GREYLAG GEESE IN BRITAIN IN WINTER

Hugh Boyd

SUMMARY

PERSONAL investigations in 1957 and 1958 are combined with data contributed by more than 130 observers to illustrate the present distribution of the Greylag in the British Isles in winter. Most of the geese are concentrated in the southern half of Scotland, between 54° 40′ N and 56° 40′ N. Some 120 localities are known to have been frequented by flocks of Greylags during the winters 1955-58. Only 16 places, all in Scotland, harbour more than 1,000 Greylags for any considerable period.

No census has been achieved, but the records suggest that the population is likely to have numbered between 17,000 and 23,000 in late November 1957 and again in late November 1958. Data from earlier years, and from other times during the winter, are less complete. The numbers in the autumn of 1956 were probably similar to those in 1957 and 1958, but there may have been fewer in 1955. The impression of scarcity in the winter of 1955-56 is supported by counts in a sample of major localities, covering the years 1952-58. This sample also showed a comparatively massive peak in 1953-54 followed by a slump in 1954-55.

Maps of recoveries of ringed Greylags are used in conjunction with data on numbers to show the general pattern of winter movements. The resident Scottish population, which is very probably less than 5% of the autumn total, seems to be nearly sedentary, remaining in the Outer Hebrides and the north and west of Scotland. The Iceland-breeding geese, which comprise almost the entire bulk of winter immigrants, enter Scotland during October and November and leave again from February to April. Much of the movement in the intervening months is of a local character, shifting between roosts five to fifty miles apart, but there is a tendency for numbers to decrease in the north and increase in the south-west of Scotland from November through February. In Ireland most are seen in December and January.

The Icelandic Greylag population seems to be in a comparatively steady state at present, after increasing greatly during the last thirty years, and changes in its choice of wintering places give no cause for other than local concern. The British-breeding population, which has decreased seriously during this century, needs to be considered separately.

INTRODUCTION

The enquiry reported here had its origin in differences of opinion about the prosperity of the Greylag Goose (*Anser anser*). Its first object was to assemble a detailed picture of the numbers and distribution of the Greylag in Britain in recent years; its second, to look for changes during the last twenty years. This paper is concerned largely with the present position, because the evidence covering the longer period is too full of holes and contradictions to provide the basis for a reasoned assessment.

The Greylag is of especial interest as our only native goose. But the status of the small breeding population is deliberately excluded from treatment

here. Breeding Greylags are vulnerable to human disturbance and most of the landowners and other people with a particular interest in the scattered breeding colonies, whether of wholly-wild or feral birds, feel strongly that knowledge of their whereabouts and success should not be made public. It would be foolish to publish an account dealing only with colonies not subject to " security " restrictions.

Ringing has shown that the Greylags found in Britain in winter must nearly all breed in Iceland. A recent short paper (Boyd, *Wildfowl Trust Eighth Annual Report,* pp. 51-54, 1957) reported that Iceland-ringed Greylags have been found only in Iceland and the British Isles and that summer recoveries of Scottish-ringed Greylags have all been found in Iceland (431 Greylags were ringed in Scotland from 1950 to 1953). Greylags have also been ringed, in small numbers, in Sweden, Denmark, Austria and Hungary, but no marked geese from these countries have been found in Britain, although reported from Russia, Poland, Holland and Spain. The Icelandic-British population cannot be regarded as wholly isolated from the continental ones, because a Greylag ringed in Kirkcudbrightshire in March 1950 was shot in Jutland, Denmark, in November 1955, and because occasional individuals and small groups seen in Britain have differed strikingly in appearance from the British and Icelandic stocks. Such as, for example, three seen in Gloucestershire from December 1953 to March 1954 (*Wildfowl Trust Seventh Annual Report,* p. 13, 1955). But the extent of the mixing is so small that, though of interest from the viewpoint of genetics, it is insignificant in considering changes in numbers. Even within the British Isles, it is apparent that the breeding geese, which are nearly sedentary, mix very little with the immigrants from Iceland, so that the mobile population under discussion in the following pages is almost entirely of Icelandic origin.

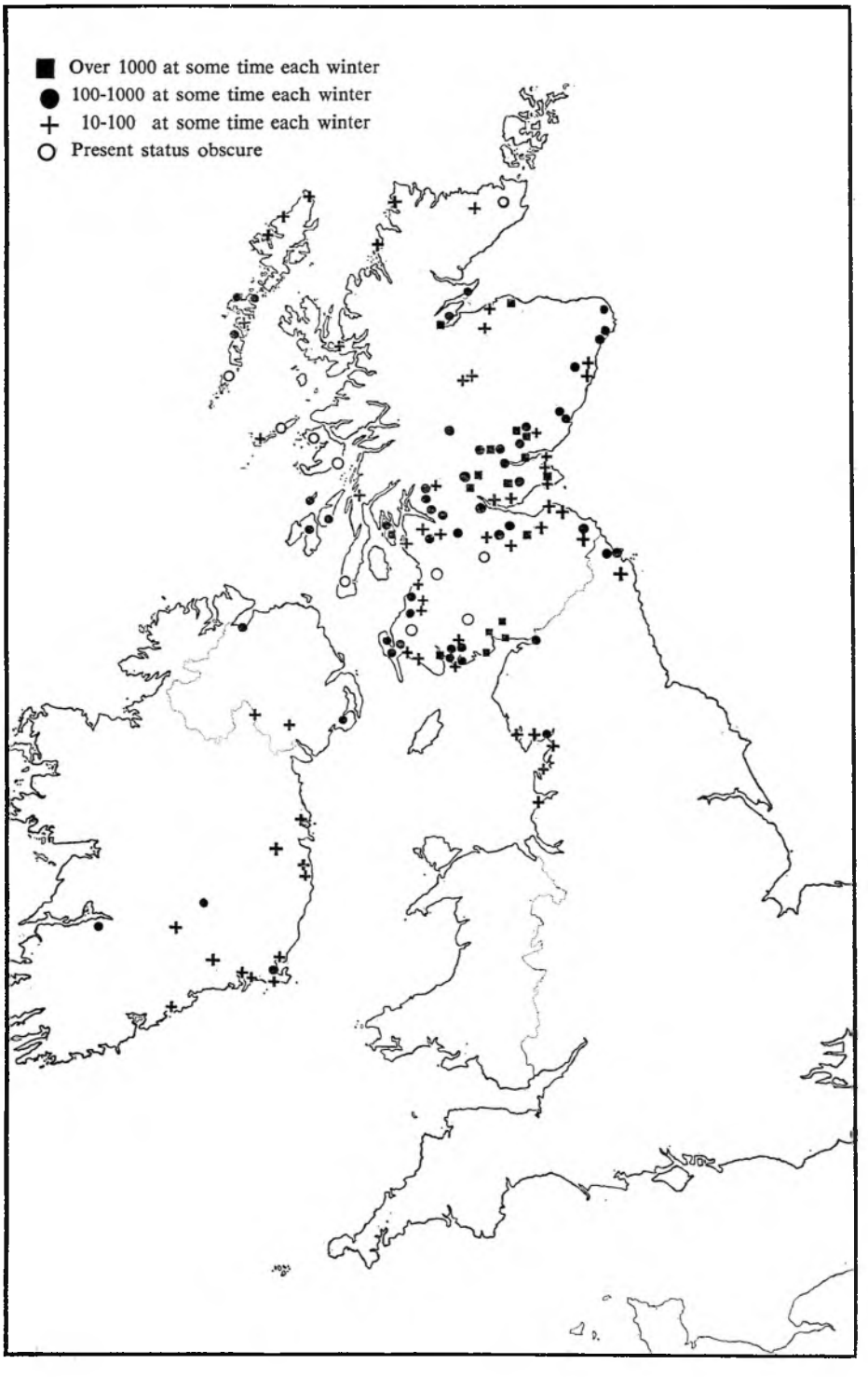
The writer has some acquaintance at first hand with Greylags in most of their wintering places in Scotland and England. But most of the data on which this account is based have been provided by others—in published reports, in letters and conversations and, especially, in observations made within the framework of the Wildfowl Count scheme. This essential help is acknowledged more fully elsewhere. This description of the present status of the Greylag is highly abstracted and condensed, but the source material remains in the Wildfowl Trust files.

THE PRESENT DISTRIBUTION

Figure 1 maps 123 localities known to have been frequented by Greylags during the winters of 1955-58, together with a further 11 places where they have been reported since 1945 but for which no very recent information is available. The marks correspond to the roosting places rather than the often quite extensive feeding ranges of goose flocks. Their location on a map of this scale cannot be very precise. This is perhaps as well. Not all the places marked are in use simultaneously, and their periods of use vary greatly in length and in seasonal occurence. " Frequented " implies that a flock has been seen for a period each winter. Records of very small numbers, or of single appearances of larger groups have been neglected in compiling the map.

The relative importance of the sites is shown crudely by symbols, corresponding to a logarithmic scale of abundance: + (class 1) 10-100 seen at winter peak; ● (class 2) 100-1000; ■(class 3) over 1000 at peak. Records

FIGURE 1: Locations frequented by Greylags in winter, 1955-58.



from three winters have been used in deciding the status, to increase the data available and so reduce errors of interpretation.

The great majority of Greylag wintering places are seen to be in Scotland, with a small number of known haunts in Ireland, very few in England and none now known in Wales. Table I summarizes the distribution of localities of the three classes of abundance: 58 in class 1, 45 in class 2, and only 16, all in Scotland, in class 3. Both the map and the table show that most of the geese are concentrated in the southern half of Scotland, from 54° 40′ N to 56° 40′ N. This presentation does not show how the population is distributed at any one time.

TABLE I
Regional distribution of Greylag wintering areas, 1955–58
Feral flocks omitted

	Class 1 (10–100 at peak)	Class 2 (100–1000 at peak)	Class 3 (1000 or more at peak)	Total	Additional localities where present status uncertain
SCOTLAND					
Outer Hebrides ..	4	3	—	7	1
North and N.East	10	6	2	18	1
East Central ..	10	11	9	30	1
West (incl. Bute) ..	5	7	1	13	2
Inner Hebrides ..	2	3	—	5	3
South West ..	7	9	4	20	2
ENGLAND					
North East (incl. Berwicks)	2	3	—	5	—
North West ..	5	2	—	7	1
IRELAND	13	5	—	18	?
	58	49	16	123	11+

THE SIZE OF THE WINTER POPULATION

No census of the Greylag population has yet been made, for a complete and simultaneous ' cover ' of the known wintering places would be difficult to arrange and much harder to achieve. The nearest approach to such cover was achieved in late November, in 1957 and again in 1958. At both times extensive aerial surveys of Scotland were made by the writer, with J. D. H. Radford and S. K. Eltringham in 1957 and with Eltringham in 1958. The combination of observations from the air and from the ground make possible reasonably complete estimates of the population of Scotland and England, which are summarised in Table II. The records used in compiling the 1957 totals were all collected in the period 20-27 November. In 1958 the period was rather longer—15 November - 3 December, but the cover was more nearly complete.

In addition to entries relating to geese seen, Table II includes two columns of figures which are speculative, headed " localities thought to be occupied " and " number of geese guessed ", to inform the reader of the reliability of the cover and the relative importance of the numbers estimated to be present at places which could not be visited during the search periods. The numbers allowed at unvisited places have been decided from all available data relating to other years or months. It will be noticed that the totals for Ireland and for the Outer Hebrides and the north west mainland of Scotland, listed apart from the other regions, are composed almost entirely of estimates. Aerial

TABLE II
Numbers of wild Greylags in the British Isles in late November 1957 and 1958

1957

Region	Number of localities known to be occupied	Number of localities thought to be occupied	Number of geese counted	Number of geese guessed
N.E. Scotland	5	3	2090	200
Central Scotland	22	9	10240	840
W. Scotland & Inner Hebrides	6	12	2790	1150
S.W. Scotland	6	7	1660	1720
N.E. England & Berwicks	3	—	300	—
N.W. England	2	2	40	70
Totals	44	33	17120	3980
Outer Hebrides & N.W. Scotland	—	6	—	600
Ireland	1	12	130	500
Totals	45	51	17250	5080

Likely limits 17,000–23,000

1958

N. E. Scotland	5	1	2900	100
Central Scotland	22	3	6140	300
W. Scotland & Inner Hebrides	8	5	2160	670
S.W. Scotland	8	7	6120	890
N.E. England & Berwicks	2	1	80	200
N.W. England	1	2	40	60
Totals	46	19	17440	2220
Outer Hebrides & N.W. Scotland	—	6	—	600
Ireland	—	13	—	500
Totals	46	38	17440	3320

Likely limits 17,000–22,000

cover of these regions could not be attempted, because of limitations of finance, and few ground observers could be found there.

The Irish total is made up of one-third the sum of the average numbers of geese found at 15 localities given in a recent paper by Ruttledge and Hall Watt (*Bird Study*, vol. 5, pp. 22-23, 1958), with an additional one hundred allowed for geese present at three places not listed in that paper but known to be in use. Greylags are most plentiful in Ireland in December and January, rather than November, and the arbitrary figure used here may be somewhat too high, since Major R. F. Ruttledge reports that numbers in Ireland continued to decline. (It is rather unlikely that any major haunt of the species is still unknown).

The arbitrary assessment for the Outer Hebrides and the north west mainland of Scotland, which has been arrived at after discussions with Dr. J. W. Campbell and Colonel H. J. Cator, probably refers almost entirely to British native geese, rather than immigrants from Iceland. Since these breeding birds seem to be very nearly sedentary, this total is less liable to be affected by seasonal movements than the Irish figure.

The totals for November, 1957 and 1958, given in Table II are 22,330 and 20,760 respectively. Because of the variety of sources used in assembling the figures, no statistical measure of their reliability is practicable. Obviously their apparent precision is misleading: some regularly-used localities may be unknown to the Wildfowl Trust; in some places where geese were seen the counts or estimates may have been incomplete; and in some the estimates may have been too high or too low. For these reasons the " likely limits " given in the last row of Table II are to be preferred, in the writer's opinion, to any one number as indicators of the population size.

Guesses account for about one quarter and one-fifth respectively of the totals for 1957 and 1958. Figures of 15,500 in mid-November 1955 and 17,400 at the beginning of November 1956 are suggested for comparison, but in each case actual counts only provide about half the total. Records for earlier years and other months are even less reliable, so that the only way to examine changes over longer periods is to restrict attention to localities for which long series of counts are available.

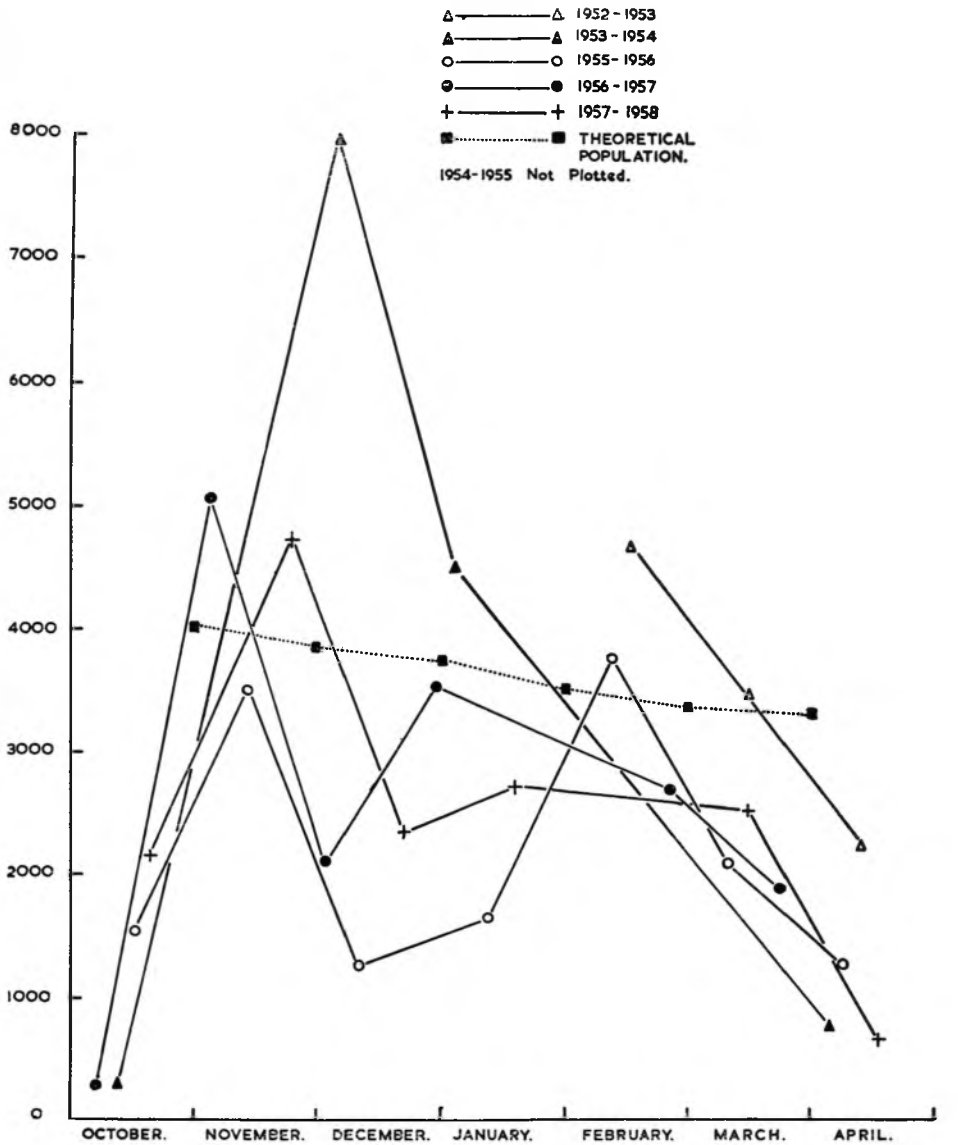
CHANGES IN OBSERVED LOCALITIES, 1952-58

Possible differences in total numbers from year to year are of considerable interest. Some relevant material is obtainable from areas where the numbers of geese have been noted at regular intervals for several years as part of the Wildfowl Count scheme. For this purpose incidental occurrences of small numbers are of little interest, so that a selection of major Greylag haunts in Scotland has been made, using only those for which long and largely complete series of counts are available. Only nine such localities have been found: in Inverness, Moray, Aberdeen, Fife, Dumbarton and Stirling, Midlothian, Bute, Dumfries and Wigtown. The sample should have included more localities in east and south-west Scotland. Unfortunately data from these areas are too fragmentary to be used.

The results of counts in the sample localities are set out in Figure 2. Observations in the months October to April, for the period October 1952 to April 1958, are included. Records prior to 1952 are too few for effective use. Even within the chosen period there are awkward gaps in the observations. These, and the considerable variations in the count dates from season to season, are sufficient to prevent straightforward comparisons between different years. For example, totals for October 1952—January 1953, November 1953, February-March 1954, the season 1954-55, January 1957 and February 1958 could not be plotted, because of gaps too large to be ignored. Interpolations have not been used, since no reliance can be placed on them in considering changes within seasons in such a series of observations.

Despite these weaknesses, Figure 2 shows several interesting features. The first point for consideration is that of abundance in the seasons 1955-58. In the previous section, from estimates of the total population in November it was suggested that 1957 : 1956 : 1955. The highest counts in the sample (all in November) indicate the order of 1956 : 1957 : 1955, despite the early date of the 1956 count. Another measure of seasonal abundance, which is potentially more reliable, is the mean of the counts in the four months November-February. The respective means are: 1955-56 2,500; 1956-57 3,300; 1957-58 3,300. Since the figures for Wigtown in January 1957 and Bute in February 1958 are omitted, because not known, these totals confirm the impression that the 1955-56 population was relatively small.

FIGURE 2: Number of Greylags in monthly counts at nine major localities, October 1952 to April 1958.



By far the most striking aspect of Figure 2 is the massive peak of December 1953. Is this evidence of a large population that autumn, or was it due to the chance occurrences of exceptional numbers in the counted localities? Inspection of the individual scores shows that well over half the total were found in the north east and in the Fife locality and that these areas were carrying unusually large numbers for December. Most unfortunately, the November total for the Aberdeen area is not known (2,000 geese were reported, but Greylags and Pinkfeet were not distinguished), and that for the Inverness locality is uncertain (350 Greylags were seen on the count date, but 2,500

on other occasions shortly before and after). Since in December there were still 1200 in the Aberdenshire area and 900 in the Inverness area, both these figures being high for that month, it is quite likely that the November sample total should have been little smaller than that for December.

If note is also taken of the relatively high totals recorded in February—April 1953, it might be argued that in the first two years of the period under review the population was importantly higher than it was later. This inference from the graphs also emerges from assemblies of November—February totals (using different groupings to allow as far as possible for gaps in the data). The most interesting set is that obtained by summing the data for all the sample localities except those in Wigtown and Dumfries, since this provides information on the season 1954-55, not plotted on the graph because data from these two areas was not obtained in that season. The successive 4-month means are: 1952-53 2,900 (without numbers from Bute, November to January), 1953-54 3,400 (without numbers from north east in November and February), 1954-55 1,300, 1955-56 1,900, 1956-57 2,800 and 1957-58 2,500. This suggests that a slump occurred in 1954 from which the sampled population had largely recovered by November 1956.

A decrease of more than half in the size of a goose population between one winter and the next, such as appears to have occurred in 1954 in the restricted sample, is quite possible, given the combination of heavy winter losses coupled with a breeding failure. However, the limitations of the sample do not permit these apparent changes to be used as quantitative indications of changes in the British population as a whole and if, as has been asserted above, the British wintering population is a closed group, it is on principle likely that a restricted sample, affected by immigration and emigration, will show more exaggerated fluctuations than the group as a whole.

MIGRATIONS AND MOVEMENTS

Figure 2 shows that winter visitors enter Scotland during October and November and leave again from mid-March to April, the speed of departure appearing to be less than the rate of arrival. It also shows, almost as obviously, that the numbers of geese frequenting the studied areas during the winter fluctuated widely, and more than would be expected to result from counting errors.

There is a general impression of a decrease through the winter, which is to be anticipated, since geese are being killed by man and dying from other causes without any replacement during this season. The " theoretical population " line on the graph shows the rate of decrease from deaths affecting a population of 4,000 at the beginning of November which would occur if data from recoveries of ringed Greylags accurately represent the mortality pattern of unmarked geese also. (Details of the calculations from which this line was drawn need not be given here).

Those fluctuations not to be explained by death, migration, or errors of observation must be due to nomadic movements, which are a commonplace of observation, though often not readily distinguishable at the time from changes in local distribution due to food-searching or disturbance. Some idea of the scale and timing of these wanderings can be obtained by further analysis of the counts from selected localities. There is a tendency for numbers to

FIGURE 3: Recoveries in winter 1952-53 of Greylags ringed in November 1952.

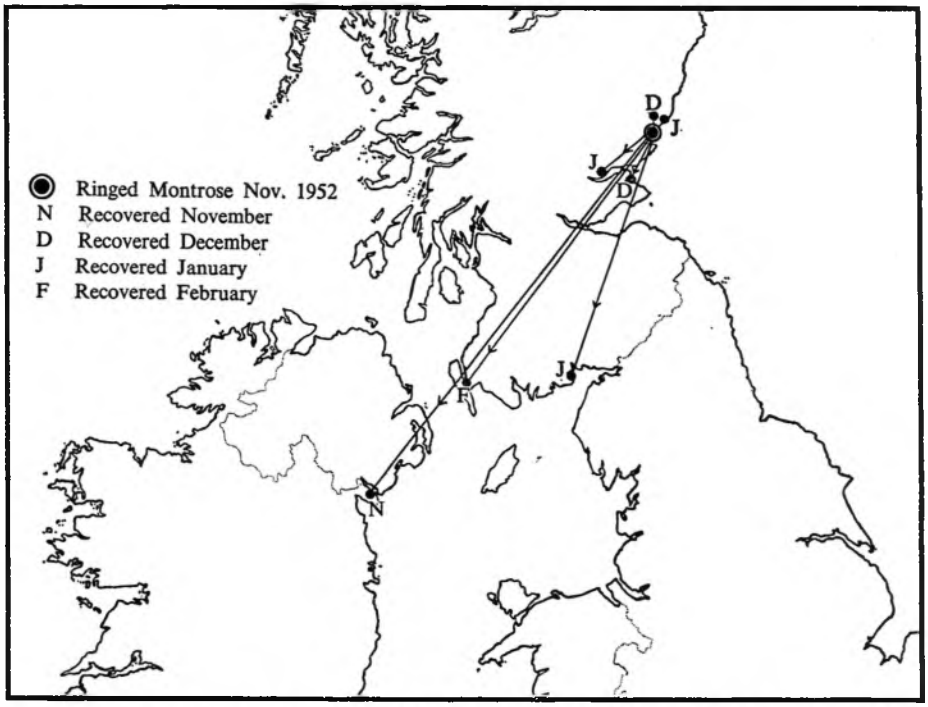
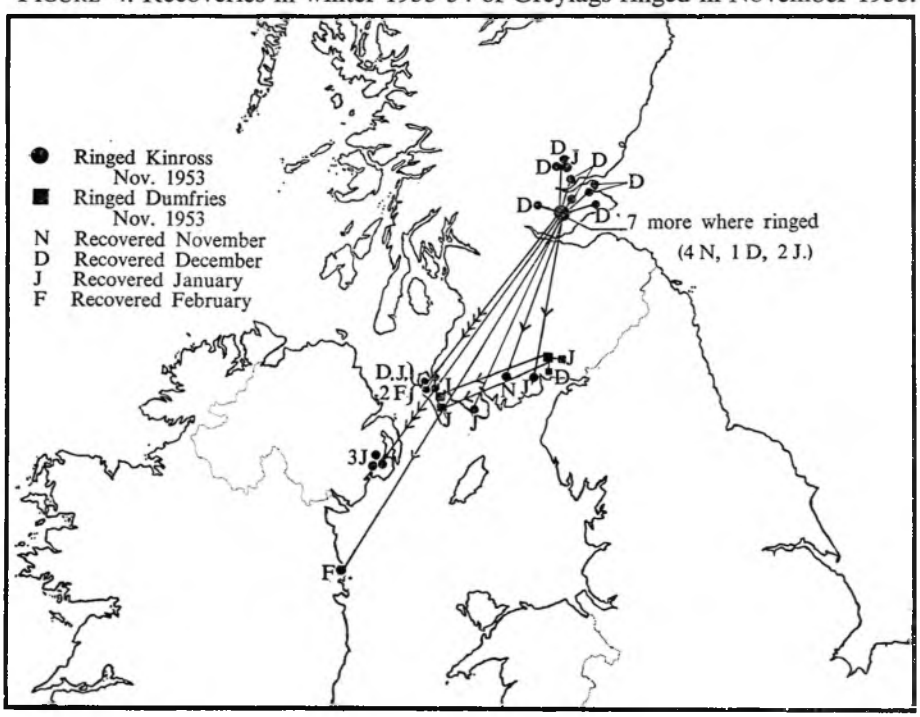


FIGURE 4. Recoveries in winter 1953-54 of Greylags ringed in November 1953.



decrease in the north and increase in the south west from November through February. More detailed comment on this pattern, and the departures from it, would need to be based on a greater wealth of material, including a variety of " background information ", to be of any value, and there are so few places for which this could be done that no general discussion is possible here.

A second, independent, source of information about winter movements is provided by recoveries of ringed geese. Some of these are mapped in Figures 3-8. Rigorous inference from recovery data is prevented by the existence of numerous sources of bias which cannot be evaluated or allowed for, especially when such a small number of recoveries is available. It is indeed somewhat remarkable that these maps provide impressions of the winter wanderings of Greylags which conform quite well with those given by observations in the sample areas and elsewhere. The pattern of distribution in March is not obtainable from recoveries, because the existence of a closed season inhibits the reporting of rings at that time, even if it does not wholly prevent continuing mortality amongst the geese.

The maps showing recoveries in the winter of marking (Figures 3 and 4) show clearly that substantial fractions of geese marked in the east of Scotland in November in both 1952 and 1953 passed on to the south-west and Ireland, later in the winter, but that geese marked in Dumfries in November apparently remained in the Solway area for the rest of the shooting season. The record for 1953-54 (Figure 4) is of especial interest because of the problems posed by the very high autumn counts in east Scotland that season. It will be noted that if the geese marked near Kinross (and so not part of the counted sample in November) behaved as typical members of an " east-central group ", the substantial decrease in the counted sample between early December and early January could have resulted from the emigration of most of the group to west Wigtownshire and Ireland, beyond the observed areas.

Since no Greylags have been ringed in recent years there have been too few recoveries to allow detailed comparisons between seasons. So far as the data go they indicate that the proportions of ringed geese recovered in the several major Greylag areas have varied very little. The maps of recoveries plotted by month of occurrence (Figures 5-8) support the inference from the sample counts that there is a shift of the main aggregations from the east of Scotland in autumn to the south-west in January and February. But, presumably because ringing has been restricted to only four areas, the recoveries fail to reflect the importance of several parts of Scotland as wintering places. From the maps no-one could guess that two islands in the Inner Hebrides harbour well over a thousand Greylags for long periods, or that parts of the north-east of Scotland, the Lothians and Northumberland are also regular haunts of many hundreds.

The maps show that much mixing of Greylags from different areas takes place during the winter, but it is not obvious that the degree of attachment shown varies. The geese ringed near Montrose and in Kinross have produced recoveries distributed about the haunts of the species in a remarkably similar way, with a pronounced tendency to be found again in east Scotland, while Solway-ringed geese have a comparable bias towards reappearance in that area, both in the course of the winter of marking and in subsequent years. More interesting is an apparent difference between two groups marked in the Solway. Comparing geese marked in Kirkcudbright in March 1950 and

FIGURE 5: Recoveries of ringed Greylags in October and November.

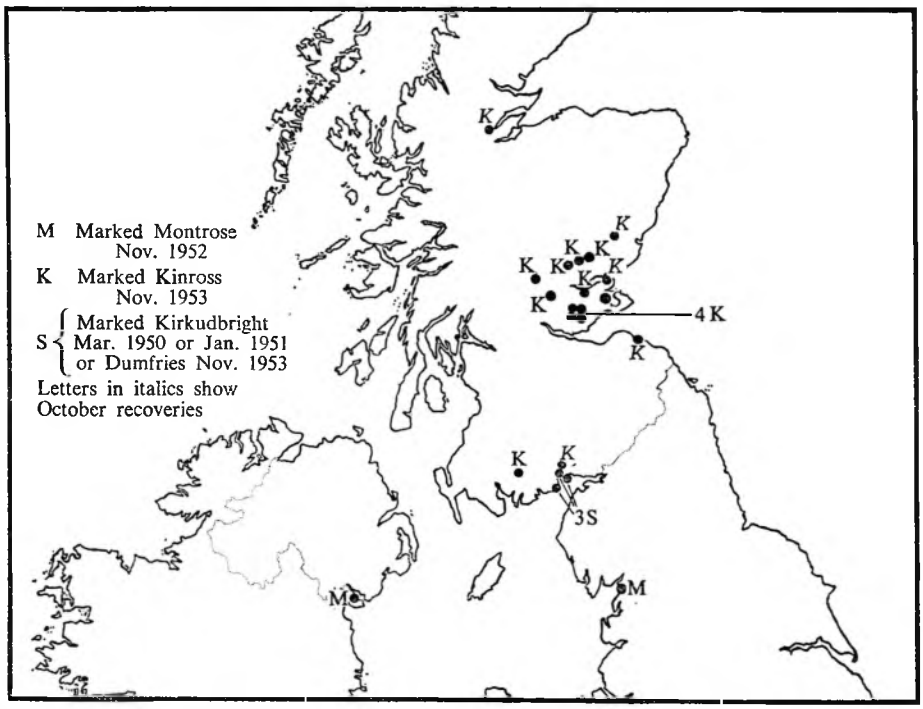


FIGURE 6: Recoveries of ringed Greylags in December.

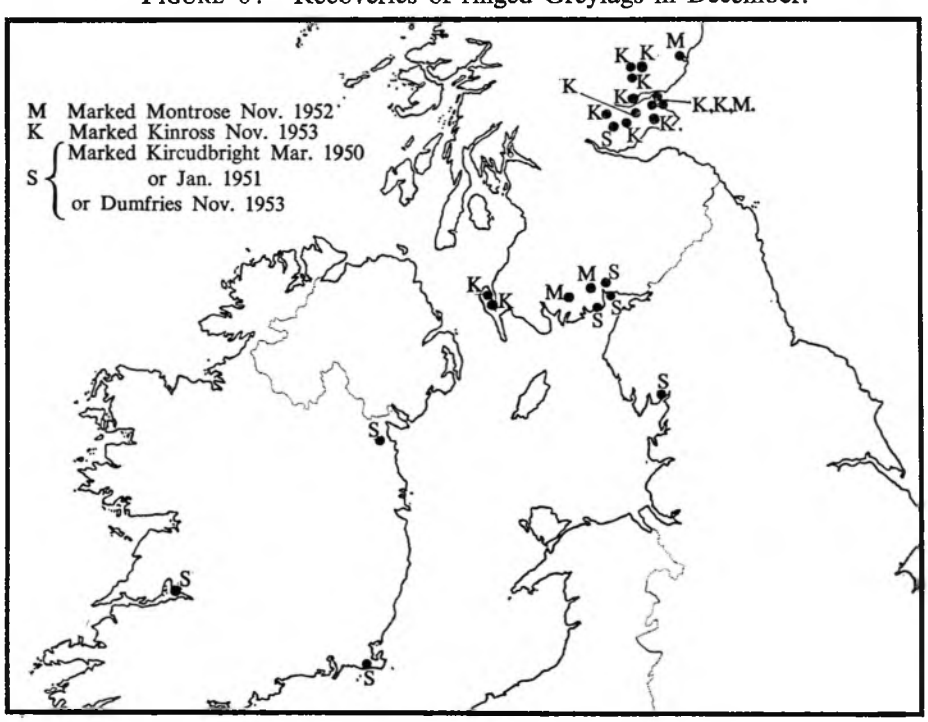


FIGURE 7: Recoveries of ringed Greylags in January.

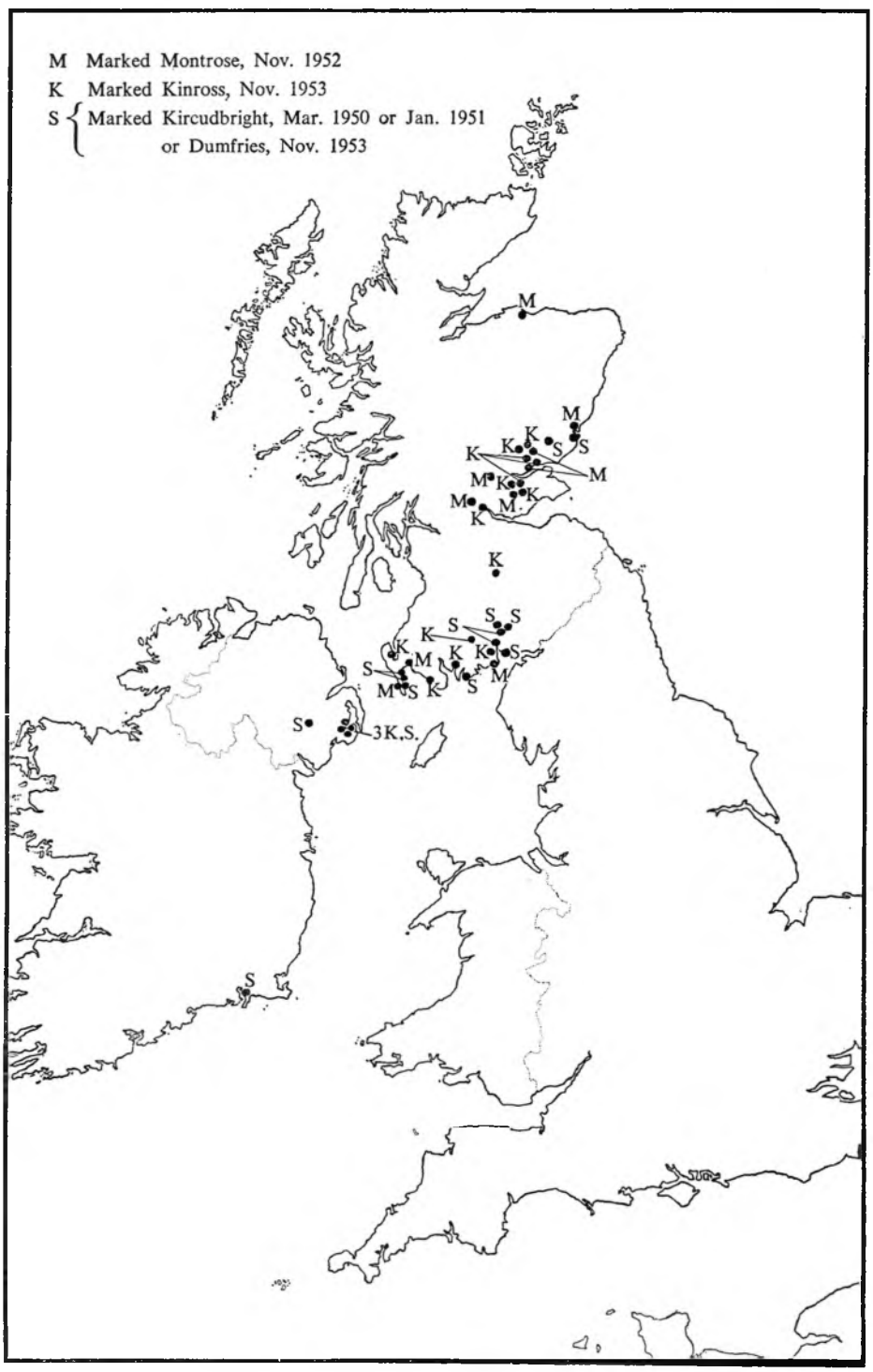


FIGURE 8: Recoveries of ringed Greylags in February.

January 1951 with those caught in Dumfries in November 1953, the Dumfries-ringed sample has produced a higher proportion of Solway recoveries. The explanation may lie not in the different catching places but in the dates of capture. Figure 4 suggests that geese arriving early on the Solway mostly remain there through the winter. But the numbers in the region increase considerably through January and February, by the return of geese from Ireland as well as by a southward shift within Scotland, and the January-for— and March-ringed samples probably included a high proportion of such late visitors.

DISCUSSION

Studies of goose numbers can be made from two points of view. One is concerned with the specific population as a reproductive unit, whose numbers are affected primarily by births and deaths. The second deals with the numbers of a particular species frequenting a particular place. The two approaches are not incompatible, but they only coincide in those cases where the whole population of a species, or an almost wholly isolated part of it, can be studied. As has been suggested in the introduction to this paper, the Iceland-breeding, British-wintering population of the Greylag seems to be a suitably distinct group.

The evidence assembled above indicates that in the last four years the population has probably numbered between 17,000 and 24,000 in the second half of November. Apparent variations between different years do not exceed the limits of error imposed by the weaknesses of the data, so that the population looks to be in a comparatively steady state. Further investigations are needed to discover why this is so. From the viewpoint of conservation it is particularly important to establish how stable a population of this size is, so that effects on the geese of changes in human activities can be predicted with some confidence, as a necessary preliminary to remedial measures.

The size of the autumn population is not by itself a sufficient basis for prediction, because it gives no indication of the size of the breeding population. In November mature geese, juveniles and pre-breeders (yearlings and most two-year-olds) are mixed in proportions which are liable to vary considerably from year to year and from place to place. The Trust has begun field observations, analogous to those already made on White-fronted Geese, which if continued over several years should provide measures of the age composition of wintering flocks. A resumption of rocket-netting of Greylags, so far carried out on only a small scale between 1950 and 1953, would provide additional information, particularly on individual survival, and on seasonal differences in losses from shooting. It might also be worth attempting a 'census' in late February with the object of determining losses during the winter by comparison with a 'census' in the previous November. But this would need exceptionally favourable weather and, since the anticipated average loss from a population of 20,000 geese during December, January and early February would be only about 2,500-3,000, both counts would have to be considerably more precise than those yet made.

The practical difficulties of organising research on the breeding grounds are formidable, so that there is little prospect of large-scale investigations being

made. It is however of great interest to learn the views of Dr. Finnur Gudmundsson, whose knowledge of the birds in Iceland is unrivalled, on the present status of the Greylag there. The writer calculates that a population of 20,000 in late November should correspond to a breeding population of 3,500 to 4,500 *pairs* of mature geese. Dr. Gudmundsson comments (*in litt.*) " 3,500-4,500 breeding pairs is in my opinion somewhat too low for the total Greylag population of Iceland, but I must confess that we have no reliable data at our disposal for making a tolerably accurate estimate of the size of the population. However, one thing is certain and that is that a spectacular increase and extension of range of Greylags in Iceland has taken place in recent years. The population seems to have started to increase soon after the turn of this century but the increase has been particularly striking in the last 25-30 years. Greylags are now becoming a nuisance in many districts and farmers are already complaining and demanding that their numbers be checked."

Most people interested in geese are more concerned with the numbers frequenting particular haunts than with the whole reproductive unit. Frequent changes in the ' popularity ' of a district amongst geese, whether of one or several species, are found wherever close investigations are made. Sometimes these changes are very striking. For British-wintering Greylags the best known recent example is the decline in numbers on the Slobs of Wexford from 5,000 or so in 1945-46 to under 250 in 1955-56 (see Ruttledge and Hall Watt, *loc. cit.*). Coupled with other examples of decrease, such as the earlier fall on the Firth of Tay and the recent ones in Ayrshire and the eastern Solway Firth, this seems to provide a basis for statements alleging a serious decrease in the numbers of Greylags. Increases in numbers over the corresponding period, such as have occurred in Wigtown and Morayshire, have attracted less attention.

In the writer's opinion, assertions about the welfare of a species must be based on studies of the reproductive unit, not on the position in fragments of its winter range. The evidence seems to show that the Icelandic-British Greylag population has not been decreasing, or increasing, markedly in the last four years, though its numbers may have fluctuated more violently before 1955.

The abandonment, or declining popularity, of a goose haunt is, of course, a proper cause of concern. But it does not seem at present either that any particular wintering place is of crucial importance to the Icelandic Greylags, or that the cumulative effects of changes in land use, shooting pressure and disturbance are too great to be offset by the adaptibility, and the reproductive potential, of the species.

It by no means follows that the Greylags *resident* in Britain are also contending successfully with their environment. There seem to be great differences between colonies in this respect. It is hoped to investigate their status in detail in the next few years. Meanwhile, it is important to see that our nesting geese benefit from the special protection afforded to them in the close season by the Protection of Birds Act, 1954.

A number of landowners in scattered parts of the country have been and are, establishing feral flocks of Greylags, some of them with considerable success. This is an attractive idea, but it would perhaps be desirable to study possible consequences of its widespread adoption, especially in relation to agriculture.

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