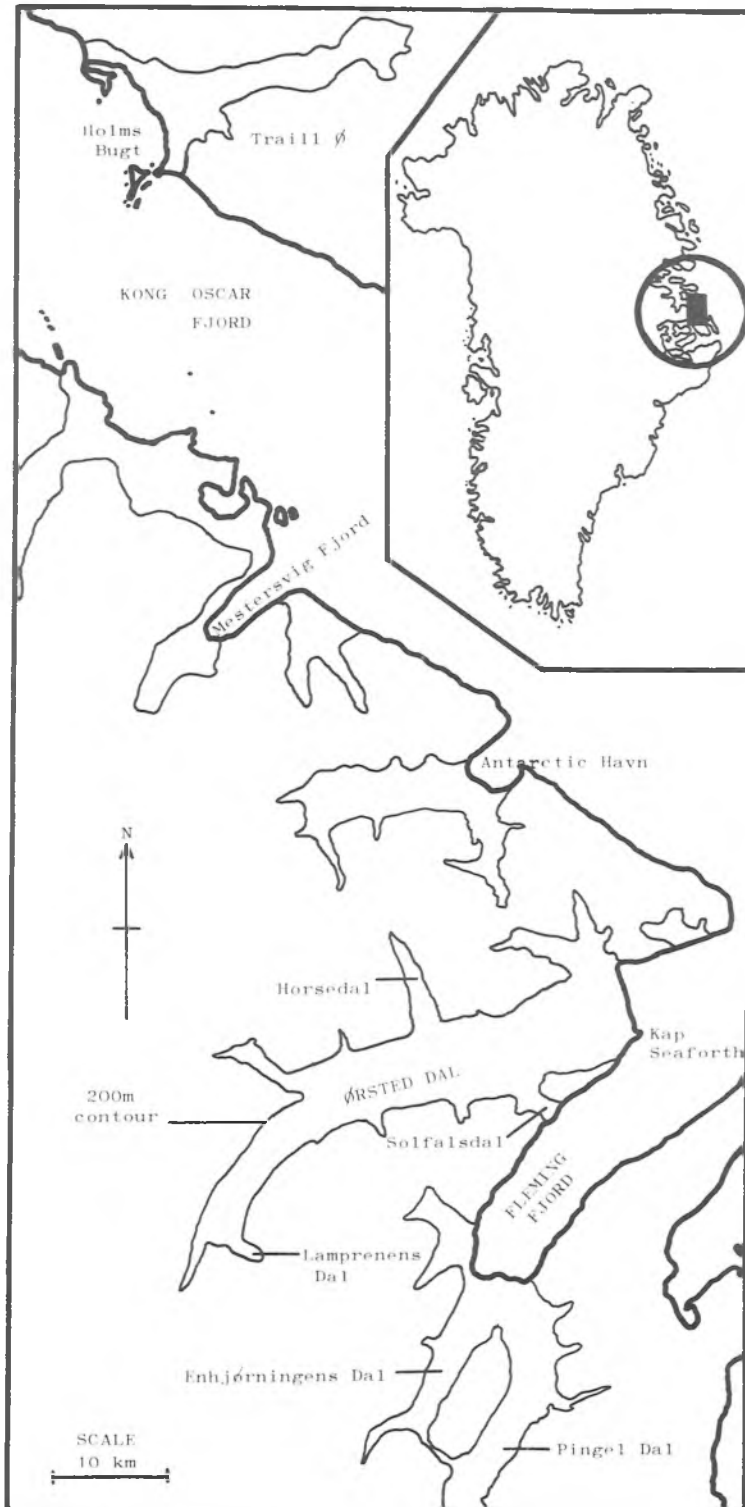


Figure 1. Map of Kong Oscar Fjord area; whole of Greenland in inset. 1, Nyhavn; 2, Lemmingdal; 3, Langdyssen; 4, Labben; 5, Mestersvig Station; 6, Tunnelleve; 7, Blykkippen.

80.9 × 52.5 mm and from Spitzbergen 78.4 × 52.4 mm (Scott *et al.* 1953; Witherby *et al.* 1940); these are combined averages, not necessarily obtained at the same colonies or during the same season. The birds from the Mestersvig colonies were seen in small family parties throughout July, and on 12th August a flock of 30 adults and 44 well grown goslings was observed on the sea at the southern side of Mestersvig Fjord (estimated brood size 3.0).

No nests were found at the other sites visited. A single family party of two adults and two goslings was observed at Holms Bugt. A flock on the sea at Antarctic Havn, seen from a considerable distance on 9th and 10th August, possibly contained a few well grown youngsters. Ten goslings were recorded there in 1961 (Marris & Ogilvie, 1962) and more than nine in 1963 in addition to two vacated nests at the western end of the valley (Marris & Webbe, 1969). Large numbers of goslings were observed in Ørsted Dal, a previously known breeding area. Eight goslings with 40 adults were seen on the large lake opposite Lamprens Dal (unofficially named by Hall & Waddingham, (1966) as Primula Pond), and a single group of 75 goslings, one of the largest recorded from Greenland, was observed at the eastern end of the valley between Solfaldsdal and Kap Seaforth. Twelve fresh nests of this species were discovered in lower Solfaldsdal in 1963 (Marris & Webbe, 1969), but this area was not searched in 1974. Korte (1974) surveyed the area around the Hurry Inlet in southern Jameson Land in 1974 and although nests were found, he considered breeding success to have been reduced as a result of the late snow melt.

In addition to the 26 nests found near Mestersvig, the number of goslings recorded at the other sites indicates a further 30 or so breeding pairs, giving an estimated total for this part of Kong Oscar Fjord of about 60

nests. It is likely that some goslings remained undetected and the true number of breeding pairs may be somewhat larger than the figure suggested.

It is now widely accepted that considerable numbers of non-breeding Pink-footed Geese originating from the Icelandic population undergo a moult migration to N.E. Greenland in late June and early July (Taylor, 1953; Christensen, 1967; Rosenberg *et al.* 1970). Flocks were observed arriving from the south-east and moving north along the Hurry Inlet by Korte (1974) in the last week of June and the first week of July. There was no corresponding influx of adults at Mestersvig during this period, possibly because the area has become too disturbed in recent years, and as a result the percentage of juveniles in the population remained high (Table 1). At the other three sites, however, flocks of moulting Pinkfeet without any young were observed. Of the 628 adults counted, only about 120 can have been breeding birds, the remaining 80% consisting of resident non-breeders, failed breeders or birds of the moult migration. The largest concentration of moulting adults was at the head of upper Ørsted Dal where 241 geese were present on and around Primula Pond.

#### Barnacle Goose *Branta leucopsis*

Twelve pairs were observed at nests on the cliffs at the eastern side of Lemmingdal. This colony was filmed by H. Miles for a Royal Society for the Protection of Birds film on bird migration. The nests were situated on an almost vertical basalt exposure about 50 m high, with a small scree slope at the base (Figure 2). A gentle incline then led westwards to the centre of Lemmingdal about 70 m lower down. Apart from a few streams and small patches of tundra, the valley floor right up to the base of the cliff was still snow covered in early July. The nests were well spaced out over the cliff face mostly between 10 and 30 m above the scree, though a single nest was only 10 m from the cliff top. The minimum distance between any two nests was 2 m. There were numerous flat and gently sloping ledges available, but the geese seemed to prefer the largest of these, which were about 75 cm deep and one or two metres wide. The adults sometimes appeared to have difficulty in landing on these ledges and this may have been a significant consideration in nest site selection. Some of the nests were quite massive, possibly as a result of additional building over several years, and contained some vegetation mixed in

Table 2. Numbers of Pink-footed Geese seen.

Site	Adults	Goslings	Total	% young
Mestersvig*	52	44	96	45.8
Traill Ø	45	2	47	4.3
Antarctic Havn	137	0	137	—
Ørsted Dal	394	83	477	17.4
Total	628	129	757	17.0

\* Occupied nests found.



**Figure 2.** Barnacle Goose colony at east Lemmingdal as seen from the south. Stauning Alper, Lyell land and Kong Oscar Fjord visible in the background. (Drawn from photographs by Ray Bishop.)

**Figure 3.** Eastern Horsedal. Barnacle Geese nested in the prominent band of rock running across the photograph. The summit is over 2,500' high.



with the down, mainly *Salix arctica* and *Cassiope tetragona*. Only four pairs were still on nests at the Lemmingdal colony on 4th July.

Two nests were observed on cliffs in the Labben peninsula and further colonies existed at south-west Lemmingdal, Blyklippen and Nyhavn. Although nests were not seen at the latter sites, extensive growths of the vivid orange nitrophilous lichen *Caloplaca elegans* were present beneath suitable ledges and there was considerable activity of adults in the area. Goslings were seen later in the season near two of these sites. Unlike the Pinkfoot, most Barnacle Goose nests were completely inaccessible. Of the 14 found near Mestersvig only one could be reached and this contained seven eggs with an average length of 78.2 mm (range 72.4–82.6) and width of 50.6 mm (range 49.2–51.8).

Barnacle Geese bred successfully at all sites visited, but very few nests were found since hatching was almost complete by 6th July, despite the late season. A recently vacated nest site was found on Traill Ø to the

south of Holms Bugt. A colony with a few adults flying to and fro was situated at a height of about 400 m on the cliffs at the eastern mouth of Horsedal. This site was in a towering 100 m section of vertical rock, beneath which was an extensive scree slope, steep and bare for the first 150 m, but thereafter becoming gradually vegetated and finally merging with gentler solifluction slopes below (Fig. 3). Lichen patches showed the presence of at least 30 nesting ledges, though many of these could have been several years old. A few similar ledges were visible in western Horsedal, but no adult birds were present. A piece of goose eggshell was found on the ground near Kap Seaforth.

All the evidence (Table 3) indicates a brood size of about 2.8 per breeding pair. The largest group, of 100 goslings, was seen in Ørsted Dal on 25th July, accompanied by 192 adults, of which about a third were still flightless. A group of 75 goslings, seen nearby on 4th August, were nearly full grown, the smallest in the flock (the only goose ringed by the expedition) having a wing length of 185 mm and a weight of 1,225 g.

The relatively small percentage of goslings recorded by numerous observers in N.E. Greenland suggests that a large proportion of adult Barnacle Geese do not breed in a given season. This is borne out by counts at the British wintering grounds. There is no information available at present to indicate what proportion of these adults actually attempt breeding but fail to rear any young. Flocks of presumed non-breeders were observed in late June at Mestersvig out on the pack ice, at a time when the breeding birds were feeding actively in small groups on patches of wet tundra which were beginning to emerge from the snow. Later in the season, large flocks of moulting non-breeders were encountered in most areas (Table 4).

In 1961 and 1963 about 1,600 Barnacle Geese from Ørsted Dal and Fleming Fjord were marked with PVC neck bands. Two of these birds were seen in 1974, at least 11 years after marking. One was observed with a yellow neck band (ringed in Ørsted Dal) in a mixed flock of goslings and adults near Solfaldsdal. The other, seen near Primula Pond on 28th July in a flock of 12 flightless adults had an orange neck band which was probably red when put on (M. A. Ogilvie, pers. comm.) and was therefore ringed in Fleming Fjord. Since no goslings were observed at the head of upper Ørsted Dal, this bird may have been a mature non-breeder. The largest numbers of both adults and goslings were observed in Ørsted Dal,

Table 3. Brood size of Barnacle Geese.

(a) Single families

Site	No. of broods of size			
	1	2	3	4
Mestersvig			3	
Traill Ø				1
Antarctic Havn		3	2	
Ørsted Dal	1		2	1
Total	1	3	7	2

Mean brood size = 2.8 (13 broods)

(b) Small amalgamated family parties

Site	No. of adults	No. of goslings
Traill Ø	10	10
Traill Ø	12	22
Traill Ø	14	14
Ørsted Dal	6	10
Total	42	56

Mean brood size = 2.7

the majority being dispersed along the southern side of the valley in the Ørsted river floodplain, which afforded extensive areas of wet and marshy ground with lush growths of sedge and moss. Pink-footed Geese on the other hand showed a marked preference for the ends of the valley, near Kap Seaforth and Lamprenens Dal, where numerous small ponds, largely dominated by mare's-tail *Hippuris vulgaris*, were available.

Using the brood size of 2.8, a rough estimate of the total number of breeding pairs of Barnacle Geese in the whole area can be made and this amounts to about 110, nearly double the number of Pinkfeet. Since a total of 2,178 adults were seen, the implication is that about 90% of the adult population did not attempt breeding or failed to rear young successfully.

### Discussion

The numbers of adult and young Pink-footed

and Barnacle Geese recorded from comparable areas in 1961, 1963 and 1974 are shown in Table 5. Since 1961 was an exceptionally poor breeding season, it is necessary to compare 1974 with 1963 in order to determine if any change in the size of the breeding population (as evidenced by the number of goslings observed) has occurred. In order to examine any change in the number of adults (breeders and non-breeders combined) it is best to compare 1974 with 1961 since these are the only years for which proper counts are available.

There is evidence of an increase in the breeding population of Pink-footed Geese in Ørsted Dal. The numbers of Barnacle goslings recorded from this area in 1974 and 1963, however, are remarkably similar, though in 1974 the percentage of young in the population was less than half the 1963 figure. Since the brood size was actually slightly higher in 1974 it is tempting to suggest that all available nest sites were occupied in both of

Table 4. Numbers of Barnacle Geese seen.

Site	Adults	Goslings	Total	% young
Mestersvig*	80	9	89	11.1
Traill Ø†	397	71	468	15.2
Antarctic Havn	183	22	205	10.7
Ørsted Dal†	1518	170	1688	10.1
Total	2178	272	2450	11.1

\* Occupied nests found. † Nest sites found.

Table 5. Comparison of goose counts in 1961, 1963 and 1974.

Species		Ørsted Dal			Mestersvig, Antarctic Havn and Ørsted Dal	
		1961*	1963†	1974	1961*	1974
Pink-footed Goose	Adults	300	225	394	419	583
	Goslings	0	25	83	10	127
Barnacle Goose	Adults	450	564	1518	620	1780
	Goslings	23	172	170	33	201
	% young		23.4(30.6)		5.1(10.7)	10.1(13.0)
	Brood size		2.5(2.8)		—(2.8)	2.8(2.2)

Figures in brackets are values observed on Islay during the succeeding winter seasons: data for 1961 and 1963 from Boyd (1968).

\* From Marris & Ogilvie (1962).

† Based on data in Hall & Waddingham (1966). The number of adult Pinkfeet is a count of non-breeders only. The number of adult Barnacle Geese is the total catch in Ørsted Dal in 1963 (unpublished).

these years and that the breeding population has thus reached a maximum in this area. Were this true of the Greenland population in general, a steady decline in the proportion of first year birds on the wintering grounds would be expected so long as the adult population continues to increase. In fact there is no evidence of a decline of this sort. Counts on Islay, the principal wintering haunt of the Greenland population, in autumn 1974 gave an average of 13.0% juveniles and a mean brood size of 2.2 (M. A. Ogilvie, *in litt.*). This suggests firstly that 1974 was a below average breeding season and that the comparison with 1963 may therefore not be entirely reasonable and, secondly, that the sites visited in 1974 (with the exception of Traill Ø) had further reduced breeding success compared with other parts of the range. The same was true in 1961 and 1963 (Table 5).

The total numbers of adults of both species, regardless of breeding success, have shown significant increases over the last 11–13 years. There is a possibility, however, that there may have been a tendency in 1974 for birds to concentrate in Ørsted Dal from other areas, particularly Enhjørningens Dal and Pingel Dal. Such a movement of non-breeding Barnacle Geese was suggested by Marris & Ogilvie (1962) and the reverse movement of a ringed gosling was recorded, showing that even young birds are capable of undertaking the journey. This tendency may have been accentuated in 1974 because of the late melt. When we flew over the area on 25th June, Ørsted Dal was comparatively free of snow, whereas the surrounding areas were completely covered and this may have forced many birds to move there in order to find adequate feeding grounds. However, the total number of adult Barnacle Geese observed in Ørsted Dal and Fleming Fjord combined was 900 in 1961 and 1,025 in 1963, far fewer than the number observed in Ørsted Dal alone in 1974. Moreover, geese were still present in the Fleming Fjord area in July 1974 (I. H. M. Smart, pers. comm.).

The additional complication introduced by the possibility of a local movement of adults, makes it extremely difficult to quantify the increase which has occurred over the last 13 years. Reasonable estimates would be of the order of 30–40% in the case of Pinkfeet and between 66 and 187% in the case of Barnacle Geese. The lower of the two figures for Barnacle Geese is based on the assumption that in 1974 all the birds from Fleming Fjord moved to Ørsted Dal, while the larger figure assumes that this movement was no greater in 1974 than in 1961. Over the same period

(winter 1960–1961 to winter 1973–1974), the wintering Greenland and Icelandic population of Pink-footed Geese increased by about 68% (Boyd & Ogilvie, 1969; Ogilvie, 1974). Between 1960–1961 and 1972–1973, one year less than the 13 being considered here, the wintering Greenland population of Barnacle Geese increased by about 73% (Ogilvie & Boyd, 1975). Population changes at the wintering areas and breeding grounds are thus at least broadly correlated. In the case of the Barnacle Goose, the sample size on which the breeding ground estimates are based is not inconsiderable, for nearly 10% of the Greenland population spend the summer in the comparatively small section of Kong Oscar Fjord which we visited.

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#### Summary

Pink-footed Geese *Anser brachyrhynchus* bred successfully at three sites in Kong Oscar Fjord, N.E. Greenland in 1974. 26 nests were found, the average clutch size was 3.7 and 129 goslings were counted. Barnacle Geese *Branta leucopsis* bred successfully at all four sites visited, the average brood size was 2.8 and 272 goslings were counted. 628 adult Pinkfeet and 2,178 adult Barnacle Geese were observed, about 80% of the former species and 90% of the latter being non-breeders or breeders that failed to rear any young. The number of adults of both species showed increases over previous counts in 1961. The number of breeding pairs in the area was estimated to be 60 Pinkfeet and 110 Barnacle Geese; only Pinkfeet showed any evidence of an increased breeding population since 1963.

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1–2 week old Barnacle goslings, Orsted Dal, 20th July.

