

# THE GREENLAND BIRD-BANDING SYSTEM

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**B**IRD-BANDING is carried out only to a limited extent in the Arctic today, although information on birds there is probably more urgently needed than elsewhere for both economic and scientific reasons. Many arctic birds make more extensive migrations and cover longer distances than is usual among boreal birds; these migrations can be studied in detail only by banding.

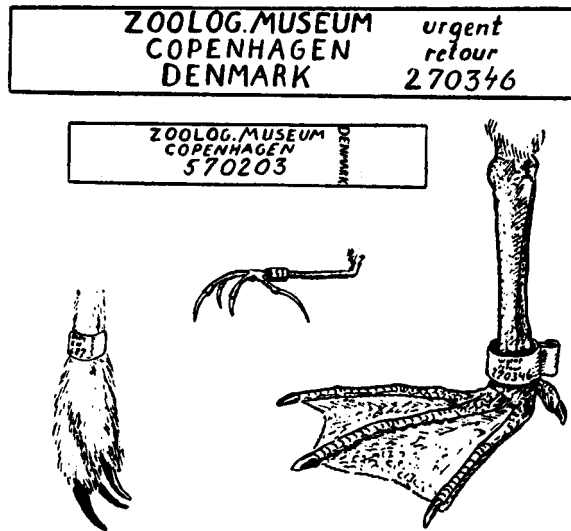
Before the Greenland bird-banding programme was started, no regular banding system was in operation in any part of the Arctic. The banding of a few sea birds, particularly kittiwakes (*Rissa tridactyla*), common murrelets (*Uria aalge*), and herring gulls (*Larus argentatus*), had been carried out by the Russians on the coast of Pol'uostrov Kol'skiy (Dement'ev, 1955; Kartashev, 1955). Arctic waders were banded at some Scandinavian stations (Jären in Norway, Oeland in Sweden, and Amager in Denmark) during spring and fall migrations, but no banding was carried out on their arctic breeding grounds. The inaccessibility of breeding localities, the nomadic habits of most of the human population and the lack of competent, educated personnel made it difficult to carry out regular bird-banding programmes in the Arctic. In Greenland these difficulties have been overcome to a large extent. Trade and other economic matters are handled by the government, and Danish officials are stationed at regular intervals along the extensive coasts as managers of settlements and outposts, or as employees at weather stations. The native inhabitants are in frequent contact with the officials, and they can be interested in bird-banding by the offer of a modest reward for their co-operation.

This idea was developed by the late Dr. Alfred Bertelsen, Medical Officer of Umanak District, West Greenland, who, with the help of Greenlanders, banded a total of 681 birds, mainly eiders (*Somateria mollissima*) and kittiwakes, in the years 1926-34. During 1936-39 only 51 birds were banded, mainly great black-backed gulls (*Larus marinus*) and Iceland gulls (*Larus glaucooides*) (Bertelsen, 1948).

After the Second World War bird-banding was organized at my request as a joint enterprise by Grønlands Styrelse (now Ministeriet for Grønland) and the Universitetets Zoologiske Museum, København. The Zoologiske Museum, which furnishes the banding material and acts as the centre of the project, is interested chiefly in the scientific aspects, while the Ministeriet for Grønland being aware of the importance of birds as a source of food in Greenland, is interested in the information for its economic value. It has been agreed that the banding programme is to be organized by the administrative officials throughout Greenland as a part of their duties, as outlined in instructions issued in "Kungørelser fra Grønlands Styrelse", 1946, No. 1. According to

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these the banding is carried out as follows. In early spring parcels of bands and notebooks are sent to all managers of settlements and outposts, a total of about 80 persons. The local manager then chooses a fully reliable man to undertake the banding during the summer. In about half the settlements it has been possible to find suitable men, but if they are not available the banding material is not used. The bands are supplied in eight sizes, No. 1, the largest, is suitable for sea eagles, and No. 8, the smallest, is used for passerines. The bands are shipped in envelopes, each containing 10 to 20 bands of one size. A list of the species of birds for which the bands can be used is printed in Greenlandic and Danish on the outside and the serial numbers of the enclosed bands are marked on it in ink. Notebooks containing detailed instructions in Greenlandic and Danish are supplied (Fig. 1). After each banding operation the following details are to be recorded: serial number of the band used, name of the species banded, date and locality of banding, and remarks, such as the age of the bird (adult or nestling) and mode of capture. In the fall, when the banding season ends, the local manager collects the notebooks and unused bands and sends them to the District Commissioner, who in turn delivers them to the Universitetets Zoologiske Museum.



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Fig. 1. Page of notebook with instructions in Danish and Greenlandic, handed to all bird-banders in Greenland.

Udfoldede ringe, samt disse anbragte på fod af  
Rype, Snespurv og And.

In order to encourage the work, a reward is paid for each bird banded. The amount varies with the difficulty of banding, but in general the larger the bird, the bigger is the reward. The rate for the sea eagle is set especially high in order to encourage the natives to band the nestlings of this rare species, instead of killing them for food.

**Table 1.** Rewards paid for the banding of various species of birds.

Name	Reward in Danish Kroner*	
	up to 1953 incl.	from 1954 on
Sea eagle	10	10
Goose	3	7.20
Cormorant, falcon	2	4.80
Raven, duck, loon	1	2.40
Gull, wader, auk	0.50	1.20
Kittiwake, tern	0.25	0.60
Redpoll, Lapland longspur	0.10	0.24
Snowbunting	0.05	0.12

\*one Danish Kroner is equivalent to about \$0.14.

A reward is also offered for the recovery of banded birds. For each bird shot, caught, or found dead 2 Kroner are paid if the band together with the foot is delivered to the local magistrate. He records the number of the band, date, locality and mode of death, and the name of the recoverer, and then sends the material to the Universitetets Zoologiske Museum. The reason for collecting the foot of the bird, which is not the usual procedure in bird-banding, is to provide a check on the identity of the bird without having to rely entirely on the knowledge of the bander.

The number of bands sent to the different centres varies from year to year. Extra large numbers of certain sizes, such as those suitable for eiders or murre, are sent on special request from a manager, or when it seems that the inhabitants are particularly interested in bird-banding. In southwest Greenland, where the natives earn a good summer income by fishing, the demand for bands is slight, while in the more primitive northern areas of Thule, Upernavik, and Umanak some very fine work is done, and the rewards paid for banding represent a substantial addition to the income of the inhabitants. So far no attempts to earn easy money by making false statements have been discovered; close attention by the managers and careful selection of suitable men have discouraged any attempts at dishonesty.

Occasional visits by scientists to the outposts are necessary to stimulate and sustain interest in bird-banding. During travels in Greenland in 1946, 1949, and 1954 the writer made many such visits, and he arranged for other Danish ornithologists to make similar visits in 1948 and 1951. The expenses of the banding programme, amounting to about 10,000 Kroner annually, are paid by the Ministeriet for Grønland. The administration has also published detailed reports on the banding system (in Danish) (Salomonsen, 1948, 1949, 1950, and 1955).

The Greenland banding programme has been operating for ten years and has yielded very good results. In the nine years 1946 to 1954 inclusive, a total of 30,215 birds has been banded, and 2,474 have been recovered, not including young found dead on the breeding grounds. Practically all recoveries are due to shooting, less than one per cent being due to other causes (mainly birds found dead, many of which have probably succumbed after being shot). The recoveries, averaging 8.2 per cent, can therefore be taken as indicating the amount of persecution by man. Table 2 lists the bandings and recoveries by species. It shows that the greater part of the recoveries has been made in Greenland itself, namely 7.6 per cent, against 0.6 per cent abroad. This is because many sea birds restrict their seasonal movements to Greenland waters and are shot during fall and winter in southern Greenland.

Table 2. Species of birds banded in Greenland.

Name	Number of specimens							
	banded			Greenland		recovered abroad		Total
	1946 -49	1950 -54	Total	1946 -49	1950 -54	1946 -49	1950 -54	
Common loon, <i>Gavia immer</i>	1	-	1	-	-	-	-	-
Red-throated loon, <i>G. stellata</i>	12	31	43	-	-	-	1	1
Fulmar, <i>Fulmarus glacialis</i>	288	688	976	15	39	2	-	56
Cormorant, <i>Phalacrocorax carbo</i>	101	250	351	34	73	-	-	107
Canada goose, <i>Branta canadensis</i>	1	-	1	1	-	-	-	1
White-fronted goose, <i>Anser albifrons</i>	632	149	781	27	28	75	52	182
Mallard, <i>Anas platyrhynchos</i>	204	146	350	22	15	-	-	37
Old-squaw, <i>Clangula hiemalis</i>	26	7	33	-	1	-	2	3
Harlequin duck, <i>Histrionicus histrionicus</i>	2	1	3	1	-	-	-	1
King eider, <i>Somateria spectabilis</i>	250	1,718	1,968	13	59	-	2	74
Common eider, <i>S. mollissima</i>	271	739	1,010	34	110	-	-	144
Red-breasted merganser, <i>Mergus serrator</i>	19	19	38	-	-	-	-	-
Sea eagle, <i>Haliaeetus albicilla</i>	19	20	39	7	8	-	-	15
Gyrfalcon, <i>Falco rusticolus</i>	11	8	19	1	2	-	-	3
Peregrine falcon, <i>F. peregrinus</i>	13	17	30	1	1	-	-	2
Ptarmigan, <i>Lagopus mutus</i>	88	70	158	11	14	-	-	25
Ringed plover, <i>Charadrius hiaticula</i>	10	6	16	-	-	-	-	-
Ruddy turnstone, <i>Arenaria interpres</i>	7	-	7	-	-	-	-	-
Purple sandpiper, <i>Erolia maritima</i>	71	60	131	15	12	-	-	27
Red phalarope, <i>Phalaropus fulicarius</i>	1	-	1	-	-	-	-	-
Northern phalarope, <i>Lobipes lobatus</i>	81	28	109	1	-	-	-	1
Pomarine jaeger, <i>Stercorarius pomarinus</i>	13	-	13	-	-	-	-	-
Parasitic jaeger, <i>S. parasiticus</i>	39	29	68	3	2	-	-	5
Glaucous gull, <i>Larus hyperboreus</i>	335	439	774	42	49	-	-	91
Iceland gull, <i>L. glaucoides</i>	691	979	1,670	161	206	-	5	372
Great black-backed gull, <i>L. maritimus</i>	103	130	233	23	13	-	-	36
Kittiwake, <i>Rissa tridactyla</i>	997	2,737	3,734	55	84	3	1	143
Ivory gull, <i>Pagophila eburnea</i>	6	-	6	-	-	-	-	-
Arctic tern, <i>Sterna paradisaea</i>	1,897	1,340	3,237	36	19	2	1	58
Brünnich's murre, <i>Uria lomvia</i>	807	3,574	4,381	19	139	4	19	181
Black guillemot, <i>Cepphus grylle</i>	656	1,275	1,931	114	217	-	-	331
Puffin, <i>Fratercula arctica</i>	62	42	104	-	1	-	1	2
Razor-billed auk, <i>Alca torda</i>	38	53	91	-	-	-	1	1
Dovekie, <i>Plautus alle</i>	803	1,667	2,470	144	293	-	1	438
Raven, <i>Corvus corax</i>	69	29	98	10	17	-	-	27
Redpoll, <i>Acanthis flammea</i>	62	45	107	1	-	-	-	1
Wheatear, <i>Oenanthe oenanthe</i>	720	547	1,267	4	6	2	1	13
Lapland longspur, <i>Calcarius lapponicus</i>	725	453	1,178	15	7	-	-	22
Snowbunting, <i>Plectrophenax nivalis</i>	1,788	1,000	2,788	30	36	3	5	74
Total	11,919	18,296	30,215	840	1,451	91	92	2,474

The percentages of recovery for a number of the more common species are given in Table 3, where the period of 1946-49 is compared with the whole banding period of 1946-54. The two sets of figures are remarkably uniform. Bearing in mind that the death rate of nestlings among sea birds that nest in colonies is often very high, a loss of more than 30 per cent by shooting, as

**Table 3.** Percentages and total numbers of recoveries of various birds banded in Greenland.

Name	in Greenland		Recoveries abroad		Total number
	1946-49	1946-54	1946-49	1946-54	
Fulmar, <i>Fulmarus glacialis</i>	5.2	5.5	0.7	—	56
Cormorant, <i>Phalacrocorax carbo</i>	33.7	30.5	—	—	107
White-fronted goose, <i>Anser albifrons</i>	4.3	7.0	11.9	16.3	182
Mallard, <i>Anas platyrhynchos</i>	10.8	10.6	—	—	37
King eider, <i>Somateria spectabilis</i>	5.2	3.7	—	0.1	74
Common eider, <i>S. mollissima</i>	12.5	14.3	—	—	144
Sea eagle, <i>Haliaeetus albicilla</i>	36.8	38.5	—	—	15
Ptarmigan, <i>Lagopus mutus</i>	12.5	15.8	—	—	25
Purple sandpiper, <i>Erolia maritima</i>	21.1	20.6	—	—	27
Glaucus gull, <i>Larus hyperboreus</i>	12.5	11.8	—	—	91
Iceland gull, <i>L. glaucooides</i>	23.3	23.0	—	0.3	372
Great black-backed gull, <i>L. marinus</i>	22.3	15.4	—	—	36
Kittiwake, <i>Rissa tridactyla</i>	5.5	3.7	0.3	0.1	143
Brünnich's murre, <i>Uria lomvia</i>	2.4	3.6	0.5	0.5	181
Black Guillemot, <i>Cepphus grylle</i>	17.4	17.1	—	—	331
Dovekie, <i>Plautus alle</i>	17.9	17.7	—	—	438
Raven, <i>Corvus corax</i>	14.5	27.5	—	—	27

recorded for the cormorant, is certainly too high if the population is to preserve its numbers. The percentage of recovery for the sea eagle, the highest of all, shows that protective measures are urgently needed for this species. A loss by hunting of about 20 per cent, which is usual for the larger gulls (*Larus marinus*, *L. hyperboreus*, and *L. glaucooides*), the purple sandpiper (*Erolia maritima*), guillemot (*Cepphus grylle*), and dovekie (*Plautus alle*), probably does not endanger the population. Recoveries of the dovekie are all due to netting by the Polar Eskimo at the northern breeding grounds, and no recoveries have been made during the wintering period in southwest Greenland. The difference in the percentages of recovery of the common eider and the king eider may be due to the latter being banded only when adult and flightless, while the former is banded in the nestling stage and its recoveries include, therefore, many inexperienced birds that fall an easy prey to the hunter. The small numbers of kittiwakes and Brünnich's murres (*Uria lomvia*) recovered as compared with those for the larger gulls are explained by the fact that the gulls are all littoral species that spend the whole winter close to the coast in south Greenland; the kittiwakes, on the other hand, move south during the fall and spend the off-season in the pelagic zone of the Atlantic, where they are safe from man. Brünnich's murre also spends the winter off shore, where it is not easily accessible.

The recoveries outside of Greenland are of importance for only a few species. It is of interest that no less than 16.3 per cent of the white-fronted geese banded in west Greenland have been shot while wintering in Great Britain, against 7 per cent recovered in Greenland. Some hunting of murres was carried out in Newfoundland before that country became a province of Canada, but the small numbers killed did not affect the stocks of this bird in Greenland.

The banding has provided valuable information about the migration routes and wintering grounds of the migratory birds of Greenland. All recoveries abroad, amounting to a total of 183 until 1954, have been listed (Salomonsen, 1947-55); it is, therefore, unnecessary to go into details here, nor would it be possible to bring out the significance of individual records in a short article.

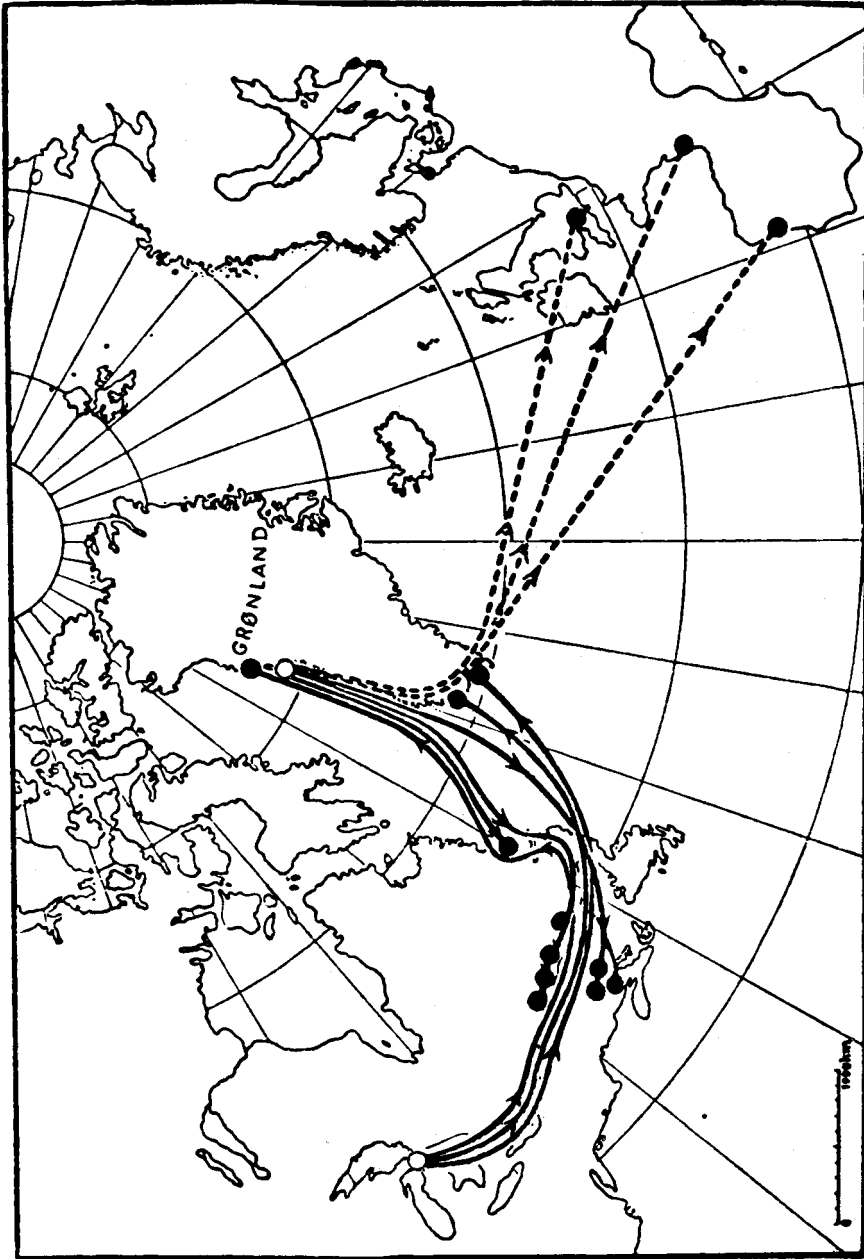


Fig. 2. Migration routes of snowbunting and wheatear, based on recoveries of banded birds. Solid lines: snowbunting; broken lines: wheatear. Open circles: place of banding; solid circles: place of recovery.

However, a few outstanding examples should be mentioned. The recoveries of snowbuntings (*Plectrophenax nivalis*) and wheatears (*Oenanthe oenanthe*) have been mapped in Fig. 2. These two small passerines that share the same breeding grounds in summer, show very different migration patterns in the fall. The snowbuntings move to the interior of Canada, whereas the wheatears

cross the Atlantic and winter in Europe. Old-squaws (*Clangula hiemalis*) that were banded on Disko Island have been recovered as far apart as the Alaska-Yukon border in North America and the Baltic Sea in Europe, displaying an extreme case of so-called abmigration. Two recoveries of king eiders, banded during their moult-migration in late summer in West Greenland, have been made in northern Canada, showing the place of origin of the vast flocks of this species that gather in summer in Greenland waters. A total of 127 recoveries of white-fronted geese that had been banded in West Greenland, shows that the migration route of these birds just touches southwest Iceland and that the majority winter in Eire, whereas a small number stay in Scotland. This pattern was rather unexpected. Among the recoveries of the arctic tern (*Sterna paradisaea*) one is especially noteworthy. A specimen that had been banded in the Disko Bay region was recovered in Natal, South Africa, after travelling a distance of more than 18,000 km. in less than three months. This is the longest flight ever recorded by means of banding.

#### NOTE:

Since the above paper was completed a new list of recoveries abroad of birds banded in Greenland has been published by the author in *Dansk Ornith. Foren. Tidsskr.* 1957, Vol. 51, p. 33. This list adds 49 recoveries to the previous total of 183 and contains the first results of banding in East Greenland that was started in 1955. Among these are recoveries in the Old World of barnacle goose (*Branta leucopsis*), pink-footed goose (*Anser brachyrhynchus*), and snowbunting (*Plectrophenax nivalis*). Especially noteworthy records of birds banded in West Greenland are: the first recoveries in Canada of Greenland duck hawk (*Falco peregrinus anatum*) and of Lapland longspur (*Calcarius lapponicus*), the third recovery in northern Canada (Boothia Peninsula) of king eider (*Somateria spectabilis*), two further recoveries of snowbunting (one in Ontario and one in Minnesota), and two recoveries of wheatear (*Oenanthe oenanthe*) in Belgium and France respectively.

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