THE NUMBER OF BARNACLE GEESE IN EUROPE IN 1959-1960

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Summary

A CO-OPERATIVE international inquiry in the winter of 1959-1960 resulted in an estimate of about 30,000 for the world population of *Branta leucopsis*. At 1st December, 1959 there were about 11,100 in the Netherlands, 8,600 in Germany, 7,100 in Scotland and 2,800 in Eire. No other country is likely to have held more than a few stragglers at that date. Evidence from ringing and from observations on the proportions of first-winter birds in different flocks suggests that the geese in the Netherlands and Germany are those breeding in Novaya Zemlya and Vaigach Island, off the Siberian coast. Scottish birds include some from Spitzbergen, and more from east Greenland. The Irish geese probably come only from Greenland. The stocks from Siberia and Spitzbergen have apparently recovered in recent years from the dangerously low levels they reached in 1945-1950, although aerial surveys in Sweden show that numbers stopping there in spring have decreased greatly in the last few years. Barnacle geese breeding in Greenland are faring less well than the other two stocks.

Introduction

In 1957 the writer began, on behalf of the Trust, an investigation into the distribution and population dynamics of the Barnacle Goose *Branta leucopsis* in the British Isles. This study must be continued for several more years before a satisfactory understanding of the behaviour of the British population is achieved. The main purpose of this short paper is to report the results of an international inquiry in the winter of 1959-1960 which produced for the first time details of the numbers of Barnacle Geese present in all the important wintering places at one time, namely 1st December, 1959.

The arrangement of counts in Germany, the Netherlands and Sweden was carried out by national organisers at the request of the International Wildfowl Research Bureau. The results were transmitted to the writer, who embodied them in a report approved by the Bureau at a meeting in Wilhelmshaven in October, 1960. That report forms the basis of the present paper.

In addition to summarising the results of the winter census, the paper also presents evidence from recoveries of ringed geese and from observations on changes in numbers and on the proportion of first-winter birds present in flocks in different areas which helps to explain some problems in the distribution of the species.

The number of Barnacle Geese at 1st December, 1959

From counts and estimates made in Germany, the Netherlands, Scotland and Ireland in November and December, 1959, it appears that the total number of Barnacle Geese at 1st December, 1959 was most probably about 30,000, with extreme limits of 24,600 and 37,500.

It is unlikely that any other country held more than a few vagrants at this date.

The geese were distributed in the following way:-

GERMANY:	Schleswig-Holstein	8400		
	Nieder-Sachsen	170		
			8,600	(5,400– 9,500)
NETHERLANDS:	Friesland	11000		
	Delta area	100		
			11,100	(9,000–13,300)
SCOTLAND:	Outer Hebrides	1430		
	Inner Hebrides	3300		
	N.W. Highlands	550		
	Solway area	1800		
			7,100	(6,500–11,500)
IRELAND (Eire):			2,800	(2,700– 3,200)
	GRAND TOTAL		29,600	(24,600–37,500)

The surveys in each country varied in technique and completeness so that some account should be given of how the above figures were arrived at.

Germany. Counts organised by Dr. F. Goethe and Dr. H. Requate, of Vogelwarte Helgoland, supplemented by observations submitted to the British Services Wildfowl Sub-Committee, reported by Mr. J. A. V. Davies. Observers: Sqn. Ldr. R. S. T. Buchanan, W. Fuhrman, Dr. jnr. R. Heldt, P. Petschendorffer, P. Rabe, Dr. Rassow.

Schleswig-Holstein. Two major flocks. At Hamburger Hallig, near Bredstedt, about 5000 geese estimated to be present on 1st December. There were about 5000 in the same area on 18th November and about 6000 on 6th December.

2,500 to 3,000 geese were seen in the Friedrichskoog area on 15th November. No observations were made around 1st December. On 13th December, only 80 were seen on Dieksanderkoog, part of the Friedrichskoog area. Since it seems clear that the Hamburger Hallig flocks were not affected by the movements of the Friedrichskoog birds, the compiler has assumed that 2,700 were present in the latter group on 1st December. In view of the rapid build-up in Friesland (see below) in the last few days of November this assumption may well exaggerate the size of the continental population, by including in the German total some birds that had already moved from Friedrichskoog to Friesland.

100 Barnacles were present on the island of Föhr at the time of the survey.

Nieder-Sachsen. All the known resorts of the species except Greetsiel seem to have been visited in November and December, but the only positive records were of 100 on the west side of the River Weser, opposite Bremerhaven and of 70 on the east side of the Jade Busen, both on 29th November. There were about 50 at Carolinensiel in mid-November and about 30 on Langeoog for a few days in mid-November, but none in either haunt on 1st December. The compiler has put the regional total at 170. About 1500 were seen at

Balje, on the River Elbe, on 31st October. They had been there for about a week, but flew off westwards that day. It seems unlikely that any substantial number was still in the area at the beginning of December.

Netherlands. Counts made and collected by A. Timmerman and communicated by Dr. M. F. Mörzer Bruijns, of the State Institute for Nature Conservation Research—R.I.V.O.N. Full details are held by that Institute. A series of counts and estimates of the numbers in the two important wintering areas in the Netherlands were made from October to the end of March. All the regular haunts (6 in Friesland, 5 in the delta area) were counted each month. Only the counts on 30th November are used in Table 1.

Scotland. The Solway area was counted from the ground by E. L. Roberts (Warden, Caerlaverock Wildfowl Refuge), J. Powell and R. Stokoe. The counts were complicated by the frequent shifting of the geese between two localities about 16 miles apart during the census period, but the error is unlikely to have exceeded ± 200 in 1800.

All other areas were inspected from the air by H. Boyd. There are about 100 haunts known to be frequented more or less regularly at the present time. All were examined except Eilean nan Roan, Sutherland and Staffin Island, off Skye, Inverness. Neither haunt is a large one and the total missed there has been put at 150 ± 150. Errors in counting or estimating numbers from the air are likely to have been of the order of 5% in flocks of less than 100, 10% in flocks of 100 to 250 and up to 20% in larger groups. Since most of the flocks seen contained less than 150 birds, counting errors are thought to have been small (± 500 in all). Failure to find geese is likely to have been an important source of error only on the island of Islay, the main wintering place, where 2,800 were seen on 2nd December. This total was smaller than had been expected and larger numbers were seen later in the winter (see below). It is rather unlikely that large numbers were missed in December, since the observer is familiar with the distribution of geese on the island and since some geese were in fact seen on all the major feeding areas except one.

Ireland. All the known haunts and a number of other possible islands were inspected from the air by H. Boyd. Since most of the birds were in small groups the limits of error are believed to have been small.

A full account of the survey in Scotland and Ireland is in the files of the Wildfowl Trust. Though no complete census had been made in the previous winter, 1958-59, data from the Solway, Islay and Ireland suggest that the British mid-winter population in that season was substantially bigger than in 1959-60, probably about 13,000.

Mixing of breeding stocks in winter

A second task of the 1959 inquiry was to find out to what extent geese from the three breeding areas (E. Greenland, Spitzbergen and Novaya Zemlya) may mix in the wintering places. There were two ways in which field observations might help : (1) by the comparison of counts in different places at intervals through the winter, and (2) by the comparison of age-group ratio counts from different areas.

Numbers at other times during the winter of 1959-60

The series of counts obtained in the Netherlands is of great interest. There were only 500 on 23rd October, 600 on 29th October and 13th

November, at least 4,500 on 24th and 11,000 by 27th November. The number present in early December, 1959 (11-12,000) increased to over 16,000 at the beginning of January, 1960 and reached a peak of 19,200 on 17th January, dropping slightly to 18,260 on 22nd, to 17,515 on 31st January, 17,325 on 8th February and 17,020 on 14th February. Later in February far fewer were present and the most seen in March was 3,000. Perhaps the most important feature of these counts is that the maximum (19,200) lies close to the estimate of 19,700 present in the Netherlands and Germany together at the beginning of December, 1959. Though in the absence of a complete series of observations from Germany it is not possible to be sure that the number of Barnacle Geese on the North German coasts on 17th January, 1960 was negligible, the resemblance between the December and January figures fits the hypothesis that the geese of Germany and the Netherlands form a single group. Where most of these geese went in late February and March and where they were in October and the first half of November are questions that still have to be answered.

Because of the widely scattered occurrence of Barnacle Geese in Scotland and Ireland it was financially impossible to repeat the November-December survey later in the winter. But some records from the principal haunts—the island of Islay, Argyll, and the Caerlaverock Wildfowl Refuge on the Dumfriesshire coast of the Solway estuary—show that substantial fluctuations in numbers took place during the winter. In mid-February, 1960 Dr. J. Morton Boyd found 7,200 $\pm$ 20% (5,800-8,600) on Islay, and Professor M. F. M. Meiklejohn reported about 8,000 there shortly afterwards. The numbers on the Caerlaverock Refuge in the second half of February, 1960 varied : 1,600 from 12th-19th; 1,000 on 20th and 21st; and 1,650 from 22nd to 28th, but it is very probable that the temporary drop was due to a shift to another part of the Solway, rather than further afield. Thus these two localities alone seem to have held 8,800 Barnacle Geese, compared with the total of 9,900 found in all the Scottish and Irish haunts together at the beginning of December, 1959. If the geese wintering in Scotland and Ireland are isolated from those in the Netherlands and Germany, it seems necessary to suppose either that the December census on Islay was incomplete or that most of the other haunts in the islands were deserted or greatly depleted in the middle of February. Alternatively, it is possible that in late February and March some Barnacle Geese from the Netherlands moved to Scotland. Further information on seasonal changes in numbers on the smaller Scottish islands, particularly in the Outer Hebrides, is badly needed.

Age-group ratio counts

In the appeal for help in this inquiry sent out in September 1959 it was suggested, on the basis of weather records, that " few young birds will have been reared in Spitzbergen and Greenland but that the population of Novaya Zemlya may have had a successful breeding season." These predictions seem to have been correct.

On the Caerlaverock Reserve, Dumfries, Scotland, where a flock of about 1600 Barnacle Geese was examined on 20th and 21st October 1959, 146 in a sample of 1000 were identified as juveniles (14.6%). This flock was seen to include at least four geese ringed in Spitzbergen in July, 1954 (which carried white plastic rings as well as numbered aluminium ones).

On Islay, Argyll, Scotland on 26th to 28th October, 1959, 102 juveniles were identified in groups totalling 721 (14.1% juveniles). The only ringed goose so far recovered in Islay (in December, 1956) was marked in Greenland in 1955.

Precise counts of juveniles cannot be made from an aircraft, but in favourable conditions it is possible to distinguish between flocks containing many or only a few young birds, because the wings of juveniles look darker than those of adults when seen in flight from above. None of the flocks seen in Ireland in December, 1959 contained a large proportion of young birds.

Opportunities for close study of Barnacle Geese in the Netherlands are less favourable than in the two Scottish localities where large samples were scrutinised, but four groups studied at close range in widely scattered localities included 86 juveniles in 345 (25.0%). 46 caught in nets at Joure, Friesland, in January and February, 1960 included 17 juveniles (37%). A flock of 800 at Sondel, Friesland, on 21st January, 1960 appeared to contain 30-50% young birds and another flock of 300 seen on 1st March, 1960 near Lemsterland, Friesland had 20-30%. (Full details of these Dutch observations have appeared in a paper by Dr. M. F. Mörzer Bruijns in *Limosa* 34 : 29-33.

It is planned to extend these age-group observations in the Netherlands and in Britain in future winters.

The distribution of recoveries of ringed geese.

An important step forward in our knowledge of distribution has been made by Mr. J. A. Eygenraam, of the Institute for Biological Field Research, Arnhem (I.T.B.O.N.). He has persuaded nearly all the remaining professional goose-netters in Holland to ring geese for the Institute. Most of the geese caught are White-fronted *Anser a. albifrons* and Bean *A.f. fabalis*, but since 1956 increasing numbers of *B. leucopsis* have been marked and have so far yielded 11 recoveries. From this recent Dutch ringing, and earlier work by expeditions to Spitzbergen in 1954 and Greenland in 1955, both led by Mr. Russell Marris, the following picture of distribution has emerged:

Recovered in	Ringed in Spitzbergen	Ringed in E. Greenland	Ringed in Holland
Siberia			4
Germany			3
Holland			4
Iceland		1	
Scotland			
Hebrides		17	
Solway	6		
Ireland		4	
Spain		1	

This evidence from ringing supports the hypothesis that the Continental population is distinct from those of Scotland and Ireland, although movements in late February and March, such as those which may have occurred in 1960, are unlikely to be demonstrated by recoveries, since only in Germany can Barnacle Geese legally be shot at that time.

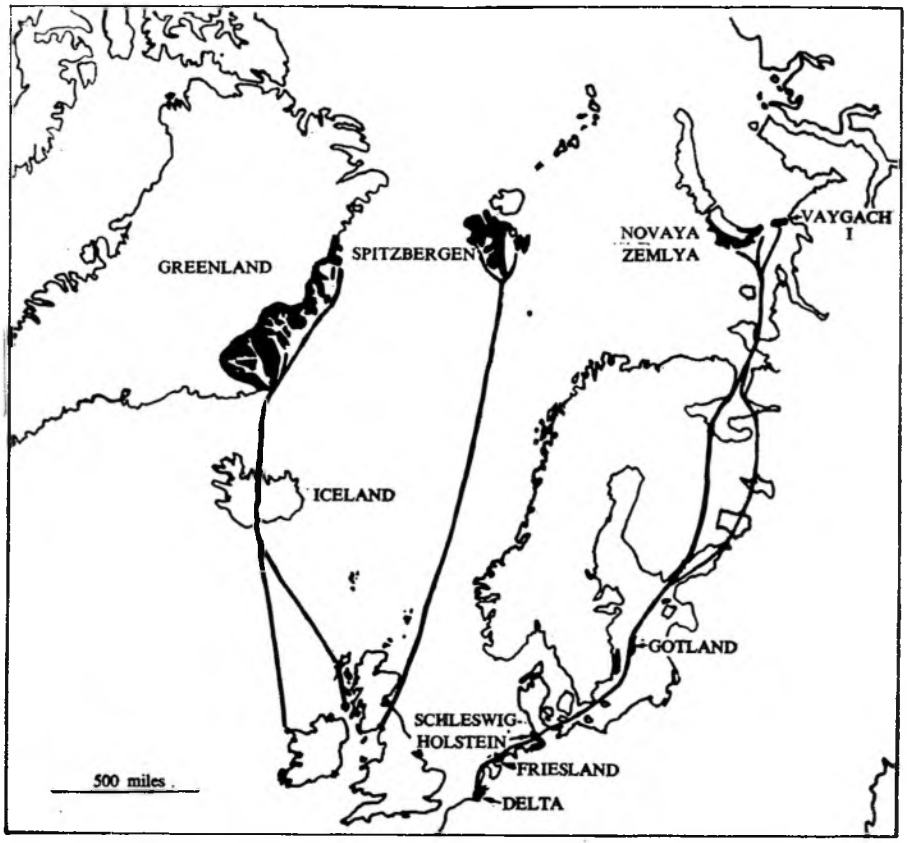

Figure 1. Breeding and wintering areas of the Barnacle Goose

Numbers of Barnacle Geese in Sweden in the spring of 1960

As part of the international inquiry Dr. K. Curry-Lindahl, of Nordiska museet and Skansen, Stockholm, organised an aerial survey of Barnacle Geese in Gotland on 29th April, 1960. The census was arranged in collaboration with the Royal Swedish Air Force and the Swedish Association of Hunters, who provided two observers, Mr. Nils Höglund and Mr. R. Beinert. Two small aircraft were used, one following the other around the coast of Gotland, providing independent estimates of the numbers of geese present. In addition, photographs were taken to check the visual estimates.

Seven different areas on the south-western and eastern coasts of the island are used by Barnacles. The total number found on 29th April, 1960 was about 3,500 geese, a slight increase on the numbers estimated visually (3350 from aircraft A and 3250 from B) because the photographs showed a tendency to underestimate numbers.

This number was much lower than expected. The spring of 1960 was exceptionally early in northern Scandinavia and possibly the geese continued their migration earlier than usual. But other factors were probably involved, since numbers in recent years are known to have declined from the 10,000 geese reported in the early 1940's. There have been marked changes in the

abundance and distribution of Barnacles in Sweden in spring at other times during the last hundred years, which are discussed fully by Curry-Lindahl in *Vara Faglar i Norden,* pt. 1, (p. 353, 1959).

For the immediate purpose of this inquiry the important point is that the number seen in Sweden is only a small fraction of the total population and less than one-fifth of the number present in Germany and the Netherlands from November to February so that Swedish observations seem unlikely to be useful as a check on midwinter numbers.

Breeding distribution of the Barnacle Goose in the U.S.S.R.

A recent paper by S. M. Uspenski (Some species of birds in the north-east of the European part of the U.S.S.R., *Uchen. Zap. Moscow Univ.* 197 : pp. 35-47, at pp. 40-1, 1959) reviews the present distribution of Barnacle Geese on

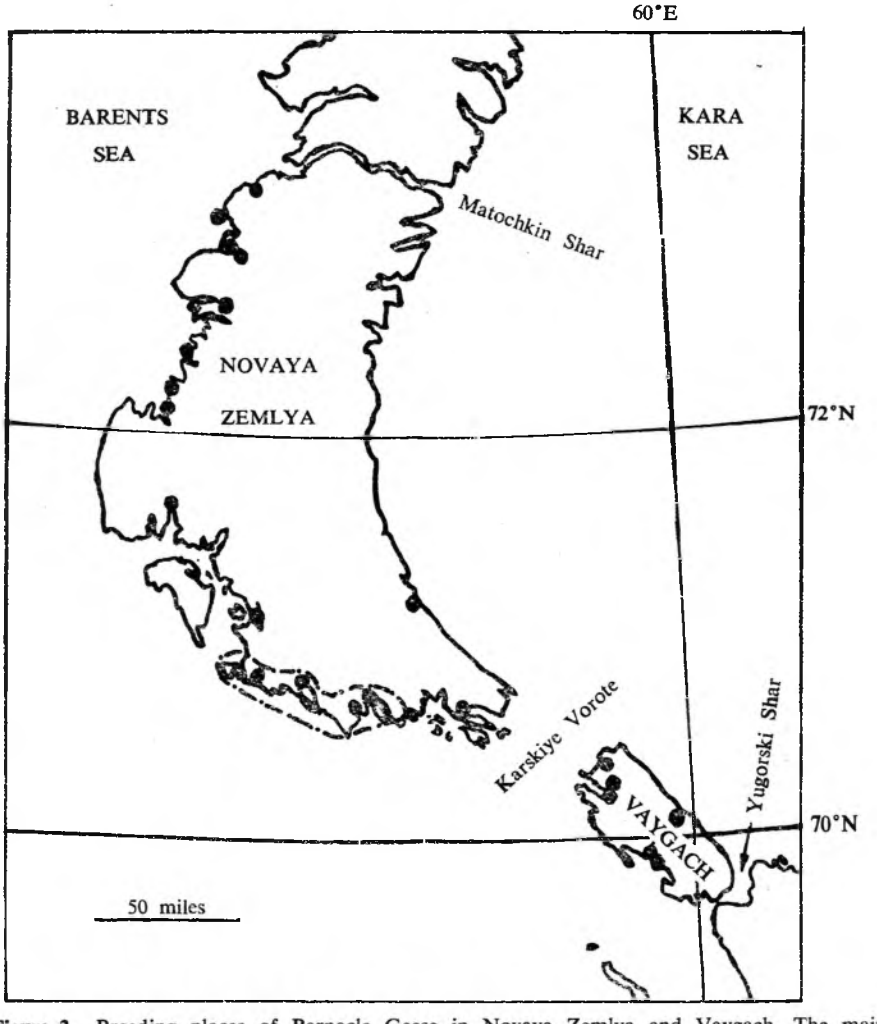

Figure 2. Breeding places of Barnacle Geese in Novaya Zemlya and Vaygach. The main concentration is in the area enclosed by a broken line. (After Uspenski, 1959).

the southern island of Novaya Zemlya and reports the discovery in 1957 of breeding on the island of Vaigach, between Novaya Zemlya and the Kara peninsula. The buoyant tone of this paper is in contrast to the gloom of the account of *B. leucopsis* in *The Birds of the Soviet Union* (1952) which said that in recent years the species had declined catastrophically on Novaya Zemlya. It seems possible that the earlier decline has been checked, or even reversed.

The accompanying map, redrawn from one given by Uspenski, shows the distribution of the known breeding places of Barnacles on the two islands.

Discussion

The present inquiry was intended to provide a starting-point for future research rather than to be complete in itself. The lack of detailed and complete counts in earlier years effectively prevents thorough discussion of changes in the abundance of Barnacle Geese, but it seems proper to indicate briefly how the findings of 1959-60 compare with what was known before.

The population wintering in Germany and Holland seems to be larger now that it has been since the 1939-45 war. The large numbers found in the Netherlands in January and February, 1960 and at the same period in 1959 were substantially greater than had been recorded previously. In the early 1950's the wintering population was thought to be about 10,000. There are some indications that recent gains in Holland are due to reductions in the numbers staying in Germany in mid-winter, although there are too few numerical records from German haunts to make this certain. In any event the numbers in Germany in autumn seem to have increased over the last twenty years. In 1952 J. G. Harrison remarked that " there seems every reason to associate the increase of the Barnacle Goose with the extensive reclamation schemes that are being developed," since these have provided additional areas of turf-forming grass, the preferred food of the species. It is also likely that the improved status of this continental population is due in part to the complete protection afforded by law to the species in the Netherlands since 1946.

In the British Isles the situation appears more complicated. As has been noted above, there were probably substantially more Barnacles wintering in 1958-59 than in 1959-60, but the difference could be due solely to a poor breeding season in 1959. On the Solway the 1,800 or so present in 1959-60 were the largest number recorded for about twenty-five years (though the total rose again in the autumn of 1960 to 2,500). There has been an encouraging growth in the numbers wintering in the Solway since 1953-54 when the stock was as low as 300. The resurgence followed immediately upon the full legal protection afforded by the Protection of Birds Act, 1954, and has been especially marked since the creation of the Caerlaverock Nature Reserve, on the Dumfriesshire shore, in April, 1957.

Numerically, the most important British resort is Islay, where from 6,000 to 10,000 have been found nearly every winter since 1954-55, the numbers having increased to that level over the last thirty years and having probably reached somewhere near the " carrying capacity " of the island. Here, as on all the island resorts of the species in Scotland except three, the

total legal protection afforded from 1st December, 1954, was removed by an Order taking effect on 18th November, 1955, permitting Barnacles to be shot on the islands in the months of December and January. On Islay this Order has had no serious effects, because the geese are exceptionally well looked after by interested landowners, but elsewhere the situation is less happy and there is some evidence that the numbers frequenting the Outer Hebrides have continued to decline in the last four years.

In Ireland the numbers of Barnacles found in 1959 seem to have been of the same order as at any time in the last ten years. There has been a big decrease at what was formerly the largest haunt on the mainland, in Co. Sligo, which held about a thousand from the early years of this century until about four years ago and where now less than 250 occur : and a decrease in numbers and in regularity of occurrence at the only other important mainland locality, in Co. Wexford. But on the islands off Mayo, Donegal and Galway the numbers do not yet seem to have fallen to a similar extent, despite increased disturbance of some of the larger flocks by indiscriminate shooting. In Eire, Barnacle Geese may be shot from 1st September to 25th February. In Northern Ireland the Barnacle has been wholly protected since 1951, but unfortunately it nowhere occurs in quantity.

In sum, the Barnacle Goose is not a very rare bird and its present status does not seem especially perilous, but the species is scarce enough to justify a continuing careful watch and restraint on factors liable to be harmful, as well as further research on several aspects of its biology. There is a particular need for information about the places frequented on passage in autumn and spring.

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