

# Scottish Birds

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# Scottish Birds

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## Research Progress Report

I. NEWTON

### *A 20-year study of Sparrowhawks in Eskdale*

In the late 1950s, Sparrowhawks *Accipiter nisus* over much of Britain suddenly declined in numbers, and disappeared altogether from some eastern districts. This was attributed to the agricultural use of organochlorine pesticides, which the hawks accumulated from their prey. The most toxic chemicals, notably aldrin and dieldrin, killed the hawks directly, while the less toxic DDE (derived from DDT) lowered breeding success through causing eggshell-thinning and breakage. Hawk numbers thus declined from a combination of increased mortality and reduced reproduction. The problem had been investigated in the 1960s by Ian Prestt and Derek Ratcliffe, in the former Nature Conservancy. When I began my studies in the 1970s, restrictions had already been imposed on the use of organochlorines, and Sparrowhawks were increasing again. In one of the areas in which I worked, the Esk Valley around Langholm in Dumfriesshire, the population seemed in 1972 to have recovered fully and, despite some slight shell thinning, showed no obvious depression in breeding success. At the time this population therefore acted as a standard, against which to compare the trends and breeding of Sparrowhawks elsewhere.

I have continued to study this population to the present day, collecting data from the same 200 km<sup>2</sup> area in a consistent manner throughout. In each year, I have searched all the woodland in the area in an attempt to find all the nests. I have climbed to the nests frequently, to obtain laying dates, clutch and brood sizes, and to ring the young, and recovered any prey items that were present. In each year I have also trapped for ringing and identification as many of the breeding adults as possible, enabling their individual histories to be followed. Because females spend more time

at the nest, however, they proved easier to catch, and provided much larger samples than males. The overall objective was to find what factors influenced numbers and nest success.

Over the 20 year period from 1972 to 1991, the breeding population remained remarkably stable (Figure 1). Nest numbers fluctuated between 29 and 39, or by no more than 15% on either side of the mean level of 34, with no long-term trend. Within these limits, high nest numbers occurred in years when March-April were relatively warm and dry, and low nest numbers when March-April were cold and wet. The general stability was associated with relative consistency in the amount of nesting habitat over the years.

Within areas of suitable woodland, nests were regularly spaced, about 0.6-0.8 km apart, reflecting the territorial spacing of adjacent pairs. However, most nests were much further apart, because they were separated by areas of open country or by unsuitable woodland. In this mainly coniferous area, the woodland was managed for timber production. In every year, some patches were felled and re-planted, and from about 20 years on, each stand was thinned every five years or so, when a proportion of trees was removed. Thus, as a stand aged, the trees became bigger and more widely spaced. In the absence of management, the same process would have occurred through tree mortality, but over a longer period, as in a natural forest. Most Sparrowhawk nests were found in young stands, about 20-35 years old, and as any given stand aged, occupancy and nest success progressively declined (Table 1). Few nests were found in stands older than 40 years, though those same stands were well used in earlier years.

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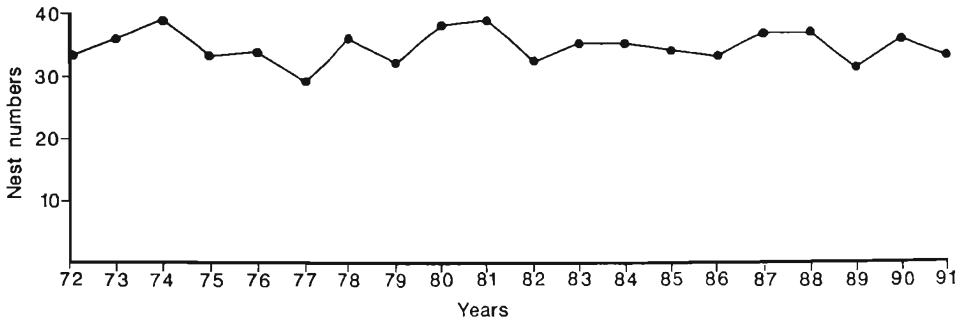


FIGURE 1. The numbers of Sparrowhawk nests found each year during a 20-year period in a 200 km<sup>2</sup> area in Eskdale, Dumfriesshire.

In this area, then, general stability in the numbers of breeding Sparrowhawks was associated with a system of rotational forest management, which ensured a fairly constant age structure in the total forest over time, and plenty of stands in the younger age-groups. Although the number of nests changed little over the years, their distribution within the area changed slowly, as older stands were abandoned and younger ones taken up.

In the younger stands of 20-35 years old, Sparrowhawks produced, on average, more than enough young per nesting attempt to offset the usual annual adult mortality, but in the older stands of 35-50 years they produced too few. These older stands therefore acted as 'sinks', whose sporadic occupation was maintained largely by continual net immigration from the most productive younger stands.

It was not obvious why Sparrowhawks bred better in younger woods than in old ones, but study of the causes of breeding failures offered clues. The main causes of failure were non-laying (having built a nest), egg desertion and chick starvation. All these proximate causes could be attributed to a single underlying problem, namely food-shortage. Moreover, because all these types of failure occurred more frequently in old woods than in young ones, Sparrowhawks may have had more difficulty in catching

their prey in mature, open stands than in young, dense ones. Males fitted with radio-transmitters did most of their hunting within 0.5 km of their nests. Within these areas, they showed a strong preference for hunting in young woods, spending much more time there per unit area than they spent in older woods or in other, more open habitats. In continental Europe Sparrowhawks were also less likely to be killed by Goshawks in young stands than in old ones, but Goshawk predation was not important in Eskdale. The general conclusion was that Sparrowhawks thrived best at a particular stage in forest succession, and in Eskdale benefitted from the prevailing forest management, which ensured a continuing availability of young woods.

From trapping records, the annual survival of breeding females was estimated at 58%, on average, but varied between 37% and 72% in different years, partly associated with rainfall. In general, the more days on which rain fell during October - March, the lower the survival between one breeding season and the next. These large annual variations in adult survival were not reflected in the year-to-year changes in nest numbers. In each year, the recruitment of new breeders was generally sufficient to make up for the loss of old breeders since the previous year, so that nest numbers were largely maintained. New breeders were

drawn from the non-breeding contingent. These birds, mostly in their first two years of life, had apparently been excluded from nesting largely by the territorial behaviour of established breeders. Partly as a result of competition for nesting territories, many Sparrowhawks did not start breeding until their second or third year of life. Non-breeders that were fitted with radios spent most of their time in areas not used for breeding, such as farmland.

The trapping of adults at nesting territories has shown that, while about 70% of survivors nest on the same territory in successive years, 30% change territories between one year and the next. This applied to both sexes. Territory changes did not occur at random, however, because birds were more likely to change territory after a breeding failure than after a success; they were more likely to move from a poor territory (old woodland) than a good one (young woodland); and they were more likely to move between their first and second year of life than subsequently. To some extent, these trends were inter-related, because young birds were more likely to nest on poor territories and to fail in their breeding than were older ones, but statistical analysis revealed that the three trends were also to some extent independent of one another.

The combination of mortality and movements meant that, on individual

territories, the turnover in occupants was high. Most birds were present on particular territories for only one year, but some stayed up to eight, with a mean residence period of 1.5 years. So the continued occupation of certain territories was produced by many birds occupying them in succession, but most staying for only a short period. One territory was occupied for ten successive years, but by a different female each time. Many of these females were found in later years nesting on other territories nearby. In general, regular territories, in young woods, tended to be occupied every year by birds which remained for longer-than-average periods, while other territories, in older woods, were occupied sporadically, mainly by young birds which later moved elsewhere.

Sparrowhawks in south Scotland fed primarily on birds, the smaller male concentrating on smaller species (5-120g, especially 5-80g) than the larger female (chiefly 20-120g, also up to 500g). About 97% of all prey items recorded were birds, and included all the species available locally up to the size of Woodpigeon *Columba palumbus*. However, a few species were numerically especially important, namely Chaffinch *Fringilla coelebs*, Song Thrush *Turdus philomelos*, Blackbird *T. merula*, Robin *Erithaca rubecula* and Starling *Sturnus vulgaris* in the breeding season, with the addition of Redwing *T. iliacus* and

**TABLE 1.** Occupancy and nest success at Sparrowhawk nesting places, according to years from first occupation. Most woods were first occupied at around 20-25 years of age, when they were first thinned. Thereafter, with increasing age of wood, both occupancy and nest success gradually declined.

	Years from first occupation				
	1-5	6-10	11-15	16-20	21-
Number of nesting opportunities*	152	114	68	36	11
Number of nests (%)	140(92)	85(75)	31(46)	9(25)	0(0)
Number successful (%)	106(76)	53(62)	14(45)	4(44)	0(0)

\*Calculated as the number of potential nesting places times the number of years.

Fieldfare *T. pilaris* in winter. The remaining 3% of the diet consistent of mammals, mainly voles and young rabbits, with no reptiles, amphibia or invertebrates.

Like many other birds, Sparrowhawks nested at a time of year when food was most readily available. In south Scotland, they depended heavily on easily-caught fledgling song-birds. In each year, the first hawk eggs were laid around the end of April, soon after fledgling prey first become available, and others followed in May. By the time the hawks had chicks, in June-July, young song-birds were at their most plentiful. None-the-less, as mentioned above, food-shortage seemed to be the main cause of individual breeding failure, manifest in non-laying, late-laying, small-clutches, egg desertions and chick mortality. All these problems were alleviated in experiments when extra food was provided artificially.

Weather also affected breeding, probably through its influence on food-availability. Annual variations in mean breeding success ranged between 1.4 and 2.8 chicks per nest and could be explained largely in terms of the weather in March-April. The occurrence of many cold wet days in this period was associated, not only with reduced nest numbers, as mentioned above, but also with late laying and poor success, whereas the occurrence of many warm dry days in this period was followed by early laying and good success. The weather seemed to influence the breeding of the song-birds on which Sparrowhawks relied, but also affected the hawks directly. During nest watches later in the season, the hawks brought in few prey items on wet days, so that their young often lost weight. It seemed that rain itself interfered with hunting.

Because I was able to follow the same Sparrowhawks year after year, I was also able to record lifetime reproductive success: the total numbers of young raised by individuals during their entire lives. The importance of such measures is that they approximate Darwinian fitness, reflecting

the contributions that individuals make to future generations. Among Sparrowhawks, lifetime reproduction depended largely on the number of breeding attempts, which in turn depended on age of first breeding (1-3 years) and longevity (up to 10 years). On average, some 72% of individuals which left the nest died before they could start breeding at 1-3 years of age. A further 6% nested but failed to raise young. The remaining 22% bred successfully, but varied greatly in the numbers of young produced. Most successful birds bred only once, so raised only 3-5 young, the number usually found in a brood. Others bred more than once, and the most productive females raised more than 20 young during their lives. In fact, the most productive 5% of individuals in one generation produced more than 50% of young in the next. I am now trying to understand which factors predispose some individuals to fail and others to breed well. Such factors include features of the birds themselves and of their habitat. It is already apparent that territory quality plays a major role, because birds which spent most of the breeding lives nesting in young woods reared the most young.

The main conclusion to emerge from this work on Sparrowhawks concerns the over-riding importance of food-supply in influencing breeding density and nest success. Comparing nest spacing in forests in different parts of Scotland, the mean distance between nests was inversely correlated with the densities of song birds measured in the local woods: hawk nests were furthest apart in districts where prey were scarcest. The effect of food supply on breeding density is apparently mediated by territorial behaviour, as pairs space themselves according to the food-supply. Through territorial behaviour in Eskdale, annual recruitment to the breeding population was regulated, so that the numbers of new breeders added each year approximately matched the numbers of old ones lost. By this mechanism, the annual

fluctuations in breeding density were relatively small. Other factors also influenced the performance of individuals, possibly through their influence on food availability, as shown by the correlations between forest age and performance and between weather and performance.

From a research viewpoint, Sparrowhawks are not the easiest of birds to study. Not only are they difficult to observe, but their nests are hard to find and reach. More importantly, they are not readily amenable to experiment, so most of our understanding must rest on observational evidence only: on correlations between changes in numbers and breeding performance on the one hand and changes in environmental variables on the other. Some aspects have yielded to experiment, however, notably the role of territorial behaviour in limiting breeding density (some removed breeders were soon replaced by others), and the role of food supply in

breeding success (pairs given extra food raised more young than unfed pairs). None-the-less, no-one who was concerned solely with mechanisms of population regulation, with no interest in the birds themselves, would choose to study Sparrowhawks.

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## Research Progress Report

JEFF GRAVES AND JOSE ORTEGO RUANO

### *Shags on the Isle of May: Who Mates with Whom?*

Some birds live for many years, successfully rearing one or more broods each year after they become adults. Others either die young, or fail to find a mate, or nest in places where their clutch is more likely to be lost. They may also fail to rear young for many other reasons. There is thus a lot of variation in the numbers of descendants that birds leave. Since those that leave the most surviving offspring will be at an advantage, it is interesting to examine just how the successful achieve this feat. It is straightforward to count up the numbers of young that each pair of birds rears every year and then, with a long-term study, to see how many they rear in a lifetime. But unfortunately this is not all there is to it. When a female mammal gives birth, we can be sure that the infant is her own; although, if she mated with more than one male there may be some doubt about who its father may be ('paternity uncertainty'). It is rather more complicated in birds. Extra-pair mating may lead one or more of the young in a nest to be the offspring of some other male than the one that tends them, but there may also be 'egg-dumping', or intra-specific brood parasitism. This is where the female lays an egg in a nest that is not her own but of the same species, so that neither of the pair that rears the chick are its parents. Given the amount of work that many birds must expend in raising their brood, egg-dumping is rather a good strategy. A bird that lays an egg a day in its own nest has a lot of work ahead of it; one that lays its eggs in the nests of others has none. Only in recent years has the frequency both of egg-dumping and of extra-pair mating amongst birds been recognised. The former is now known to occur in over a hundred species (Andersson 1984). The latter has been observed in many different bird

species, but the difficulty has always been to know whether it actually resulted in chicks whose father was not the male of the pair that reared them.

New biochemical techniques have allowed us to come to grips with this question in the last ten years or so. Unless they are identical twins, individuals all have a different spectrum of genes, half inherited from each parent. Where a gene differs between two individuals, this leads to differences in one of the proteins that are a major constituent of an animal's body. By examining these proteins using a method called electrophoresis, which will separate ones that are slightly different from each other, we can detect whether a bird has a protein whose structure is different from those of one or both parents. If it does, then it is very likely to be the offspring of a different pair or of an extra-pair mating by its mother. Unfortunately, proteins do not vary very much, and unrelated birds may have a similar spectrum, so that the chick may not belong to the pair tending it even if it shares the structure of several different proteins with them. In a study of Indigo Buntings in the United States, David Westneat (1987) estimated that only 40% of the time could he be sure that a chick was not the offspring of the male at its nest. Even if he was sure in a particular case, he could not easily tell which of the other males in the vicinity was its real father.

Better methods were clearly required to allow us to tell who is related to whom in a group of birds. The new technique of DNA fingerprinting, which has become well known for its human applications in forensic medicine and in paternity suits, offers just such a possibility for studies of birds. The method was developed by Alec Jeffreys, at Leicester University (see Jeffreys

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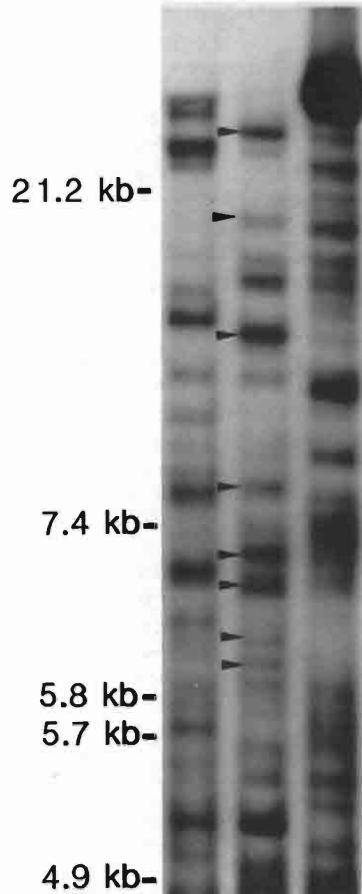


*et al* 1985), and it permits a very high degree of uncertainty that two birds, such as a chick and the male that is rearing it, are not related.

The chance of getting it wrong, and thinking the birds are parent and offspring when they are not, is less than 1 in 10,000! It is not therefore surprising that many recent studies of breeding systems in birds, more than 30 to date, have used DNA fingerprinting.

Birds are particularly suitable for fingerprinting because, unlike mammals, their blood contains a large amount of DNA, so only a small blood sample is needed to carry out the analysis. This can easily be obtained without harming the bird. The method works because there are regions of DNA that vary enormously between individuals, but the extent of this variation depends on how closely they are related. The DNA is split up into sections, and electrophoresis is used to separate these out on a strip of gel: the smaller pieces move more quickly and so migrate further along the gel. A piece of DNA known as a 'probe', which is radioactively labelled, is then added and this binds to the DNA on the gel. A photograph reveals the radioactivity and shows a pattern rather like a supermarket bar code, each bar being a different segment of DNA. If the bar code of a chick is compared with that of its parents, nearly all of its bars are found to match those of one or other parent. But if it has several bars with no equivalent in either parent we can be certain that one or both of them is not really its parent at all. An example is shown in Figure 1.

We started studying the breeding behaviour of Shags on the Isle of May in April 1990. In the last two years we have observed all the courtship and matings that have taken place in a small colony of 25-30 pairs, all of them colour ringed. We have used DNA fingerprinting to identify the parents of each of the chicks that fledged in both these years. We also took blood samples from the birds in the colony in 1987



**FIGURE 1.** An example of extra-pair paternity revealed by DNA fingerprinting. The chick's fingerprint is in the middle with the male's on the left and the female's on the right. The arrows point to bands not found in either parent. The chick shares over half its bands with the female but only 25% with the male. The lengths of the DNA fragments (in thousands of bases, or kb) are shown on the left.

and 1989, and from these we already knew that some chicks (18%) were not fathered by the pair-male at their nest. Of the broods we examined in those earlier years, 22% had at least one chick with this 'extra-pair paternity'.

In 1990, the Shags on the May, in common with several other seabird species, had the worst breeding season for over 20 years. The 25 pairs on our colony that got as far as laying eggs fledged only seven young (an average of 0.28 chicks per nest, compared with the usual 1.0-1.2). We do not know the reasons for this failure, though they doubtless relate to the birds' inability to find enough of the sandeels on which they mainly feed their young. In line with this, Mike Harris and Sarah Wanless (pers. comm.) found that the sandeels that were brought back in 1990 were significantly smaller than in recent years. In 1991, the colony fared a little better: 22 pairs laid at least one egg and 15 chicks fledged, giving an average of 0.68 chicks per nest.

Surprisingly, all of the 22 chicks that fledged in these last two years were fathered by the male at their nest, giving a significantly different picture from what we obtained in the two earlier ones. The likely explanation is that the pressures that lead to bad breeding success also reduce extra-pair paternity, and we are going on to examine this more closely with a larger group of birds. A surprise in these results is that extra-pair matings were just as high in 1990 and 1991 as before. In both years we observed around 2000 matings, and 17-22% of these were not with the female's nesting partner. This is very much in line with the level of extra-pair mating we had found earlier (Graves *et al* 1992).

The birds vary a good deal in whether they mate with individuals other than their nesting partner. In particular, those females that successfully fledged chicks in both 1990 and 1991 showed very little extra-pair mating, and significantly less than the ones that laid but failed to fledge any chicks. We could also detect this difference by comparing the behaviour of the same female between the two years: those that successfully fledged chicks in one year of the study, but failed in the other, had significantly more extra-pair matings in the year that they failed. This relationship leads

us to expect that high fledging rates in a population will be related to high levels of extra-pair paternity, although this is not something that has so far been found in any other species.

Why might we get this rather curious result? Shags have a long reproductive life: they start breeding at the age of two, and some live till they are 14 or 15 years old. Once adult, only about 11% of birds die each year. This means that any one brood is not particularly valuable to them, as it would be to an animal that bred only once or twice. Rather than working hard to rear a brood in difficult conditions, and perhaps stressing itself and so lowering its survival over the winter, it may be better for a bird to stop trying to breed in a particular season and wait for better conditions. Nicholas Aebischer (1985) found that the decline in the number of breeding Shags that occurred on the Isle of May 20 years ago was not due to a crash in the population, but to large numbers of birds not attempting to breed for two consecutive years. This would not be an option open to birds with high annual mortality, because their chances of surviving to the next breeding season would be too low.

Extra-pair matings in Shags are not forced on females, but are actively sought by them. In most cases they take place at the male's nest after a female has approached a displaying male. The link between this behaviour on the part of the female and her lack of success in fledging chicks, could be because she tends her chicks less well or because her nesting partner does so. Perhaps females with partners or nest sites that are less satisfactory attempt to change by seeking to become the pair female on a different nest where either the male or his site is better. However, this seems unlikely as we have only twice observed paired females moving to a different partner in this way. Another possibility is that females may seek extra-pair matings with males that will father better offspring than their own partner. We have no way of

testing this yet, as none of these matings has led to any offspring in the two years we have studied them.

Another possible reason why females that mate outside the pair fledge fewer young is an intriguing one. Perhaps males that have a higher risk of having chicks that they did not father in the nest are less prepared to work hard at tending the brood than those with greater paternity certainty. Anders Møller (1988) found just such an effect in Swallows, using experiments that altered the number of extra-pair matings that the females in his colony had. In Shags we have found no egg dumping by other females, so female confidence that the eggs in their nest are their own should be very high. If we can study the birds during a breeding season when most pairs fledge chicks, we will be able to test the idea that males whose partners mate outside the pair work less hard at provisioning the chicks than those whose partners do not.

While it is true that the great majority of bird species are monogamous, detailed studies of their behaviour have shown that some extra-pair mating occurs in almost all species studied so far. DNA fingerprinting

has opened up new possibilities for discovering just how this effects the relationships between individuals in a colony. It has certainly shown that the breeding system of Shags is more complex than we had hitherto imagined, and raised some intriguing questions for the future.

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## Recent status change of some birds on Islay

M.A. OGILVIE

*Recent status changes of a number of species of birds occurring on Islay, Inner Hebrides, are reviewed. Barnacle and Greenland White-fronted Geese have both increased roughly three-fold in the last 30 years largely due to favourable changes in farming practices, yet Greylag Geese have almost disappeared in the same time. Several species of ducks wintering on Loch Indaal have increased. One possible reason may be nutrients reaching the loch from agricultural run-off and sewerage encouraging more plant and animal food for the birds. Common Scoters and Red-breasted Mergansers are also summering in larger numbers. Numbers of Bar-tailed Godwits have fluctuated, in Loch Gruinart as well as in Loch Indaal.*

*Nearly all the birds of prey have increased in recent years, with a cessation of persecution probably the main reason. Corncrakes are declining, though management agreements with farmers and crofters may help. Choughs increased to a peak about five years ago but numbers have since declined a little. Nest sites in old buildings are being maintained through grants.*

### Introduction

The following review makes no claims to be complete. It is one person's survey of what has happened to a number of species on one island in the Inner Hebrides since about the 1960s with, in some cases, a retrospective look back to the last century. Some data have been easy to come by and are presented here as a reasonably true record of what has occurred. Almost all the original data used by Booth (1975) and Elliott (1989) in writing their books on the birds of Islay have been available to me but I have re-analysed and, in some cases, re-interpreted them. Other information remains buried in people's notebooks but perhaps I shall make sufficiently wild guesses to stimulate its (in some cases, overdue) publication.

It is usually true to blame all negative

status changes of birds in Britain, and further afield, on man's activities though this may mean that more natural causes are overlooked. Certainly on Islay, almost every status change I shall discuss can probably be attributed to man's activities, either deliberate or unwitting.

My selection of species has been governed mostly by the availability of information and my personal interest in the species. Thus it will come as no surprise that geese figure largely here, though former colleagues may be surprised at my recent addiction to birds of prey. As it happens, the majority of species discussed in detail have increased in the period under review, but a few have decreased and others also in decline are mentioned in brief.

## GEESE

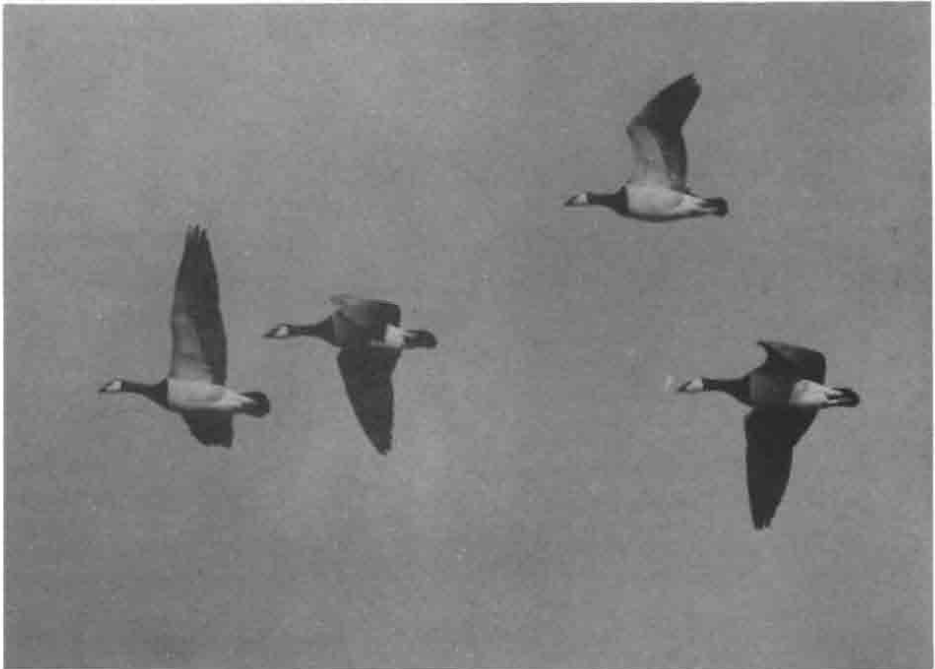
Three species of geese winter on Islay, Barnacle *Branta leucopsis*, Greenland White-fronted *Anser albifrons flavirostris* and Greylag *A. anser*, in that order of abundance. Two have increased greatly in the last 30 years, one has, perhaps surprisingly, declined.

### Barnacle Goose

This species has wintered on Islay, as well as on many other islands in the Inner and Outer Hebrides, for as long as records exist. Precise figures, though, are unsurprisingly scarce. Gray (1871) was told of "very large flocks" particularly at Loch Gruinart and Ardnave. Harvie-Brown and Buckley (1892) wrote of "thousands in Islay, Jura, Colonsay and ... on most suitable islands" and also commented that "they do great

damage to grass", from which it would appear that less has changed than is sometimes thought. There are other reports of large flocks from the same period and into the first part of the 20th century, though information from the 1920s and 1930s is hard to come by. Berry (1939) contacted five local observers who reported increases over the previous 25 years in two areas on the island, no change in two more and a decrease in a fifth, this last because of the construction of an airfield. No figures are given, however.

Boyd (1968) assembled all post-war counts and estimates known to him, from the earliest available, in December 1952. Some were clearly 'guestimates', e.g. "8000-10000" and "over 10000", others gave the impression of being more accurate, e.g. "just over 5000". Boyd agreed with Atkinson-Willes (1963) who described the



Barnacle Geese flying, Islay.

Morley Hedley

status thus: "Taking the island as a whole the normal numbers are estimated at about 5000-6000, but by February there is usually an increase to 7,500 and in some seasons as many as 10,000 may be present for short periods."

In the early 1960s, Boyd began a series of early November counts which I took over in 1964 and have continued to the present day (Fig. 1). There have been many other counts during the same period, including a long run of spring counts which I started in the late 1960s. In March 1983, a team from the Nature Conservancy Council began a series of monthly counts which continued until 1986-7, then reduced to two or three per winter. Variations between these counts and my own, as well as variations through a winter, have tended to be small, rarely

more than 15% and usually less than 10%. A pattern apparent in the 1970s of an increase in the spring is now less regular, with decreases recorded during several recent winters. An arrival peak in October 1983 and 1984 of considerably more birds than subsequently wintered on the island, reported by Easterbee *et al* (1987), has not occurred in any autumn since.

The large and rapid growth in numbers of Barnacle Geese on Islay that took place during the 1960s and 1970s can be attributed to a combination of better feeding on the island coupled with low mortality. Agricultural improvements during this period included a much greater use of artificial fertiliser and more frequent reseeded using more reliable seed mixtures, while the increased number of sheep kept



FIGURE 1. November counts of Barnacle and Greenland White-fronted Geese on Islay, 1961-1991.

on the improved pastures produced the kind of short swards attractive to the geese. The mean breeding success during this period exceeded the calculated annual mortality by several percentage points per annum. Shooting of Barnacle Geese on Islay was comparatively light, being largely restricted to a few private shoots each winter.

The situation altered in the late 1970s when, in response to increasing complaints from farmers, the law was changed to allow shooting throughout the winter instead of the hitherto restricted season of December and January. This encouraged the marketing of the shooting to paying visitors and consequently the numbers of geese shot more than trebled, coinciding with, and probably contributing to, a run of poor breeding years. This produced the sharp downturn in numbers shown in Figure 1, when the November total dropped from 24,000 in 1976 to 13,000 in 1982.

The Wildlife and Countryside Act of 1981 changed the rules again. The Barnacle Goose became a fully protected species, though with licenced shooting permitted to prevent serious agricultural damage. Over the next few years, management agreements covering three SSSIs were negotiated between the NCC and the rather few farmers involved, compensating the latter for feeding the geese but also prohibiting the shooting of them. In 1983, the RSPB acquired most of the Gruinart Flats as a reserve. This has probably always been the most significant area for Barnacle Geese on the island. Although badly run down at the time of acquisition, the land has since been greatly improved through ploughing and reseeded as the RSPB have successfully encouraged as many geese as possible to remain on their land.

With a combination of active management for the geese and decreased shooting, breeding success rose once more, as did total numbers. The increase from the low of 13,000 in November 1982 to 28,000 in November 1990 was even steeper than the previous period of growth. However, the

sharp drop to 22,000 in November 1991 was a timely demonstration of the very marked effect on arctic-breeding goose populations of the vagaries of the weather. The breeding season of 1990 had produced 23.7% young birds present in the flocks on arrival on Islay, the second highest percentage since annual age samples began in 1959. This was immediately followed, in 1991, by the worst ever recorded, with a mere 4.7% young birds. Estimates of annual mortality in the last ten years have fluctuated between about 10% and 18%.

While the management agreements and the RSPB reserve were clearly contributing through the 1980s to the well-being of this important group of Barnacle Geese, representing about two-thirds of all the discrete Greenland-breeding population, the majority of the agricultural community on the island were far from happy. Those with management agreements were receiving significant annual payments, while those outside the SSSIs, a much larger number of farmers, received nothing at all. Up to 70% of the Barnacle Geese could be found within the SSSIs in the autumn but this proportion fell to below 50% by late-winter as the birds dispersed in search of more feeding, then usually picked up again in the spring. In winter 1988-9, a goose scaring scheme was operated by the Islay Forestry, Farming and Wildlife Advisory Group, funded by the Manpower Services Commission. Teams of scarers worked in areas outwith the SSSIs, endeavouring to persuade the geese by non-lethal scaring that life would be more congenial within the managed areas. This was reinforced by a fairly high level of shooting, mainly by the large estates.

In the next three winters, up to 1991-2, a different goose scaring scheme was operated, funded jointly by NCC and the Department of Agriculture and Fisheries for Scotland. This involved making payments directly to the farmers to help them with the extra costs of scaring, whether through purchasing static scaring devices or paying for time and fuel used in mobile

disturbance. The payments per farmer were well below the level received by those with management agreements, and the farmers concerned were virtually unanimous in saying that the payments were far too low and the scaring was having a negligible effect on goose numbers or distribution. My own observations, carried out for the Department of Agriculture, showed not just a decline in flock size through each winter, which is to be expected, but a reduction in flock size between winters 1988-9 and 1989-90 and again between 1989-90 and 1990-1, despite increased overall numbers of geese. My interpretation was that the scaring was having at least this beneficial effect of breaking up the larger flocks. An increase in flock size between 1990-1 and 1991-2 might be attributed to the farmers' own belief that there was no effect, leading to a reduced effort.

No direct monitoring of the efficacy of different types and levels of scaring was carried out but some incidental observations suggested that devices which issued loud and irregular warbling noises, including some supposedly audible to geese but not to humans, did discourage geese from coming too near. However, as with every other scaring device ever tried against birds, it is necessary to vary the type and location of the device at frequent intervals, a strategy not always open to farmers with limited labour available.

For winter 1992-3, and hopefully for the foreseeable future, a new goose management scheme has been proposed by Scottish Natural Heritage. It will apply to the whole island and be based on a headage payment for geese on each holding. At the time of writing (August 1992) the details are still being discussed with interested parties, but it should offer adequate payments to all landholders outside the SSSIs as nearly equivalent as possible to the payments being made to those inside. This will be a voluntary scheme but it is hoped that there will be a high take-up, leading to a final recognition by all involved that the geese can

be conserved at an adequate level through a scheme which effectively subsidises the farmers and crofters who bear the brunt of feeding them.

It has been suggested that the scheme, which will bring about a significant reduction, even a cessation, of licenced shooting, will lead directly to a further increase in numbers. Predictions about trends in goose populations have a poor track record among goose biologists, including myself, and on this occasion I am declining to speculate, though I will monitor future events with great interest.

### **Greenland White-fronted Goose**

Historical information about this species on Islay and on the adjacent Inner Hebrides is much harder to come by than for the Barnacle Goose; a difficulty is that this race of the Whitefront was not described until 1948. However, Gray (1871), referring just to the White-fronted Goose, stated that "in the West of Scotland, its headquarters are in the island of Islay" and was told that they showed "a great partiality for certain fields" and that "they go in flocks of from three to four to one hundred or more", both traits which are still exhibited today.

Harvie-Brown and Buckley (1892) had nothing to add to this but Scot-Skirving (1878) reported another long-standing habit, though one showing signs of recent change, namely that of using small fields and ignoring larger ones, even at the expense of being easier to shoot on the small fields. More recently, Berry (1939) reported local observers as saying that in the previous thirty years Whitefronts on Islay had "increased enormously".

Post-war counts began, as with Barnacles, in the 1950s, but were fewer and nearly all demonstrably incomplete. Hugh Boyd and then myself commenced what we hoped were more complete counts in the early 1960s, though some of the early ones are almost certainly under-representations. The full series of early winter counts since 1964 is shown in Figure 1. Allowing for





*Greenland White-fronted Geese, Islay.*

*Morley Hedley*

increasing experience producing more complete counts, there is only a slight upward trend over the first 20 years, (1964-5 to 1973-4 - 2900, range 1200-4700; 1974-5 to 1973-4 - 3700, range 2900-4560). Since 1983, however, the numbers have increased steadily to a record 10,000 in 1991.

Prior to 1981, when the subspecies was given full protection in the Wildlife and Countryside Act, it was not shot particularly heavily on Islay, certainly not as much as the Barnacle, despite wider availability. However, the increase in Barnacle shooting in the late 1970s, and particularly the larger numbers of shooters visiting the island, did bring about an increase in Whitefront shooting in some areas. Since 1981, it has been possible to shoot Whitefronts only under licence and these have been issued much less frequently than has been the case with the Barnacles, while the numbers shot in any winter have been very much less than in the years prior to that date.

Breeding success does not vary by as much as in the Barnacles, a reflection of the easier breeding conditions in West than East Greenland. However, mean breeding success in the last seven years (20.2%) has been higher than in any previous similar period back to the mid-1960s (1964-5 to 1970-1 - 15.8%, 1971-2 to 1977-8 - 14.0%; 1978-9 to 1984-5 - 12.9%). This increase, coupled with declining mortality on the island, will have played a large part in the growth in numbers wintering. There have also been significant changes elsewhere in the range, with much reduced shooting in Ireland and considerable work on safeguarding and managing wintering haunts there, all helping to bring about an overall population increase from c.16,500 in 1979 to the present 28,000. Islay's increase over the same period from 3700 to 8000-10,000 in the last three years has thus been proportionately greater than the growth in the total population.

Simultaneously with the growth in numbers wintering on Islay has come a change in feeding habitat. Formerly, most of the Whitefronts fed mainly, if not exclusively, on bogs, marshy and rush-filled fields, and older pastures. Nowadays, between a half and two-thirds of the birds feed on recently improved pasture, including new reseeds. This change, which makes the geese much more visible, could be linked to the virtual cessation of shooting. Certainly the birds are much less wary than they were even ten years ago.

The increasing numbers, and greater visibility, of the geese has, not unexpectedly, led to complaints that they are causing agricultural damage. Although no measurements of this have been made, whereas they have for the Barnacle Goose, the Whitefronts on improved pasture are certainly feeding on the same foods as the Barnacles, albeit in smaller numbers and at a much lower density. Flock size in the Whitefronts remains much smaller with a mean range of 80-120 compared with 300-600 in the Barnacles (own data). Occasional large flocks, 1000-1500, do occur but only on stubble fields or harvested root crops where the birds are taking split grain or discarded leaves. This compares with regular counts of 3000-4000 Barnacle Geese in a single field, especially in autumn.

Neither the RSPB reserve nor the SSSIs normally hold more than small numbers of Greenland Whitefronts, except occasionally on stubbles. The goose scaring schemes did not differentiate between the species and so farmers outwith the SSSIs were receiving payments to scare either or both. The new Scottish Natural Heritage scheme will be making payments based on overall numbers of geese regardless of species thus recognising the obvious, that the Whitefronts are causing agricultural damage, something there has been a reluctance by some conservationists to admit in the past.

As with the Barnacles, I am loathe to predict what will happen to Whitefront

numbers but it seems unlikely that the recent upward trend will level off just yet.

### Greylag Goose

It is remarkable to turn from the previous two species, both of which have trebled their numbers on the island in the last thirty years, to one which has declined almost to vanishing point in the same time, without obvious reason.

Greylags were wintering in small flocks on Islay in the last century, though less commonly than the Greenland Whitefront (Gray 1871). By the time that Berry (1939) carried out his survey, local observers were reporting large fluctuations in numbers and suggesting that the increase in numbers of Greenland Whitefronts over the previous thirty years (see above) had been at the expense of the Greylags. However, no evidence is presented for this theory. Baxter and Rintoul (1953) summarised the above and other evidence and stated that "about 70 years ago a considerable number wintered on the Islay; they decreased and now only a few winter on that island".

The next statement on the situation comes from Atkinson-Willes (1963) who reported that "although restricted to a single locality, have recently shown a striking increase, and now total upwards of 500 throughout the winter". This was based on counts by Boyd and myself, which have continued to the present. The peak count was of 665 in November 1964, but it had dropped to 217 the next year. There were still about 300 in 1968-9 but there has been no count over 200 since 1975 and in some recent years the total has failed to reach 100.

For many years, the Greylags have been restricted to the upper Laggan valley and to sites around the head of Loch Indaal. The Laggan valley flock, usually the largest, is almost always found mixed in with Greenland Whitefronts, which would seem to deny the theory that the latter have ousted the Greylags. In nearby Kintyre, Greylags and Greenland Whitefronts appear to co-exist satisfactorily.

The decline in Greylags on Islay took place at a time of rapid increase in the Icelandic population of this species and, although the origin of the Islay birds has never been proved beyond doubt, those wintering on the Kintyre peninsula, less than 30 km away, and on Bute, do belong to the Icelandic population and increased at the same time. If, though, the Islay birds were of Outer Hebridean origin, as has been suggested, then a change in the opposite direction might not be so surprising if this then poorly studied group of birds altered either in numbers or wintering distribution. However, despite a considerable increase in wintering Greylags on Coll and Tiree in recent years, some at least of which are Outer Hebridean birds, there has been no corresponding recovery of the species on Islay.

Without anyone particularly wanting even more geese on Islay, it does seem strange that the Greylags have decreased at a time when farming changes so clearly favourable to two other kinds of geese were taking place. Greylags have not shown themselves slow at adapting to farming changes elsewhere in Scotland.

## DUCKS

There is almost no past history of duck numbers on Islay. Irregular counts of some species were first made by visiting ornithologists, including goose counters, during the 1950s and 1960s, but it was not until Gordon Booth moved to the island in the late 1960s that regular winter wildfowl counts of the major wetlands began, particularly Loch Indaal and, less frequently at first, Loch Gruinart. Since 1980, coverage has been almost monthly throughout the year. Freshwater lochs on the island tend to hold relatively few birds.

I have analysed all available counts since 1969-70 for the two sealochs, adding casual counts to the run of monthly wildfowl counts. However, it is not certain that the coverage of Loch Indaal has been

the same for all the counts, some of the earlier ones, in particular, may not have included quite as much of the shoreline as have more recent ones. Also, the seaducks occasionally take some finding and it may be that since I came to live on the shore of Loch Indaal in 1986, I spend more time looking for them than did some previous counters.

The following accounts concentrate on six species, Wigeon *Anas penelope*, Pintail *A. acuta*, Scaup *Aythya marila*, Long-tailed Duck *Clangula hyemalis*, Common Scoter *Melanitta nigra* and Red-breasted Merganser *Mergus serrator*, all wintering in Loch Indaal, and all of which appear to have shown changes in numbers over the last 20+ years. All six occur in larger numbers in Loch Indaal than anywhere else on the island. At their other haunts there has either been no change in status or the data are too fragmentary to show it.

Loch Indaal is a long fairly narrow sealoch though with a reasonable cycle of about 24 hours for a complete change of water. One small river, the Sorn, and several burns flow into it having passed through agricultural land. Also flowing in is the largely untreated sewage from the villages of Bowmore (c.1000 inhabitants), Bridgend (c.100), Bruichladdich (c.100) and Port Charlotte (c.200). Perhaps as significant as all these put together are the waste products from two distilleries, at Bowmore and Bruichladdich. Bowmore is probably the more important as it is nearer the head of the loch and discharges into shallower water. The waste, which consists of a potent mix of nitrates, nitrites and phosphates, together with particles of crushed barley, has presumably been discharged into the loch since the distilleries were founded, Bowmore in 1779 and Bruichladdich in 1882. Normally three mashes are produced every 24 hours so that the quantities of nutrients flowing into the loch must have had an enormous cumulative effect on the invertebrate and plant life which in turn will have affected the birds which feed on them.

Pollution it may be to some people, but it must surely have had an extremely beneficial effect on the numbers of birds wintering on the loch and around its shores. Just in the last few years, the Bowmore Distillery discharge has ceased to go direct into the loch but instead goes via the settlement tanks of the public sewer so that crushed barley probably no longer reaches the loch, but it is doubtful if there has been any reduction in the other components of the discharge.

### Wigeon

Loch Indaal has extensive beds of *Zostera* and marine algae particularly on the east side of Bowmore, so it is not surprising that it is popular with Wigeon. In the autumn and early winter, flocks of Whooper Swans *Cygnus cygnus* also feed here. The Wigeon take full advantage of the swans' ability to upend during the high tide period and pull weed to the surface. Each upending swan quickly attracts an attendant scrum of Wigeon.

Counts of Wigeon in Loch Indaal since 1970-1 are summarised in Table 1. The two columns give the average annual maximum (= mean of three highest counts per season) together with the peak count. I have used a season of July to June, though for this species virtually all the counts are concentrated between September and April.

The counts in the 1970s were reasonably complete and showed a lot of fluctuation. Leaving aside the very low counts in 1980-1, for which I can find no explanation, the counts for the next four winters tended to be lower than previously. In the last six winters, since 1986-7, there has been an increase in wintering Wigeon, most noticeably doubling in the last two winters.

There have been no direct measurements of the amount of food for Wigeon in Loch Indaal but there is evidence of increasing amounts of *Zostera*. The extensive *Z. marina* beds lie at or below low-water mark but if winter tidetrack is

anything to go by these have increased substantially in the last few years. Additionally, in 1991 I discovered quite large patches of *Z. nana* growing on the tidal sandflats within the area favoured by the Wigeon. *Z. nana* had not previously been reported from Loch Indaal and, indeed, was known only from a single bay in the south-east of the island. If the growth in marine algae has paralleled that of the *Zostera* then an increased food supply may explain the recent increase in Wigeon numbers. The 150-250 wintering in Loch Gruinart, the second largest flock on the island, have shown little change in the last few years and there is no other evidence that the increase in Loch Indaal has been at the expense of other haunts on the island.

### Pintail

Prior to 1982-3, this species was a casual visitor in very small numbers, the birds staying for a few days or weeks at most. If any occurred on the island at all it was most likely at a fresh water loch such as Ardnave in the north-west. Since 1982-3, however, the species has become regular on Loch Indaal and has increased rapidly (see Table 1). They spend their time mainly in the channel of the River Sorn where it crosses the intertidal sandflats or dabbling at the tide edge.

Thom (1986) stated that the winter maxima of Pintail wintering in Scotland in recent years varied between 1500 and 3380. As in the rest of Britain, there are a few large flocks and many much smaller ones. Thom listed only the Solway and Cromarty Firths as major sites, where over 1000 occur. Flocks of over 100 away from these areas are found regularly only on the inner Clyde. Elsewhere, hardly any flocks exceed 20, which puts the Loch Indaal flock, now peaking at over 50 in three of the last four winters, as of at least regional interest. Over the whole of Britain, Pintail have declined in recent years and in 1990-1 were only at about 50% of their level ten years previously (Kirby *et al* 1991).

**TABLE 1.** Average maxima and peak annual counts of ducks on Loch Indaal, Isle of Islay, 1969-70 to 1991-2.

Season	Wigeon		Pintail		Scaup		Long-tailed Duck		Common Scoter		Red-breasted Merganser	
	Ave max	Peak count	Ave max	Peak count	Ave max	Peak count	Ave max	Peak count	Ave max	Peak count	Ave max	Peak count
1969-70	(150)	155	-	0	800	1100	-	0	-	10	-	0
1970-1	565	749	-	1	1191	1407	0	0	36	60	97	171
1971-2	431	480	-	2	1082	1097	0	0	3	5	52	99
1972-3	(270)	400	(1)	2	1050	1500	1	1	0	12	122	220
1973-4	562	647	0	0	933	1000	1	1	18	43	27	40
1974-5	504	564	0	0	1000	1000	-	2	2	6	113	150
1975-6	315	345	(2)	3	1167	1300	0	0	30	60	43	55
1976-7	415	450	(2)	7	1227	1300	0		5	15	46	80
1977-8	288	345	-	1	1083	1200	1	1	17	42	50	69
1978-9	-	115	-	3	521	nc	-	1	3	8	nc	nc
1979-80	312	800	-	5	793	950	2	5	15	46	32	73
1980-1	46	91	0	0	640	500	1	1	7	81	9	26
1981-2	419	615	0	0	1052	915	-	2	26	45	53	101
1982-3	220	270	7	8	901	785	2	6	34	70	16	19
1983-4	169	209	2	6	557	770	0	0	10	26	17	24
1984-5	312	348	7	14	836	1189	0	0	61	86	14	19
1985-6	295	341	7	11	1160	1505	4	5	45	100	70	87
1986-7	402	623	19	23	756	817	7	8	112	165	182	189
1987-8	555	688	28	32	931	1198	6	8	87	94	109	120
1988-9	431	527	44	51	858	1230	4	6	125	141	91	106
1989-90	466	615	32	37	383	442	11	13	147	171	139	240
1990-1	699	798	46	53	647	660	10	10	108	130	120	172
1991-2	1115	1799	44	61	1202	1430	12	16	223	232	264	350

**Notes.**

Count season runs from July to June

'Ave max' is average of highest three counts in season; if placed in brackets, then only two counts available to average; "-" = only one count in season

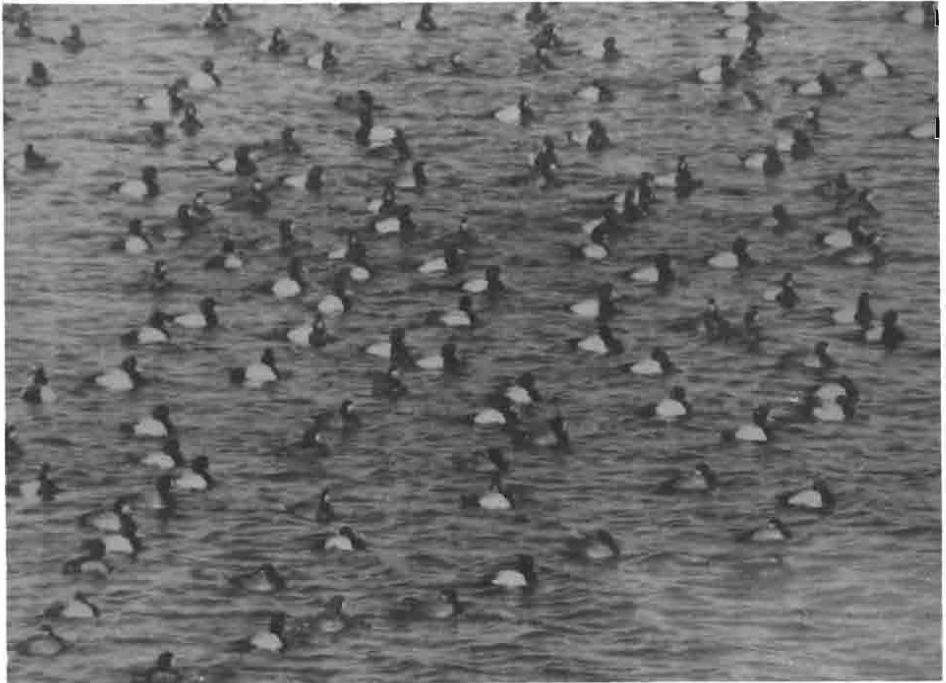
'Peak count' is highest count in season

**Scaup**

I have been unable to discover any pre-war counts of Scaup for Islay. The bird was known to winter here in the last century but no details are given in any of the books consulted. Scattered counts in the 1950s enabled Atkinson-Willes (1963) to describe Loch Indaal as an important site with maxima up to 1500, dependent either directly or indirectly on the Bowmore distillery discharges. This remains the situation today, but the wintering

population has shown some marked fluctuations since more regular counts began in 1969-70 (see Table 1). Although the flock of Scaup is usually quite easy to find, rarely straying far from the inner part of the loch, it is much harder to count when the sea is choppy and the coincidence of a careful counter with a really flat calm day is probably needed to produce a really accurate peak count.

Throughout the first nine winters of counts, the annual mean maximum hardly



**Part of Scaupflock, Islay.**

**Rodney Dawson**

dropped below 1000, while the peak count varied between 1000 and 1500 birds. Since 1978-9, however, despite more frequent counts, the mean has only three times risen above 1000 and in only half the winters has the peak count been above this level. Marked annual fluctuations are shown in maximum counts at other Scaup resorts in Britain and Northern Ireland, including at the only two sites with more Scaup than Loch Indaal, the Solway (1500-4000) and Loughs Neagh and Beg, Northern Ireland (1200-1600). National indices (Kirby *et al* 1991) do not help as the long-term picture remains grossly distorted by the disappearance after 1976 of the 10,000-30,000+ that had previously wintered on the Forth. None of these, certainly, moved to Islay.

It is possible, therefore, that all that is being seen is the variation in breeding

success and mortality being experienced by these birds which are presumed to breed in Iceland. One fear was that the sharp drop between 1988-9 and 1989-90 reflected the change from direct discharge into the loch of the Bowmore distillery waste. However, the return to former levels in winter 1991-2 hopefully means that such an effect, if any, has been merely temporary. The flock remains comfortably above the level of 40 which qualifies it as of national importance (Kirby *et al* 1991) and not so far below the internationally important qualifier of 1500.

#### **Long-tailed Duck**

Numbers of this species are very small (see Table 1) but in the last thirty years it has increased from a less than annual visitor, with one or two individuals staying for short periods in the 1960s and 1970s to, in each of the last three winters, over ten birds on

Loch Indaal for several months. Whilst the numbers are trivial in a Scottish context, there are only a few places in Argyll and the Inner Hebrides where Longtails occur and no other site that currently holds even such a small regularly wintering flock.

Quite why Longtails should begin to winter regularly on Loch Indaal is unknown, though there is evidence from the increasing numbers of Red-breasted Mergansers (see below) that there may have been some recent growth in fish stocks within the loch.

### Common Scoter

Meaningful statements concerning the status of this species are perhaps more subject to counting problems than for some of the other seaducks on Loch Indaal, because the birds habitually spend much time in the outer part of the loch and are often only clearly visible through a telescope. On the other hand, there is plenty of evidence from counts in the 1960s and 1970s that regular birdwatching visitors to the island knew of their presence and made attempts to find and count them. Thus the picture revealed in Table 1 for the period up to 1984-5 of a small wintering population averaging 20-30 and peaking at 70-80 is probably close to the truth.

In the winter following my arrival on the island in May 1986 I immediately became aware of the presence of a flock of Common Scoters because I could not only

see them but often hear them displaying from my house. I have since paid them quite a lot of attention including counting them at least monthly and often more frequently. The considerable increase in numbers shown in Table 2 which seemed to begin in 1986-7 may well, therefore, be at least partly attributable to my efforts, but the subsequent sharp increase in 1991-2 is certainly genuine.

Moreover, Common Scoters are now present throughout the year on Loch Indaal, as shown in Table 2. It is as difficult to explain this change, with as many birds in some summer months as in the winter, as it is to explain the overall increase. However, the status of Common Scoters as a breeding bird on Islay appears not to have changed over the last 30 years or more. When they were first discovered nesting in the 1950s, Meiklejohn and Stanford (1954) reported at least five pairs present at the one site. This is still the situation today, though very frequent counts suggest that perhaps another five to seven pairs use the breeding loch in the early part of the summer, presumably for feeding, and then move away to small pools to breed. The original observers would not necessarily have spotted these extra birds at the time of their visit. Scoters have been seen flying from the main breeding site to Loch Indaal, but the true extent of the connection with the flock on the sea is unknown. Certainly there is no evidence that the increase in numbers or the

TABLE 2. Monthly peak counts of Common Scoters in Loch Indaal, Islay, 1985-1992.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	0	86	0	35	0	0	0	0	0	10	23	12
1986	3	4	100	6	10	0	0	0	92	56	11	9
1987	140	165	0	0	87	59	22	10	2	94	79	54
1988	82	60	88	84	65	45	18	36	76	0	10	59
1989	109	35	62	141	82	125	140	171	111	104	82	49
1990	83	104	37	125	130	96	96	96	87	87	98	68
1991	92	85	85	130	83	82	80	69	105	95	76	109
1992	124	107	232	209	228	68	92	125	160	162		

recent presence of the summering flock has made any difference to the numbers breeding.

Although Common Scoters occur in several places on the east coast of Scotland, including some moulting flocks, they are relatively scarce on the west. The only other known flock in Argyll is in the Sound of Gigha, between Kintyre and that island. Counts in the last few years have revealed a year-round and probably increasing flock here, at its largest in summer, reaching over 300 in 1991. However, there are insufficient earlier counts to show whether summering is a new phenomenon as it appears to be on Islay.

### Red-breasted Merganser

Loch Indaal has long been known as a year-round site for this species, with the highest numbers in the summer through the presence of a moulting flock. There are scattered counts of up to 150 in the 1950s and 1960s. Counts since 1969-70 are summarised in Table 1. All the peak counts for the period up to 1977-8 fall in the period June-September. Then the moulting flock seemed to vanish. Counts fell right away, with the single exception of 101 in July 1981. In 1986-7 there was a sudden return that has been maintained and, most recently, significantly improved upon. Table 3 sets

**TABLE 3. Monthly counts of summering (moulting) Red-breasted Mergansers on Loch Indaal, Isle of Islay, 1983-1992.**

	May	Jun	Jul	Aug	Sept
1983	0	0	0	0	13
1984	0	0	0	0	3
1985	0	0	65	18	4
1986	6	7	64	189	180
1987	3	70	100	76	17
1988	22	120	106	88	80
1989	0	76	90	240	122
1990	15	14	172	102	87
1991	46	46	45	114	350
1992	15	270	360	560	176

out the summer month counts for the last ten years. Only some tens of pairs breed on Islay, so the moulting birds are coming in from elsewhere.

There is considerable variation in the timing of the peak, which sometimes occurs in June-July, but in other years not until August-September. The then record count of 350 in September 1991 suggested that these were birds coming in much later, though still presumably to moult. Cramp and Simmons (1976) state that male Red-breasted Mergansers are flightless for about one month in the period mid-July to end-August, while females are about a month later. There is no information on the sex of the moulting birds in Loch Indaal. The sudden surge of numbers in 1992 is so far inexplicable. It certainly indicates substantial numbers of small fish but there is no direct information that would suggest fish stocks have also increased.

The changes in numbers of Red-breasted Mergansers in Loch Indaal over the years probably are not due to variation in counting effort. The moulting flock has always preferred the head of the loch, especially on the north side around Blackrock, and are readily visible from the road. Another moulting flock of up to 100 birds, at Claggan Bay on the east coast of Islay, also dwindled in the 1970s, to no more than 25, but has been back up to about 100 in recent years, including 98 in August 1992.

Red-breasted Mergansers have increased and spread throughout Scotland and northern England in recent decades, though the national index of numbers, based on winter counts, having doubled through the 1970s, has fallen back sharply in the last few years so that by 1990-1 it was back to the level pertaining before the 1970s (Kirby *et al* 1991). Moulting flocks of Red-breasted Mergansers are found quite widely round Scotland, though many are not easy to count regularly. In Argyll, up to 1000 have been counted in the Sound of Gigha, on the west side of the Mull of Kintyre, but not often enough to be able to say whether



variations there can be matched with changes in the Loch Indaal flock. It should be noted that a regular flock of 100 birds qualifies a site for recognition as of national importance for this species.

## WADERS

Several species of wader occur regularly on Islay, but it is rare for a flock of any species to reach 1000. The most numerous are Oystercatcher *Haematopus ostralegus* and Curlew *Numenius arquata*, both of which occur in flocks of hundreds in Loch Indaal and Loch Gruinart, as well as breeding widely. Other species, such as Ringed Plover *Charadrius hiaticula*, Sanderling *Calidris alba* and Dunlin *Calidris alpina*, can occur in hundreds but these larger flocks are mainly comprised of migrants in spring and autumn and their occurrence is too irregular to detect any pattern or trend. Just one estuarine species, Bar-tailed Godwit *Limosa lapponica*, has shown some changes in the last 20 years and is examined in detail below, as is the Lapwing *Vanellus vanellus*, purely in its status as a breeding species on the Loch Gruinart reserve.

### Bar-tailed Godwit

Islay has regular wintering flocks of this species in both Loch Indaal and Loch Gruinart. Counts were much less complete in the latter site during the 1970s but have been monthly since the early 1980s. The figures for both lochs are set out in Table 4. Allowing for the gaps in the Loch Gruinart data it does appear that numbers at the two lochs change in synchrony. There was a period of high numbers in the first half of the 1970s then a few years with much smaller numbers before a short-lived recovery in the early 1980s. Numbers fell back again but have returned to former levels in the last four years.

Reasons for these fluctuations are unclear but may be linked to food supply on the intertidal flats or to weather elsewhere as Bar-tailed Godwits are known

**TABLE 4.** Average maxima and peak annual counts of Bar-tailed Godwits on Loch Indaal and Loch Gruinart, Isle of Islay, 1969-70 to 1991-2.

Season	Loch Indaal		Loch Gruinart	
	Ave max	Peak count	Ave max	Peak count
1969-70	(69)	110	nc	nc
1970-1	131	294	(5)	11
1971-2	222	250	90	175
1972-3	152	280	(60)	100
1973-4	172	329	-	200
1974-5	210	220	nc	nc
1975-6	233	280	nc	nc
1976-7	129	277	nc	nc
1977-8	53	80	nc	nc
1978-9	17	34	nc	nc
1979-80	41	56	nc	nc
1980-1	118	300	nc	nc
1981-2	145	240	76	108
1982-3	129	200	29	64
1983-4	56	91	74	86
1984-5	91	190	50	70
1985-6	86	106	59	62
1986-7	117	161	10	12
1987-8	87	100	68	74
1988-9	134	155	225	323
1989-90	115	119	162	184
1990-1	172	243	129	152
1991-2	248	292	95	120

#### Notes

Count season runs from July to June

'Ave max' is average of highest three counts in season; if placed in brackets, then only two counts available to average; '-' = only one count in season

'Peak count' is highest count in season

to shift in response to severe conditions. The weather seems an unlikely factor, however, as the numbers summering have varied more or less in line with wintering numbers. Thus during the 1970s, the peak count in June and July, when passage appears to be almost negligible, regularly reached 50-70, occasionally 100, then fell away almost to nil until a slow increase occurred through the 1980s, from under 10 in 1983-1988, to 50-90 in 1989-1992.

### Lapwing

Most farmers and crofters say that the Lapwing is much scarcer than it used to be, though there are no adequate counts to back up this widely-held view. One, in a letter to the local newspaper, went so far as to put the blame on the increasing numbers of geese leaving no room on the fields for the Lapwings to feed or nest.

Contrary to any such changes over the island as a whole has been the great increase in breeding pairs on the RSPB Loch Gruinart reserve. The number of pairs has been censused annually from 1985 when a total of 108 pairs were found. It has increased each year since to no less than 220 pairs in 1992. The area surveyed, of approximately 250 ha (62 acres), has remained the same though the personnel involved have changed and it is likely that the census technique has improved. Nonetheless there is no doubt that the increase is both real and substantial and this despite rotational ploughing and reseeded of approximately 40 hectares each year. Early nests on these latter fields undoubtedly get destroyed by these farming activities, but the pairs involved have ample opportunities for further attempts on neighbouring fields.

### BIRDS OF PREY

There have been very encouraging increases in the numbers of all seven breeding species of birds of prey on Islay in recent years. In most cases, these can be attributed to man ceasing his former unrelenting persecution, in particular of Hen Harrier *Circus cyaneus*, Buzzard *Buteo buteo* and Golden Eagle *Aquila chrysaetos*, and to a lesser extent of Sparrowhawk *Accipiter nisus* and Peregrine *Falco peregrinus*, while even the Kestrel *Falco tinnunculus* and Merlin *Falco columbarius* have suffered in the past. For obvious reasons it is not possible to publish figures for some species so the following accounts will include statements unsupported by any actual data.

### Hen Harrier

The consensus on past status is that this species was more or less exterminated towards the end of the last century. Nesting was attempted from time to time over the next 50 years, followed by a steady recolonisation since about 1960. The nesting of a pair in 1969 was of sufficient interest to be noted in the *Scottish Bird Report* for 1969. Breeding was proved in four 10-km squares during 1968-72.

Since 1988, annual breeding surveys have been carried out. The precise total of nesting birds, which may have just levelled off, is still confidential, but breeding is now taking place in 12 10-km squares, while the number of nests on the RSPB Loch Gruinart reserve has increased from six in 1985 to at least nine in 1992.

As well as the apparent cessation of persecution, there has been an increase in young forestry plantations in parts of the island which seems to have been beneficial, at least in the short term, by providing undisturbed nesting sites and a good supply of food.

### Sparrowhawk

Booth (1975) was of the opinion that the status of this species had not changed for the previous 100 years, while Elliott (1989) suggested that during the 1970s and 1980s there were perhaps nine home ranges on Islay. He also considered that the species was increasing as a result of less attention from keepers. This is borne out by the BTO Atlas surveys with positive breeding in just five 10-km squares in 1968-72 but in nine in 1988-91. There has not been a thorough survey of the species on the island but available records suggest the population is currently of the order of 15-20 pairs.

### Buzzard

This is another much persecuted species but one which has made a major comeback in the last few years. Breeding was proved in 1968-72 in only two of the 14 10-km squares covering the island. There seems to have

been a slow but steady increase during the 1970s and early 1980s. Elliott (1989) using observations collected between 1975 and 1987 concluded that there were about 20 home ranges on the island. From the first year's returns (for 1988) from the new BTO Breeding Atlas, Jardine (1989) showed that the density of Buzzards on Islay, at 0.31/tetrad, was significantly lower than in other areas of Argyll, where densities of 1.0 (lowland) and 0.69 (upland), were attained. My own best estimate for the present situation, based on observations in 1991 and 1992, is that at least 30 pairs are now breeding in 12 10-km squares.

The cessation of persecution has been a principal factor in the recent increase in numbers. Poisoned Buzzards have been found on the island several times but the last certain occasion was in 1989. Pairs are now nesting freely in areas from which they were formerly excluded and where it would be very easy to deal with them if this was still the policy.

### **Golden Eagle**

Past and present records suggest that there is room for about eight pairs on the island, but it is doubtful whether this number have ever bred, or attempted to breed, in the same year. However, it may not be too long before they do.

The species has been much persecuted for a century or more, with many references to their destruction in 19th century estate game books (see, e.g., Booth (1975)). An unpublished diary, kept by a member of the Oxford Ornithological Society Expedition to the island in June 1936, records that the party glimpsed just one eagle during their ten-day visit and relates how "a keeper said that the birds do not ordinarily nest in Islay. This year, however, there was a nest in an easily accessible place which was preserved because a friend of the laird wanted to photograph it, but the birds deserted". They were also told a slightly unlikely story of another site where the male bird was shot but the female and young left unharmed.

More recently, a retired keeper claimed that 57 had been killed in 12 years in the 1950s and 1960s on one estate; a gin trap (old) was removed from an eyrie about ten years ago; and two birds were found poisoned in 1988.

During the BTO Atlas survey of 1968-72, only two pairs were thought to have bred. There has been a slow increase since then to a maximum of six pairs breeding in 1992. There are two other territories on the island where young pairs have been seen in the last two years.

### **Kestrel**

Ross (1913) was able to write: "the most abundant of the nesting species of hawks. Most keepers now acknowledge that it is comparatively harmless". This did not stop one shooting out a nest as recently as 1987. Nor is it now the most abundant nesting raptor. Elliott (1989) thought that it was common in the 1970s but declined in the 1980s. However, it was recorded in nine 10-km squares in both the 1968-72 and 1988-91 breeding Atlases, suggesting little change. The current population is probably around 10-15 pairs.

### **Merlin**

It always surprises me that the Merlin, whose diet consists largely of small birds supplemented in summer by moths, should be persecuted but as Meiklejohn and Stanford (1954) reported: "it bred on the island in 1954, the nest being destroyed by a keeper".

It is difficult to make a lot of sense of the past records of this species, not least because Icelandic birds are present into April so that spring sightings are not necessarily of potential nesting pairs. Positive breeding only occurred in one 10-km square in 1968-72, plus sightings in five more, yet in 1974 a fairly thorough survey revealed about nine pairs present in eight squares. The late Richard Elliott estimated that there were at least eight and possibly 15 home ranges in 1986 (Elliott

1989), though this seems high and I have been unable to discover on what he based his estimate.

No particular effort has been put into looking for Merlins in recent summers, but pairs have bred or been present in five different locations since 1989. On the other hand, a number of former known Merlin localities seem to have been deserted. The national survey of Merlins due in 1993 will, it is hoped, stimulate sufficient fieldwork to provide a clearer picture. There seems to be plenty of suitable habitat for them, with good heather banks to nest on and an abundance of small birds for food. If there has been a recent decline then perhaps one may hazard that increasing numbers of other birds of prey might be working to the detriment of the Merlins. This thought is reinforced by the drama I saw this summer when a male Merlin, flying in with food to a nest site, had the narrowest of escapes from a Peregrine stooping at him at the very moment the Merlin was passing the food to his female. The Merlin dived to the ground and escaped while the unsuccessful Peregrine disappeared at speed closely pursued by the female.

### Peregrine

This species is also increasing and again there have been no recent signs of persecution though only in 1990 a farm owner, recently arrived from the South of England, who claimed that a pair nesting close to his land were taking his lambs (!), had to be discouraged from taking drastic action against the birds. The 1991 census found about 30% more occupied territories than in 1981.

### OTHER SPECIES

Detailed evidence and space dictates only two more species accounts, namely Corncrake *Crex crex* and Chough *Pyrrhonorax pyrrhonorax*. There have undoubtedly been status changes in several other species in the last 20-30 years,

including such obvious ones as the arrival of the Collared Dove *Streptopelia decaocto*. Red Grouse *Lagopus lagopus* and Black Grouse *Tetrao tetrix* have both declined disastrously, the former almost certainly because of the same adverse conditions pertaining over other grouse moors of western Scotland, namely increased numbers of deer and sheep, and therefore ticks carrying louping ill, as well as decreasing management of the heather. Annual bags of 500-700 Red Grouse on a single estate were commonplace in the 1930s but such a number probably comfortably exceeds today's total island population.

Woodcock *Scolopax rusticola* have always been subject to wide fluctuations in numbers, not least in the size of winter immigrations, but it is over 50 years since influxes of the size that produced a kill of over 1000 in two weeks on one estate in 1937-8 have taken place.

Islay lost its Puffins *Fratercula arctica* many years ago. Meiklejohn and Stanford (1954) found five pairs at Sanaig in the north-west of the island, and breeding was proved there in 1969 but since then only occasional birds have been seen though it is not inconceivable that breeding is attempted in some years. At the turn of the century Puffins were reported as being numerous on the Oa, but had deserted the area by the 1930s or soon after. Introduced land predators such as cats and, more recently, ferrets, may well have been responsible for the species' demise as a nesting bird.

Another disappearance as a breeding bird is the Corn Bunting *Miliaria calandra* which last certainly bred in the 1930s and 1940s, as the farming began its steady change from small mixed arable to mainly pasture.

To set against these declines and losses are substantial increases in some woodland birds, particularly those favouring conifer plantations. Thus Coal Tit *Parus ater*, Goldcrest *Regulus regulus* and Siskin *Carduelis spinus* have all benefitted greatly

from the large blocks of forestry planted in the Glen east of Bowmore in the early 1960s and will presumably be further encouraged as the 1980s plantings mature. The forestry, too, has been responsible for a recent gain of a breeding species, Crossbill *Loxia curvirostra*.

### Corncrake

The first ever count was by Meiklejohn and Stanford (1954) who in June that year "heard birds calling in thirty-one different fields". Birds were recorded in ten 10-km squares during the BTO Atlas survey of 1968-72. By the time of the national survey in 1978, the total for the island was down to 22-24 (Cadbury 1980). In 1985, another thorough census was carried out by Moore (1985), when a total of 20-29 calling birds was heard. Since then, censuses have been attempted almost every year as follows: 1986 - 23; 1987 - no census; 1988 - 19; 1989 - 12; 1990 - 14; 1991 - 13; 1992 - 11.

The reasons for the decline undoubtedly include the well-documented adverse effect of the change from hay-making to silage. In an attempt to reverse the trend, the RSPB, Scottish Natural Heritage and the Scottish Crofters Union have promoted an initiative to pay small sums of compensation to crofters and farmers willing to delay cutting selected grass fields until 1st August. Four such grants were made on Islay in 1992, at sites with calling birds. It is understood that the prescriptions now being drawn up for the Inner Hebrides Environmentally Sensitive Area, which is due to come into existence on 1st April 1993, will include the opportunity for similar Corncrake-friendly management agreements.

### Chough

Islay is the Scottish stronghold of the Chough with c.90% of the population and around 40% of the total British population. Formerly much more widespread in western Scotland, the range has steadily contracted

and it has hardly occurred as a regular breeder outside Islay and neighbouring islands this century. In the last century it was reported as common all over Islay and there is mention of wandering flocks as well as pairs (Gray 1871). A little later, Scot-Skirving (1876) was reporting much persecution on account of demand for skins for natural history specimens, but Ross (1913) saw flocks totalling 60 birds on the Oa in July 1907.

There is little information on which to base estimates of numbers until very recently. Rolfe (1966) reported a flock of 47 on the Oa in July 1963 which was thought to be the whole island population, though this seems highly improbable in view of counts of flocks in other parts of the island in years immediately before and since. There is no evidence that the island population has ever gathered together in one locality.

In 1976, a survey of coastal birds produced a total of 135-140 birds (Booth and Taylor, unpub.); adding in known or suspected inland pairs brings their total to 153-158 birds, including 39-41 breeding pairs. A count of 134 in February 1978 is just attributed to "Islay" (*Scottish Bird Report* 1978). In 1981, Warnes (1982) undertook thorough surveys in December 1980 and April 1981, and estimated an island total of 160-180 individuals with 58-61 breeding pairs. She drew attention to the increasing use of buildings inland for nesting as opposed to the previous traditional cliff caves. As Choughs are highly territorial when breeding, this extension of the range inland opened up considerable new areas for them. However, Warnes wrongly stated that the first known inland breeding was in 1977. When Susan Cowdy was gathering information at the time of the 1963 census she was informed of a nest in an old building in that year.

A repeat survey carried out in 1982 found a slight decrease to 141-175 birds including 53-61 breeding pairs (Warnes 1983). However, another survey in 1986 found pairs of Choughs present at no less

than 95 sites, with 62 pairs confirmed breeding, 16 probably breeding and a pair present at the remaining 17 sites. A further 105-140 non-breeding birds were recorded giving an island population of 295-330 (Bignal *et al* 1988).

Unfortunately, Bignal *et al* do not discuss the difference between their results and those of Warnes just four years earlier except to predict that "the population should continue to expand". That, though, it has not done. Recent information suggests a fall in numbers probably linked to a run of years of relatively poor breeding success and low young survival (E. Bignal, pers.comm.). A full survey being conducted in 1992 should reveal more clearly what has happened.

Management agreements with farmers on SSSIs aim to benefit the Chough by controlling cattle grazing in order to produce short swards with plenty of cowpats, both of which provide the Choughs with important food supplies. In addition, grants have been awarded by Scottish Natural Heritage and the Worldwide Fund for Nature to enable Chough 'caves' to be incorporated in the roofs of buildings being renovated. This has been very successful, the birds continuing to nest after the renovations.

## DISCUSSION

This personal, and patchy, account of changes in status of some of the birds occurring on Islay, based on reasonably respectable data, has indicated what changes have occurred, but suggested reasons have had to be speculative.

For the Barnacle and Greenland White-fronted Geese, it seems clear that agricultural improvements coupled with low mortality have been the main factors for the substantial increase in numbers. Changes in duck and wader numbers on Loch Indaal, on the other hand, whilst relatively straightforward to monitor, are much harder to explain.

The main inputs to the loch were mentioned earlier. Changes in these could perhaps be described if the relevant data were forthcoming. For example, it seems probable that the increased use of artificial fertiliser in the catchments of the River Sorn and the various burns will have led to an increase in the amount reaching the sea, particularly in this area of relatively high rainfall. Despite an overall decline in the human population on Islay in the last 30-40 years, the number of people living in the villages around Loch Indaal has probably increased, though whether by sufficient to affect the quantities of nutrients in the sewage might be hard to discover.

What this survey does confirm is that few if any bird populations are static and that the continued monitoring of numbers, whether through national schemes such as Wildfowl Counts and Birds of Estuaries Enquiry, or just the assemblage of records for a defined area by one or two people, can provide information of potential value. In these days when more and more birdwatchers seem content merely to find and identify birds, or to chase after rarities, there is a need to ensure that at least some of us realise the worth of noting numbers, too.

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## **Development of an internationally important Pink-footed Goose roost at West Water Reservoir, Borders Region, 1966-1990**

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*This paper records the development of an internationally important Pink-footed Goose roost at West Water Reservoir, Borders Region, over the 25 years 1966-1990. The pattern of use by the geese throughout the winter is described with peak counts occurring in October/early November when the site regularly holds over 10% of the British population. The lack of disturbance at the site is highlighted as a major factor in maintaining the importance of the roost.*

### **Introduction**

The Pink-footed Goose *Anser brachyrhynchus* population which breeds in east Greenland and Iceland and winters in Britain totalled 72,000 in the 1970-71 winter (Ogilvie 1970), increasing to 95,000 in 1980-81 (Ogilvie 1981) followed by a dramatic increase to 194,000 by 1990-91 (Kirby & Cranswick 1991). A distinct and much smaller population, numbering over 30,000 birds in the 1980s (Batten *et al.* 1990), breeds in Spitsbergen and winters from eastern Denmark to Belgium. Together these two populations, totalling about 225,000 birds in 1990-91, comprise the entire world population of Pink-footed Geese.

This paper describes the development over a period of 25 years of a Pink-footed Goose roost at West Water Reservoir, Borders Region, to a site of international importance. The first report of geese using the site was in the 1965-66 winter (W. Brotherston unpub. data). The peak count in winter 1967-68 represented 5% of the British population at that time. Since 1980-81 the reservoir has consistently held over 10% of the British population with a peak count in October 1988 of 40,000 birds, 23% of the British population and 20% of the world population.

West Water has been found to be of particular value from late September to early November and again in springtime, with geese utilising feeding sites a considerable distance from the reservoir, but numbers declining in the area from December through to February. This pattern of use is described in this paper and some reasons for it suggested.

### **Study Area**

West Water Reservoir lies in the south-east corner of the Pentland Hills, Borders Region (Fig. 1) at an altitude of 320 m and covers an area of 42 hectares. It is a water supply reservoir owned by Lothian Regional Council. Construction began in 1962 and was completed by 1967 although it began to fill with water by 1965. Lothian Regional Council shares the fishing rights with the adjoining estate which also owns the shooting rights over and around the reservoir. The surrounding land consists of heather moor, rough pasture and wet peatlands with marshy flushes, and is quite devoid of trees. As the reservoir is not fenced off from the surrounding land sheep and cattle are free to roam to the water's edge but cause little disturbance to roosting

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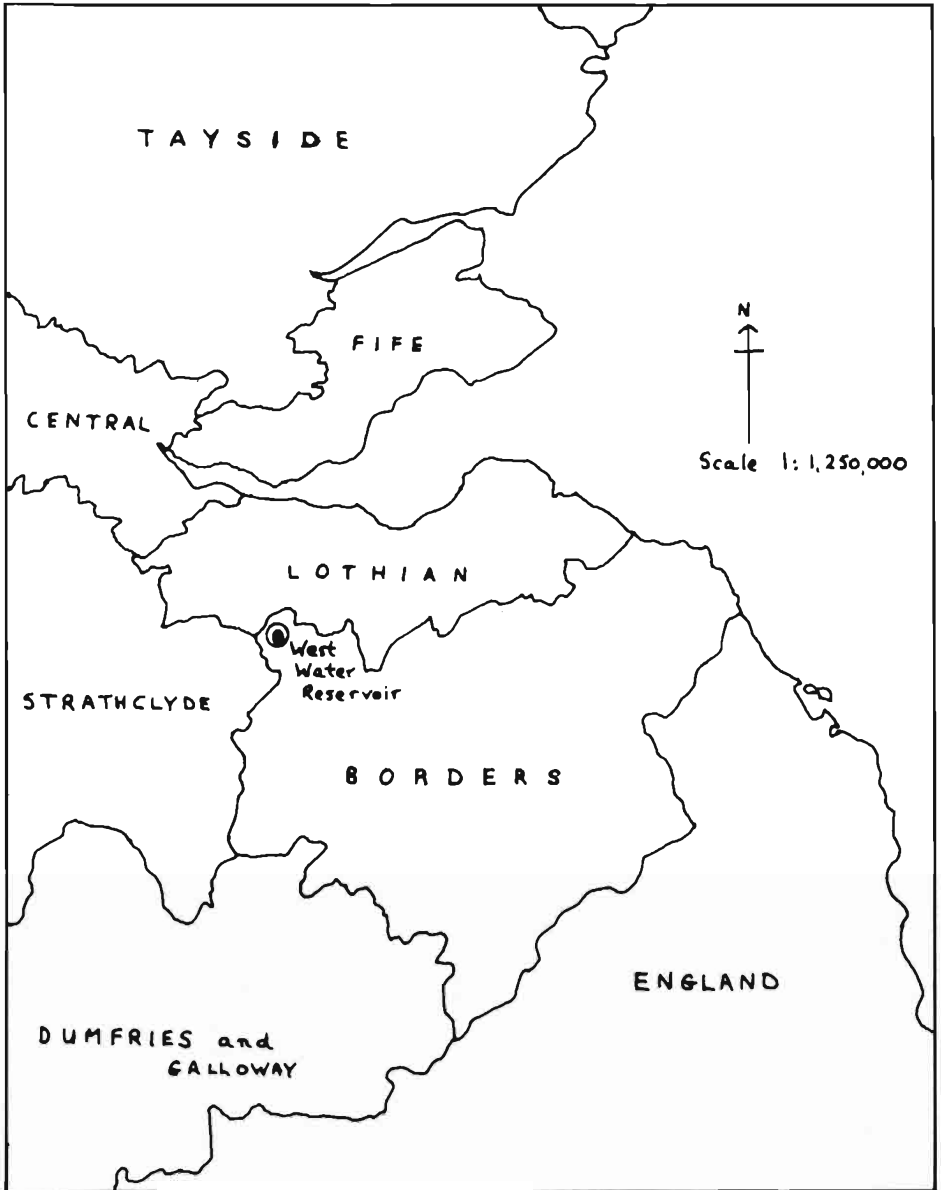


FIGURE 1. Location of West Water Reservoir, Borders Region.



geese. In contrast public access to the reservoir is restricted.

Fishing and shooting are the two principal activities which could disturb the roost. At present two boats are permitted on West Water, one each for the estate and Regional Council, and no bank fishing is allowed. Most fisheries in Lothian and Borders Regions are open from 1 April to 30 September, but in 1990 the fishing at West Water Reservoir was restricted to 1 May to 31 August in recognition of its importance to geese. In practice this affords the early goose arrivals in September a site free from disturbance allowing numbers to build up rapidly; likewise in April prior to spring migration. This may be contrasted with Gladhouse Reservoir (Fig. 2) where up to eight boats could regularly be on the water until one hour after sunset throughout September and April. The shooting season extends from 1 September to 31 January but levels of shooting and associated disturbance fluctuated at West Water during the 1970s and 1980s occasionally causing changes in the roosting pattern of the geese.

### Methods

Brotherston (1964) documented the changes in numbers and behaviour of Pink-footed Geese in the Lothians and Berwickshire up to 1963 and described the establishment in 1955 of co-ordinated annual counts in late October and early November at most of the important goose roost sites in the area. The latter count was subsequently incorporated into the National Goose count in 1960-61 (Boyd & Ogilvie 1969) while a National Spring Goose count began in winter 1969-70.

In order to establish the pattern of use of West Water by Pinkfeet and determine peak winter counts, which did not necessarily coincide with the National Goose count dates, we undertook more frequent counts, in addition to the co-ordinated October/November and spring counts, from winter 1976-77 with additional valuable data

being supplied by waterkeepers Andy Dewar and Andy Moffat.

Most counts were at dusk of birds flying into the roost. If undisturbed, especially during the first few weeks of arrival when there was longer daylight for feeding, the geese frequently loafed about the reservoir until mid-morning making dawn counts difficult without disturbing the birds. Day-time feeding areas were found by following geese out from the roost by car and again on their return to the roost.

### Results

#### Annual trends in numbers.

Fig. 3 illustrates the annual maximum counts of wintering Pinkfeet at West Water Reservoir from 1966 to 1990 and shows its development into a major roost site. Geese apparently used the site in winter 1965-66 (W. Brotherston unpub. data) but no counts are available. From 1966-67 to 1977-78, counts only once exceeded 5,000 birds whereas in every subsequent year over 6,000 birds were recorded in each winter and over 10,000 in all but one of the winters 1981-82 to 1990-91. Fig. 3 also shows the annual maximum counts as a percentage of the national population. Since 1967-68 over 1% of the national population has annually used the reservoir, increasing to over 10% annually since 1980-81 and peaking at 22.7% in 1988-89. Thus the increase in the number of geese using West Water was in excess of what would be expected had it merely reflected the increasing population wintering in Britain. Rather, the increasing proportion of the national population roosting on West Water suggested either a greater increase in population locally than elsewhere in Britain, or a shift in roosting behaviour from nearby localities into West Water. There was strong evidence for the latter because prior to 1966 Baddinsgill Reservoir (Fig. 2) was the main goose roost in the south-east Pentlands and was designated a Site of Special Scientific Interest (SSSI) due to the numbers it held.

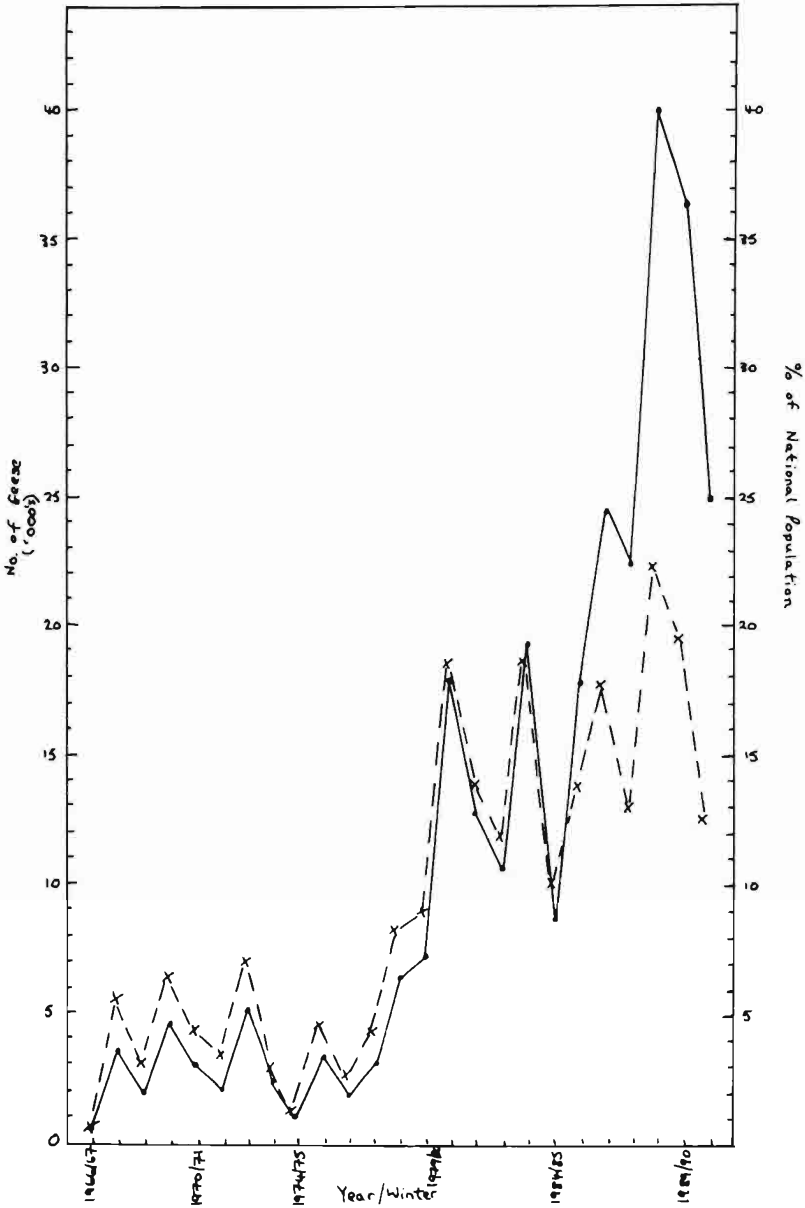


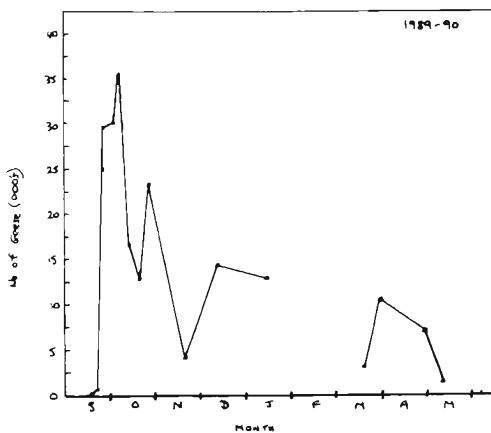
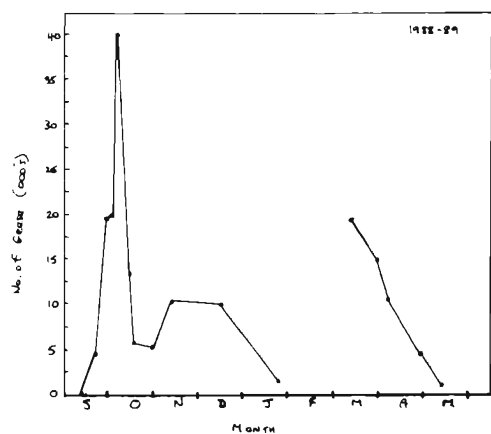
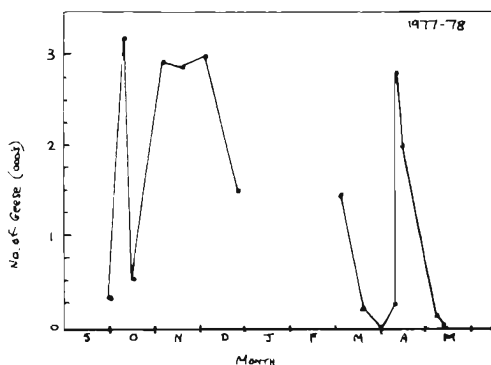
FIGURE 3. Annual maximum wintering Pink-footed Goose counts and their percentage of the national population at West Water Reservoir, 1966-90. ● = number of geese in 1000's; x = percentage of national population.

However, by 1978 the geese were favouring West Water, utilising Baddingsill only when heavily disturbed at West Water. This practice in turn ceased by 1980 (and Baddingsill was subsequently de-notified as an SSSI) and if heavily disturbed at West Water they tended to delay arrival or 'park out' until well after dark, come into roost from a great height or change their direction of arrival.

#### Trends in numbers within winters.

The first arrivals appear by mid-September followed by a rapid influx. This is illustrated in Fig. 4 for five winters where more complete counts are available. Some dispersal takes place after the initial mass arrival but the peak count generally occurs in October or early November and by late November numbers decline. Bell *et al.*, (1988) described a similar pattern for Pinkfeet roosting at Meikle Loch/Ythan estuary.

In Lancashire in 1977-78 to 1981-82 Forshaw (1983) recorded that numbers of Pinkfeet peaked in late November or in December with high numbers remaining into January followed by a decline in February, most having left by the end of March and the last birds gone by early May. This mirrors the pattern at West Water where declining numbers coincided with an increase in Lancashire by November/December and conversely a decline in numbers in Lancashire in February/March coincided with a return of birds to West Water. Numbers built up at West Water from late February into March with substantial numbers recorded in April, while in 1989 and 1990 some birds lingered into May. Prior to 1977 a roost count in mid-March was the only data available on the use of the roost in spring and thus gave no indication of its value at that time of year. From 1977 we undertook more frequent counts and Fig. 5 illustrates the peak counts in March, April and May from 1977-90. In most years since 1982 the maximum March count exceeded 4,000 birds, reaching 19,334



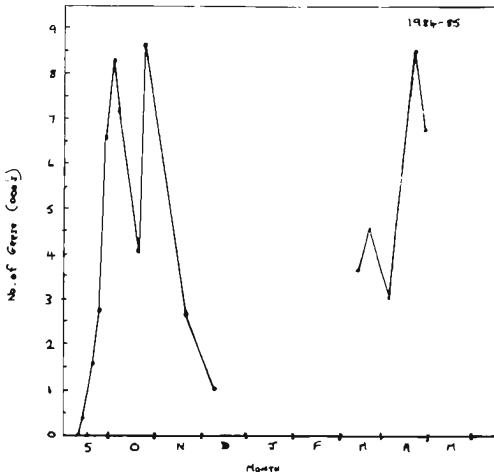
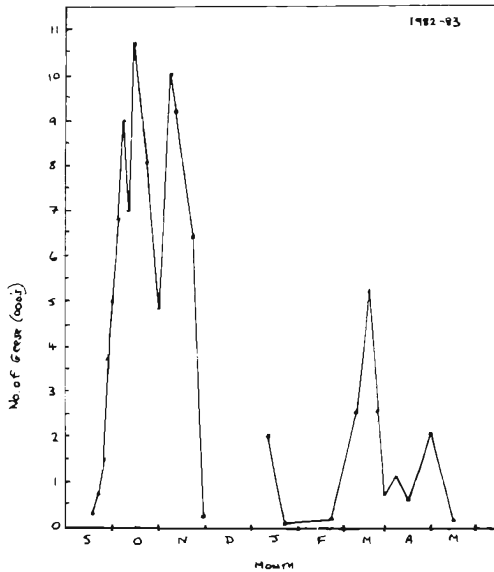


FIGURE 4. Roost counts of Pink-footed Geese at West Water Reservoir for winters - 1977/78, 1982/83, 1984/85, 1988/89, 1989/90 - for which count data are more complete.

in 1989 and 11,000 in 1990. Peak annual April counts (Fig. 5) from 1984 regularly exceeded 5,000 birds. The mean of the nine March peak counts 1982-90 was 7,607 while for eight April peak counts (no data for 1987) it was 6,263.

### Feeding areas

The reservoir attracts geese from as far as Biggar, Broughton, Carnwath and the upper Clyde valley, up to 20 km distant as the geese fly (Fig. 2). In recent years goose counters at Gladhouse and Portmore Reservoirs have occasionally noted some geese overflying their reservoirs and heading in the direction of West Water. Also counters at West Water have noted that the number of birds flying in from east/north-east have exceeded the number of birds known to be feeding near West Linton. Perhaps the West Water roost attracted some geese that fed in the Gladhouse area.

### Discussion

Over the last 25 years West Water has developed into a major goose roost and has been shown to be of exceptional importance to Pinkfeet when they first arrive in Scotland. Strathearn, Loch of Strathbeg, Hule Moss, Montrose Basin (Newton *et al.* 1990) and Dupplin Loch (Bell & Newton 1991) are of similar importance. The annual peak autumn roost count at West Water Reservoir between 1966 and 1990 increased, we believe, in part due to the increase in the national population and in part to a redistribution of the geese in Lothian and Borders (Brown & Brown in prep.). It held second place in the national table of Pink-footed Goose roosts (Kirby *et al.* 1991), averaging 29,590 birds over the five Octobers 1986-90. The Loch of Strathbeg held the prime position with an average of 30,030 over the five Novembers 1986-90.

West Water is now recognised as a site of both National and International importance having regularly held 1% of the

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*Wren at nest, Troglodytes troglodytes*

*W.E. Middleton*



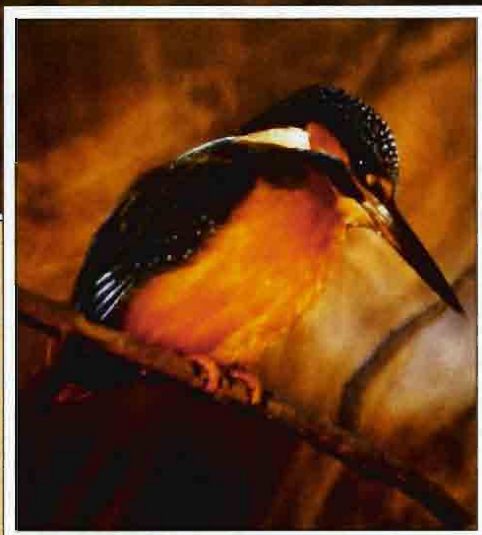


*Semi-palmated Sandpiper, Calidris pusilla, Fair Isle, Shetland, May 1992. Paul Harvey*



*Dark-eyed Junco, Junco hyemalis, Hamilton, May 1992.*

*J.C. Maxwell  
Courtesy of The Herald*

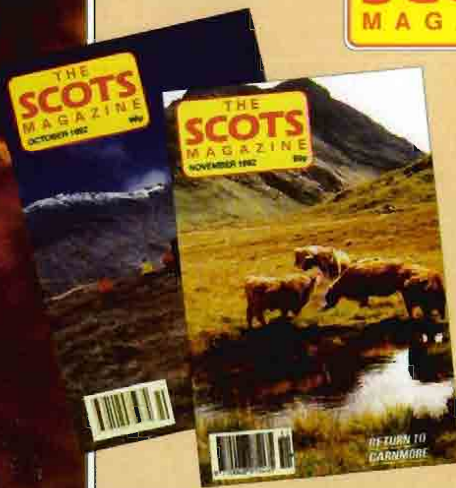


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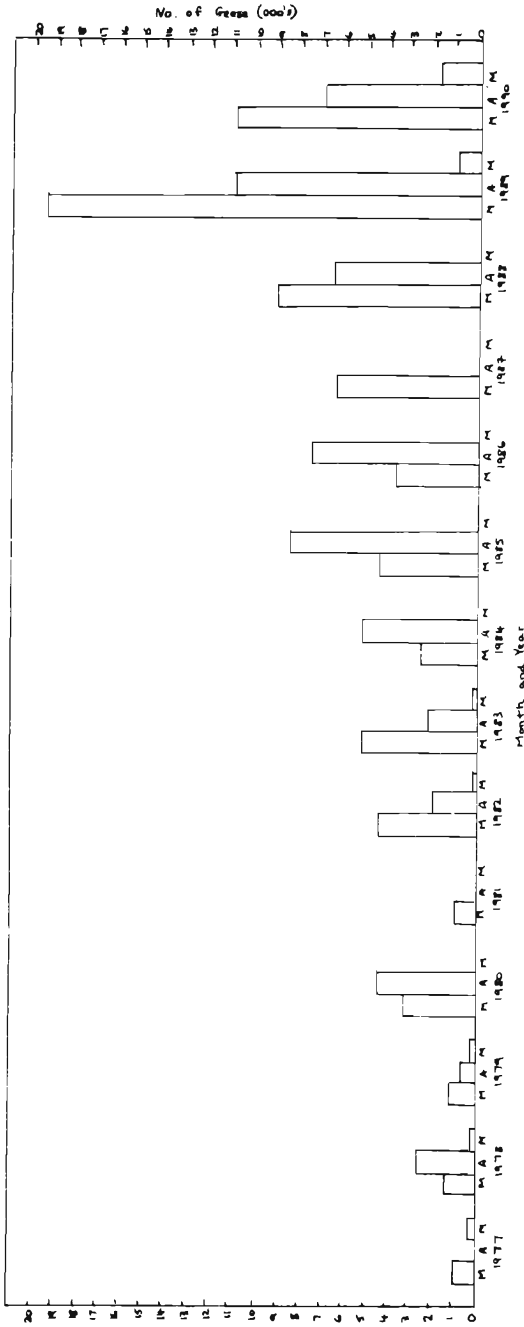


FIGURE 5. Maximum counts of Pink-footed Geese at West Water Reservoir in March, April and May from 1977 to 1990.

Pink-footed Goose population. It was designated an SSSI in 1975 and was re-notified in 1986 because of its Pinkfoot roost. It has been identified for designation as a Ramsar Site in addition to a Special Protection Area.

Newton *et al.* (1973) considered that disturbance was a major factor in influencing goose distribution. Perhaps the main reason for the development of such an important goose roost at West Water was the lack of disturbance, especially when the birds first arrive and then prior to spring departure, but also for large parties of birds frequenting the site throughout the day in order to rest, wash and preen.

Having achieved international importance as a goose roost it is to be hoped that West Water continues to hold its position, that disrupting activities continue to be restricted and that perhaps more people may be able to enjoy the spectacle of 30,000 birds flying into the roost.

### Acknowledgements

Data for West Water Reservoir prior to 1976 were obtained from the records of the late William Brotherston who was local goose count organiser for Lothian and Borders until his death in 1981. We are grateful to John H. Ballantyne for extracting the relevant information. We thank Lothian Regional Council for granting us access to West Water, Helen and Ian Chisholm for counting geese when we were otherwise engaged and Andy Moffat for supplying additional data. Dr M. Marquiss and Dr M.A. Ogilvie provided valuable comments on a draft of this paper which was kindly typed for us by Jim Aitken. Andy Dewar, waterkeeper from 1970 to 1984, and Maria his wife were particularly kind and helpful. Not only did they provide additional information, they frequently thawed us out following goose counts in wet freezing conditions with mugs of hot coffee by their warm fireside .... then encouraged us over an alcoholic beverage to return the following weekend to repeat the exercise etc. etc!

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## Grey geese and agriculture in north-east Scotland

JILL MATTHEWS

*This paper aims to stimulate debate on the problem of the economic loss that some farmers suffer as a result of grazing by grey geese, particularly in north-east Scotland. In many areas of Scotland it would be difficult to demonstrate that geese cause any harm. But in a few places farmers have to bear the cost of large numbers of grey geese feeding on their land. Solutions tailored to local circumstances are required, and the situation in north-east Scotland is used by way of illustration.*

### Background

The increase in the size of the over-wintering populations of grey geese is well documented (Owen *et al* 1986). The population of Pink-foot Geese *Anser brachyrhynchus* has risen from c.30,000 in the 1950s to the current level of c.195,000 and numbers of Greylag Geese *A. anser* from 26,000 in 1960 to the current total which is in the region of 120,000. Both Pink-footed and Greylag Geese over-winter in many parts of lowland Scotland where they feed on a range of grass, cereal and root crops. In most areas, the farmers are not economically disadvantaged. However in the north-east some evidence suggests that on farms in the immediate vicinity of the large Pinkfoot roosts at Loch of Strathbeg and the Ythan/Meikle Loch the impact of the grazing by geese has economic consequences.

### The Law

Most Greylag and all Pink-footed Geese in Scotland are migratory. The management of these populations is therefore an issue of international importance as well as of national and local concern. Both species are afforded some protection by the Bonn Convention on the Conservation of Migratory Species of Wild Animals and the Berne Convention on the Conservation of European Wildlife and Natural Habitats.

They are also listed on Annex II of the EC Directive on the Conservation of Wild Birds. Greylag and Pink-footed Geese, along with some other goose species are listed on Schedule 2 part 2 of the Wildlife and Countryside Act 1981. This allows them to be killed during the open season, but requires a licence to kill during the close season. However, a licence can be issued by the Scottish Office Agriculture and Fisheries Department (SOAFD) to allow shooting to prevent serious damage to crops. In the north-east, licences are routinely issued to farmers in the areas where geese regularly concentrate, such as around Loch of Strathbeg. Other species such as Barnacle *Branta leucopsis*, Brent *B. bernicola*, and Greenland White-fronted Geese *Anser albifrons flavirostris* are protected at all times, so for them there is no open season. Nonetheless a few licences have been obtained from SOAFD by farmers on Islay to prevent damage to agricultural crops by Barnacle and Greenland White-fronted Geese. The sale of dead wild geese has been outlawed since 1968.

In addition to the legal protection given to the birds themselves, the sites that the birds use can also be protected as Sites of Special Scientific Interest. Many of the SSSIs notified for the protected species of geese include both roost and feeding grounds but for grey geese often only the

roosts are included. The larger roosts, including those at the Loch of Strathbeg and the Ythan/Meikle Loch also qualify as internationally important and are proposed Special Protection Areas under the EC Birds Directive.

### **The problem**

In line with national trends, the number of geese at the major north-east roost sites has increased. In November 1980, 2200 Pinkfeet were counted at Strathbeg, in November 1990 the number was 37,100. Over the winter the roosts are also important staging areas for the geese on migration to and from Iceland. The spring influx, which in 1992 peaked at 37,950 (J. Dunbar pers. comm.), generates the greatest outcry from the local farmers because it is such an important time in the farming calendar. In late spring the geese feed on winter cereals and newly sown grain and compete with livestock for early bite grass (Keller & Patterson 1990). The autumn influx does not put the same pressure on agricultural crops because the geese generally only stay in the area if there is rich feeding on spilled grain in stubble fields. If this is not available the geese disperse fairly rapidly. Research at Aberdeen University (Patterson 1991) has shown that under severe goose grazing pressure yields of spring grass can be depressed by up to 60%, yields of silage by up to 20% and winter barley by 10-20%. These are extremes, normally losses would not be so high, but as well as reducing yields, grazing by geese can cause other effects such as uneven ripening of crops, delayed harvesting, more weeds in the crop and a delay in the turning out of livestock onto spring grass.

After years of research attempting to measure crop losses, it is generally agreed that it is very difficult to evaluate the economic cost of crop damage to individual farmers because of a variety of complicating factors including weather, soil and crop type.

### **Management Options**

Three main techniques are used to attempt to manage goose numbers and distribution. These are culling, scaring and habitat management.

**Culling.** Some farmers have advocated that numbers of grey geese should be reduced to a pre-determined level by culling. However other people believe that the setting of arbitrary population levels for geese is neither desirable nor practicable. A cull on either the breeding grounds in Iceland or on the over-wintering grounds in Britain could be both practically and politically difficult to implement.

**Scaring.** A variety of scaring devices such as gas guns, mobile scarecrows, kites and wires have been used to scare geese, usually with only limited success. Shooting at flocks to scare them and disturbance by people are more effective. But all scaring techniques have a cost. However, scaring only moves geese from one location to another, so it is most valuable when used in conjunction with habitat management.

**Habitat Management.** For some species of geese such as Barnacle and Brent, feeding grounds have been provided in reserves. Crops are grown specifically to feed the geese. This technique has been used primarily for small, concentrated populations of protected species of geese but it has not been widely adopted in Scotland as a means of managing the large and dispersed populations of grey geese, although at the Loch of Strathbeg on a relatively small scale the RSPB manage some of the grassland in their reserve for grey geese.

### **Current Management Practices**

The schemes currently operating in Scotland mainly concern protected species. On Islay, the farmers in 'goose' SSSIs can be paid through a Management Agreement to

tolerate the grazing geese and a new scheme has just been started to allow for payments to farmers on the island outside SSSIs. On the Solway at Caerlaverock there is a sanctuary system for the Svalbard Barnacle Geese. Here the merse or estuarine grasslands are managed to attract the Barnacles but this also benefits the Greylag Geese in the area. At Loch Leven, the RSPB manage land in their Vane Farm reserve for Pinkfeet. At Montrose Basin the issue of managing the increasing numbers of geese outside the reserve areas is being investigated.

In England, there is a Brent Goose option in the Countryside Premium Scheme whereby farmers in a prescribed area can enter their land into the Ministry of Agriculture, Fisheries and Food's 'Set Aside' Scheme. But if they manage their land in a specified way farmers can qualify for 'top up' payments from the Countryside Commission.

The Dutch government is encouraging the development of regional goose management plans. The policy is to scare geese, in a planned and co-ordinated way, from land susceptible, to damage such as arable crops, onto land less susceptible to damage including pastures, areas of natural habitat and reserves. At present, goose damage is reimbursed from a special fund unless a licence has been issued to scare geese away.

In October 1990 a conference entitled *Farmers and Waterfowl: Conflict or Co-existence* was held at Lelystad in the Netherlands. It recommended that a management strategy for geese is required at the international, national and regional level. Work has already begun on developing international flyway management plans for some species, notably for Greenland White-fronted Geese, but it is likely to be some time before such plans are finalised for Greylag or Pink-footed Geese. In the interim, a system is required to assist those farmers whose land is intensively grazed by grey geese causing

economic loss. The Lelystad conference acknowledged that although wildlife is an integral part of agriculture, it is still a negligible part of agricultural policies. The participants at the conference recommended that "it is of the utmost importance to broaden the scope of agricultural policies to ensure the conservation of our natural heritage".

### *Farming with Wildlife*

Pienkowski & Stroud (1991) have proposed that for large or medium-sized dispersed populations including Greylag and Pink-footed geese an approach similar to the Environmentally Sensitive Areas is required. This would enable farmers to opt in and accept payments and tolerate geese or opt out and bear the losses and costs of preventing them feeding. In a limited area around the largest Pinkfeet roosts in north-east Scotland, such a scheme could be very valuable in reducing tensions between the local farmers and bird protectionists. It may be necessary to operate a scheme only during the close season when the goose grazing competes with livestock grazing or damages growing crops. At other times, farmers can derive some income from the geese by letting the shooting. Rather than trying to compensate farmers for individual losses, the scheme could offer flat rate payments per unit area in a defined area around the roost. Payment would only be made on the fields where significant numbers of geese actually feed. This could be determined by 'dropping counts'. Additional payments could be made to those prepared to grow special crops for the geese. Outside the defined area, licences could be readily available in order to disperse the geese and encourage them to return to the refuge.

The recent reform of the Common Agricultural Policy (CAP) had introduced new opportunities for introducing such a scheme. The new Agri-Environment Programme could be developed to

accommodate farming with geese. This could be integrated with the Set Aside Scheme and, although this has shortcomings in its present form, it could be modified to accommodate management of 'set aside' land for geese. The international lifestyle of the Greylag and Pink-footed Geese seems a suitable case for EC consideration. If the policy makers can be persuaded, the wildlife on some of Scotland's farms could benefit from CAP funding in much the same way as those in Environmentally Sensitive Areas. This would help offset the detrimental effects on wildlife that CAP has caused elsewhere.

### **Acknowledgements**

I would like to thank Professor David Jenkins and Dr Ian Francis for their helpful comments on this paper.

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## Some post-war declines in Corn Bunting numbers in north-east Scotland

ADAM WATSON

*Notes based mainly on counts of singing birds along public roads are compared for 1944-48 and 1988-92. In Deeside west of Ballater, Corn Buntings were widespread in 1944-46 but not seen in summer 1947 and since. In the Turriff area, summer adult numbers are as high in a few places as in 1944-48, but in most places lower or absent. Adult numbers in the Turriff area were no lower in summer 1947 following a severe winter than before it. Birds were seen in mid Deeside in 1944-46 and a big flock in mid Donside in January 1947, but none there in 1952-55. Notes from other parts of north-east Scotland show generally fewer birds than in 1944-48.*

### Introduction and Methods

The decline of Corn Buntings *Miliaria calandra* is well known from the BTO Atlas. However, few observers have compared numbers on an area in widely different years, although this is the best guide to changes in local distribution and numbers. Below, I give some such notes, based mainly on counts of birds singing on fine evenings in May to mid August on wires and other song positions along public roads. Such counts are minima, but current intensive work (Watson, unpublished) shows that in such conditions nearly all cocks are seen. I also give some notes from winter.

### Results

**West of Ballater.** East and west of Bridge of Muick, and Dallyfour to Ardmeanach, a few April 1944, "quite a number" each July 1944-46, and flocks at ricks each winter 1944-47; the foot of the Balintober road was a very favoured spot. Coilacriech, one singing July 1945. Bridge of Gairn to Crathie, quite numerous July 1944-46 and flocks at ricks each winter 1944-47. Abergairn to Prony and Culsh,

Strathgirnock to Balhalach, Mains of Abergeldie to Tornauran, and above Crathie at Crathienaird, Newton, Bush and Lawsie, quite numerous July 1946. Balnault and Inver, one each, singing July 1946. North of Braemar by the A93, south similarly, Auchallater, Balintuim, and north-west of Braemar, one each, singing July 1946. Tomintoul croft (420m) at Braemar, two in hay August 1946. I saw none west of Ballater in 1947-51, in 1952-55 when I searched for Goodbody's (1955) Aberdeenshire survey, and in 1988-92. Goodbody saw none there in 1952-55.

**Mid Deeside, mid Donside and upper Speyside.** Ballater to Tomnakeist, Ballaterach to Deecastle, and Ordie to Tarland, several each, singing July 1944-46, and Loch of Aboyne, one singing July 1946. Craigievar up from Alford, flock of at least 80 on snowfree ground, 5 January 1947. Goodbody (1955) saw none west of Crathes, and above Alford, in 1952-55. Loch Alvie, one June 1947. I saw none in these places in 1988-92.

**Turriff area.** Decreasing 1940-43, more birds 1944-48. Above Turriff Station, 20 in flock April 1945, and flocks of 8-15 at Bridgend and at Millmoss to Darra in winter 1944-48; in winter 1988-92 I saw none. Forglen kirk, a pair May 1945. Turriff to Deveron Brig railway, one singing June 1945. Aberchirder to Mountblairy, fair numbers June and winter 1944-48; none seen 1988-91 except a flock of 8 at Burrelles March 1990. Greenlaw near Alvah, flock of 50 February 1946, and flocks totalling 60 below Hill of Alvah with 25 in one tree. Craigston to Gamrie kirk, "here and there" May 1946; same comment would apply summer and winter 1988-92. Brunthall south of Turriff, 19 in flock February 1946; 20 in flock February 1990. Turriff Station to Brunthall in deep snow February 1947, flocks of up to 15 here and there, and some birds singing; in winter 1988-92, only one flock seen, in 1990 (above). Burnt Smithy to Fintry (3 km), 4 in full song 14 and 20 August 1946; none seen summer 1990. Fishrie, Troup and Pennan, "a lot" including a flock of 10 and a few still singing 22 August 1946, and "lots" June 1947; fair numbers 1988-92 but fewer than 1944-48, and some gaps with

none. Strocherie to Crudie, fairly common June 1947 and summer 1990-91.

In winter 1944-48, nearly all birds were in flocks. Most foraging birds were on grain stubble, many at ricks (especially in snow), some on sown grain, turnips and roadside grass, and a few in pasture. Loafing birds were mostly in trees and sometimes on wires. I saw many cocks singing in flocks from December onwards, and occasionally in November, and often saw lone cocks singing strongly on fine days from 5 January onwards. These habits still prevail, save for the virtual lack of grain ricks now.

The best area found in summer was the Fishrie crofts; on 10 August 1947 "great numbers, a cock was sitting singing on the wires every 200 yards for several miles and a flock of 50 was seen, while odd birds were seen here and there not singing".

Table 1 shows numbers singing along roads in 1944-48 and 1989-92 in the Turriff area. Numbers in a few places are as high as in the 1940s, but in others have declined greatly. The distribution area has retracted.

**Elsewhere in north-east Scotland.** On a high wire by the A92 north-east of St Cyrus, one December 1945; birds were in this area in

**TABLE 1.** Numbers of singing Corn Buntings along roads in the Turriff area of Aberdeenshire and Bannfshire in summer 1944-48 and 1989-92 (blanks indicate no records made).

Road	Distance (km)	44	45	46	47	89	90	91	92
Turriff-Brunthall	3	6	4	7	7	7	2	5	7
Birkenhills-Keithen	5½		8	5	8	3	2	3	4
Fishrie (Cook-Overbrae)	5			22	26	2	3	4	4
Mill of Pot to west	1½		7	6	8	1	1	0	
Turriff-Mill of Delgaty	2		3	3	4	0	0	0	
Braefoot-Lenshie	6½		3		4	1	5	3	3
Turriff-Fyvie-Gordonstown	18		6		7	1	2	2	2

Turriff by Colp to Idoch, Idoch to Woodhead of Delgaty, Turriff to Darra, Turriff to Mahon, and Turriff to Burnt Smithy (4, 2½, 2½, 3 and 2½ km) had 4, 4, 2, 3 and 2 birds in 1946, and 0 in 1990. Turriff-Brunthall 7 in 1948.

winter 1988-92. Newburgh to Balmedie, a few May 1946; same comment would apply 1988-92. Both sides of Ythan estuary, a few May and November 1946. Newburgh via Ellon to Old Meldrum, "plenty" June 1947; in 1988-92 I saw none near Old Meldrum. West of Forres, a few October 1946, and Spey Bay, "lots" December 1946; I saw none west of Forres and at Spey Bay on four winter visits and one spring one in 1988-91. Dyce north to Goval, flocks December 1946. Gartly to Lessendrum, a few May 1947. Last three miles from the south-west to Loch of Strathbeg, fairly numerous June 1947; and Strathbeg area, "lots in flocks and many singing" February 1948; such comments on high numbers would not apply in 1988-92.

### Discussion

West of Ballater, many were seen in 1944-46, but none in summer 1947 following the severe winter of early 1947, and none in 1952-55. The 1947 winter there was exceptionally cold, snowy and prolonged from January till April, and the 1950-51 winter also severe. These were the two snowiest winters at Braemar in 1939-92, judged by the number of mornings with snow lying (Monthly Weather Report, Meteorological Office, Bracknell). In the Turriff area, however, adult numbers were if anything higher than usual in summer 1947 (Table 1, and Fishrie notes in Results).

Although that winter was unusually severe in the Turriff area, it was markedly less long, snowy and frosty on this lowland area than west of Ballater. Interestingly, Corn Buntings on lowland at Freuchie in Fife increased from 12 to 18 pairs between 1946 and 1947 (Dacker 1948).

The question is why numbers have fallen in the Turriff area. Such questions can be answered reliably only by detailed research, which has been lacking. Certainly, farm practices have changed much since 1948. One change is the lack of grain ricks, but this includes places where the number of singers has not fallen, such as Turriff to Brunthall. There, steep uncultivated patches at Brunthall and weedy barley on one farm may help maintain numbers. Birds have declined greatly at the Fishrie crofts, associated with a big drop in the number of worked family farms. Most farms there had oats and turnips, but pasture has replaced these on most of the area. Corn Buntings seldom use pasture in winter, and it is usually too short for nesting.

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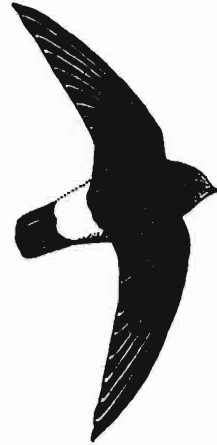
*(Revised typescript received 15 September 1992.)*

## Rare Migrants

### *Little Swift on Fair Isle: the second Scottish record*

The 1st November 1991 was preceded by six days of South easterly airflow on Fair Isle, Shetland. These classic fall conditions brought a significant arrival of migrants, which amongst others, included a Desert Wheatear *Oenanthe deserti*, 3 Siberian Stonechats *Saxicola torquata maura/stegnegeri*, a Yellow browed Warbler *Phylloscopus inornatus*, a Spotted Crake *Porzana porzana* and several thousand Thrushes *Turdus sp.* Conditions on the 31st October, a force 9 gale and heavy rain, made viewing very difficult, so with better conditions the following day, C.J. Orsman, A. Prior and myself decided to cover the island. A good assortment of migrants were present in the south of the isle, including an Olive backed Pipit *Anthus hodgsoni*. At around 1600 hrs, we were walking along the cliff tops at Bergaroo, when I saw what appeared to be a Hirundine flying away from me at the base of the cliffs. From the brief views that I obtained, I was amazed to see Swift *Apus sp.* like wings and a vivid square cut white rump. It rapidly flew out of sight into Easter Lothar. At that stage, CJO and AP had not seen it. From what I saw, the bird was obviously a species of Swift and I suggested that it may be a Little Swift *Apus affinus*! Excited, we hurried to Easter Lothar and relocated the bird, where it remained for the next twenty minutes. Looking down on it from the high cliffs, we were able to confirm my initial impressions: fairly long sickle-like wings and an obvious square cut white rump; the tail was also square cut, lacking the appendage appearance of Common Swift *Apus apus*. The colour of the underparts was noted when it made an upward glide, just metres away, showing a white throat patch contrasting with what were otherwise sooty-brown underparts. We were then joined by

S. Thomson Jnr., before the bird was lost from view, presumably going to roost. At this stage I was almost certain that the bird was a Little Swift, but I could not remember whether the species showed a white throat patch. On returning to the Observatory, I telephoned Paul V. Harvey and Pete Ellis in Shetland, describing the features we had seen. After much discussion and checking the relevant literature, we concluded that the bird was, indeed, a Little Swift. The description was submitted to the British Birds Rarities Committee and was accepted on first circulation.



### *Description*

**SIZE AND SHAPE.** No direct size comparison was made, but appeared smaller than Common Swift, about the size of a large hirundine. Sickle shaped wings, fairly broad based. Tail square ended, lacking the forked effect of Common Swift.

**PLUMAGE.** All upperparts blackish except for slightly paler remiges and a vivid white rump, square cut on leading edge. The head showed a greenish tone and a slight glossy

green sheen to the mantle was also noted. A white throat patch and white sides to the rear flanks, formed by the downward extension of the white rump feathers, contrasted with sooty-brown underparts.

**FLIGHT.** The bird spent most of the duration gliding effortlessly, fluttering only when banking, reminiscent of a Bai *Chiroptera*.

### Range

The Little Swift breeds throughout Africa and Southern Asia east to Southern China, Formosa, the Philippines and Borneo, north to Morocco, Syria, South Transcaspia and Kashmir between 40 N and 35 S. The species is mainly resident but *A.a. galilejensis* (which breeds from Morocco east to Kashmir and south to the central Sahara and Arabia), winters to just south of the breeding range (British Ornithologists' Union 1971).

Little Swift is a vagrant to Britain and Ireland. There have been 9 previous records,

which include a single at St. Andrews, Fife, on 29th May 1985 (Dymond *et al* 1989; Rogers *et al* 1989).

### Summary

A Little Swift was present on Fair Isle, Shetland on 1st November 1991. This was the second record for Scotland and the 10th for Britain and Ireland.

### Acknowledgements

I am grateful to Kevin Osborn and Pete Ellis for commenting on the manuscript.

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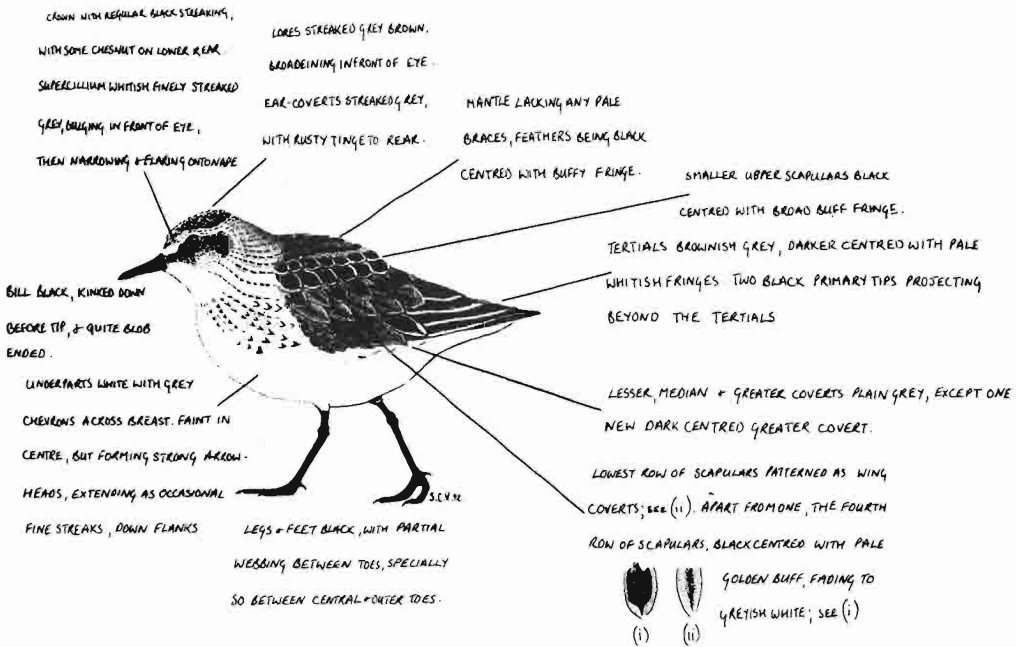
### *Semi-palmated Sandpiper on Fair Isle: a first record for Scotland*

May 13th dawned with light south to south-easterly winds and as a direct result there was a sprinkling of commoner spring migrants on Fair Isle. At around 1500 hrs I was checking the open fields between Bull's Park and Field when I noticed a small wader *Calidris* sp. feeding along the edge of a shallow pool. I was immediately struck by the bird's small size: it was obviously a stint and, as I continued to watch the bird, the lack of any obvious rufous tones to the plumage and lack of pale mantle braces (both features commonly associated with Little Stint *C. minuta*) was striking. Over the following ten minutes the bird continued to feed, quite unconcerned by my presence,

whilst I scribbled some hasty notes. At this point I considered the possibility that the bird was a Semi-palmated Sandpiper *C. pusilla*.

Following a phonecall to the Observatory, Paul Harvey arrived with a telescope and a copy of *Shorebirds*, and the next 20 minutes were spent grilling the bird; with the previous experience of PH and with reference to the available literature we were able to confirm the bird as Scotland's first Semi-palmated Sandpiper.

The bird remained on the same pool for the remainder of the day; the following day it moved to a flooded 'tattie' patch at Field croft, where it remained until 15 May, feeding alongside a Dunlin *C. alpina*.



**Description**

**SIZE AND STRUCTURE.** Generally appeared very similar to Little Stint, although perhaps a little more chunky and with a slightly more attenuated rear-end. Short primary projection with only two tips visible beyond the tertials. Bill quite heavy, and straight except for an obvious downward kink just before the swollen tip.

**HEAD.** Crown heavily streaked blackish or greyish-brown ground colour. Sides of rear crown with a distinct chestnut tinge, although this was only visible at certain angles. Nape whitish with fine grey streaking, contrasting with the crown to give a slight 'capped' appearance.

Supercilium white, finely streaked grey, prominent in front of eye and broadening just above the eye, before narrowing and finally flaring as it faded into the nape. There was no sign of any 'split' in the supercilium.

Lores streaked dark grey, narrowest at the base of the bill, broadening in front of the eye. Ear coverts finely streaked grey, streaking most intense along the upper edge of the ear-coverts,

forming a distinct dark eye-stripe behind the eye. In certain lights the ear-coverts showed a slight chestnut tone.

**UPPERPARTS.** Mantle feathers greyish- or golden-buff, with distinct black centres, contrasting with the plain nape. The bird lacked any pale 'braces' or 'tram-lines'.

Upper three rows of scapulars black-centred with obvious broad golden/buff fringes. The fourth row of scapulars with black centres, pointed at the tip, and with pale area within the black at the base of the feathers. The pale fringing to these feathers was chestnut-golden at the base, fading to whitish grey at the tip.

A single feather on each side of the fourth row and the entire fifth row of scapulars uniform grey, with darker central streak (these feathers possibly retained from winter plumage).

**UNDERPARTS.** Chin and throat white, contrasting quite markedly with grey breast streaking. Streaks finest and narrowest in the

centre, becoming heavier on the sides of the breast forming distinct chevrons, which extended slightly onto the upper flanks. The rest of the underparts white, except for occasional fine streaks on the rear flanks and undertail coverts.

**WINGS.** Tertiaries plain greyish-brown with narrow white fringes. Lesser, median and greater wing coverts uniform grey, except for slightly darker central streak. There was at least one differently patterned (new?) greater covert on each wing, these being longer and with a distinctly black centre. The primaries and secondaries were dark (blackish).

In flight showed a narrow whitish wing-bar.

**BARE PARTS.** Bill black. Legs and feet black, with partial webbing clearly visible between toes, although more prominent between the central and the outer toes. Surprisingly obvious when at close range, or when seen through a telescope. They were also noted when footprints were examined in the mud.

**CALL.** The call was heard several times in flight, being similar to Little Stint, but distinctly fuller and more rolling; transcribed as 'drrrup' or 'trrrrp'.

### Range

Semi-palmated Sandpipers breed from Alaska and central, through to eastern, Canada. They winter largely in coastal parts of north-eastern South America, but also further north to the West Indies and the Pacific coast of Central America.

It is occurring with increasing regularity in Western Europe, probably as a result of increased observer awareness. Up to the end of 1991 there have been a total of 63 British and Irish records, all but two of which have been in autumn. There have been a further 19 Western Palearctic records, 10 of which

have been on the Azores, with the others spread liberally around western Europe.

The route that the Fair Isle bird took is debatable, as with many of the vagrants to Britain, but a likely explanation is that it was on its northward spring migration, having arrived in Europe the previous autumn.

### Summary

An adult summer-plumaged Semi-palmated Sandpiper *Calidris pusilla* was present on Fair Isle, Shetland, 13-15 May 1992. This constitutes the first record for Scotland, subject to acceptance by the relevant rarities committees.

### Acknowledgements

I would like to thank Paul Harvey for his assistance and the accompanying photograph. And also Roger Riddington and Wendy Christie for their invaluable help.

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### *Dark-eyed Junco in Hamilton*

On Sunday 3 May I had been out chasing rarities since dawn and, arriving home in Hamilton just before 7 p.m., I was taken aback when my wife, Joan, insisted that an unusual bird had been feeding regularly in our back garden from 8 a.m. She had taken notes on the bird and had eliminated all the likely garden birds.

At first I was at a loss to think what it was but then I realized it could be a Dark-eyed Junco, and when I showed my wife illustrations in several field guides, she was confident that this was indeed what she had seen. Within minutes the bird appeared on a plum tree in the corner of the garden, and the first impression confirmed that it was indeed a Dark-eyed Junco *Junco hymelis*. It moved confidently around the garden, returning repeatedly to feed on a tray of seed on the ground beside a wall and chasing off a Chaffinch *Fringilla coelebs*, the only other bird in the garden.

The bill was noticeably pale pink and of typical bunting shape. The head, breast and upperparts appeared uniformly dark grey and contrasted sharply with the white belly and undertail coverts. The area around the eyes looked particularly dark, appearing almost black from certain angles. The white on the outer tail feathers looked particularly noticeable and extensive as it flitted around on the ground. In certain poses the bird did look somewhat plump, although its tail did not appear particularly long. It was roughly the same size as the Chaffinch that it had chased from the garden, providing a suitable touchstone for comparison. All in all it presented itself as a neat, strikingly unusual bunting, and the incontrovertible conclusion was that it was an adult male Dark-eyed Junco in pristine plumage.

I was in a state of shock and incredulity for several minutes, and could only speculate on why this bird had turned up in a suburban garden in Hamilton when it should have been in North America. A quick check in *The Rare Birds of Britain &*

*Europe and Rare Birds in Britain and Ireland* indicated that this was the 16th record of Dark-eyed Junco in Britain and only the 5th for Scotland, and also that 11 birds out of 16 had appeared in Britain in May.

When a small measure of calm returned, I contacted my colleague, Campbell Lindsay, and suggested that he should get to my house as soon as possible to try to photograph the bird. However, the Junco appeared to go to roost just after 8 p.m., shortly before C.L. arrived.

The weather was overcast with light drizzle and we reckoned that, given the bird's feeding behaviour throughout Sunday and the distinct possibility that it was a genuine vagrant, there was a good chance that it would remain overnight.

I was, however, hesitant about 'releasing' the news for various reasons. I anticipated problems of parking and access. If a large number of people wanted to see the Junco without disturbing it or nearby residents, they would have to view it from the back windows of my house! After discussion with Angus Murray of Birdline Scotland, I decided to hope for the best and let the news be released.

The first expectant birders arrived just after 5 a.m., and at 5.55 a.m. the Dark-eyed Junco appeared in the garden to feed for about five minutes. It then flew off but returned within the hour, a pattern it was to follow all day. By 8 a.m. a constant stream of birders began to appear, trudging up the stairs and coming back down smiling. The bird appeared either on the garage roof, where I had thrown seeds, or on the tray of seed on the ground. By 10 a.m. the number of birders had increased considerably and bemused neighbours looked out of windows, wondering what was happening. Shortly afterwards, the advance guard for a procession of press reporters and photographers appeared, and the 'twit' took on the air of a street party or a community celebration. Despite several fraught moments in the course of the day,



the Junco appeared regularly in the garden until 7.30 p.m. By this time over 300 people from all over Britain, and many neighbours too, had had excellent views of this rarity for Scotland and indeed for Britain. Monday night was clear and bright and Tuesday morning was warm and sunny. The Junco was looked for from 6 a.m. but it was not seen again. It had probably moved on during the night or early morning.

However, the publicity and interest generated by the Dark-eyed Junco's two-day stay in our garden was nothing short of staggering, ranging from interviews on the radio, mentions on national radio and television, coverage in nearly all the national and Scottish dailies with perhaps the ultimate coverage being front page articles in *The Scotsman* and *The Times*, and an interview on 'McGregor's Gathering' on Radio Scotland.

Finally, however, we were hugely gratified by the impeccable behaviour of and genuine warmth and gratitude expressed by the 300 or so visitors for allowing them into our house to see the bird. Donations amounting to £110 were collected for Hesselhead Wildlife Rescue Trust and a donation of £20 to Lega Italiana Protezione Uccelli (LIPU) was also made.

### Summary

A male Dark-eyed Junco *Junco hyemalis* spent 3-4 May 1992 in the garden of 37 Laburnum Lea, Hamilton, Lanarkshire. It was seen by more than 300 people and was also well photographed. Although no problems are anticipated, it has still to be considered by the British Birds Rarities Committee, and if accepted this will constitute the 16th record for Great Britain and the 5th record for Scotland.

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*Ian Shedden, 37 Laburnum Lea, Hamilton ML3 7LY.*

The Dark-eyed Junco, also called the Slate-coloured Junco, enjoys a wide distribution in North America, where it breeds in the north-eastern USA and in parts of Canada (while other forms breed further west). It winters over much of USA and Southern Canada.

Eds.

## Short Notes

### *Merlins' hunting effectiveness*

In Britain the prey of Merlins *Falco columbarius* ranges from day-flying insects to relatively large birds such as pigeons *Columba spp.* and Lapwings *Vanellus vanellus*, in both breeding season and in winter (see e.g. Newton, I., Meek, E.R. & Little, B. 1984. Breeding season foods of Merlin in Northumbria. *Bird Study* 31: 49-56; Dickson, R.C. 1988. Habitat preference and prey of Merlins in winter. *Brit. Birds* 81: 269-274). Hunting success and techniques may vary according to methods and defences adopted by their prey species to elude capture. Other variables include the difference between experienced adults and inexperienced juveniles, differences in hunting efficiency between individual birds, the number of inexperienced prey species available, whether the species are tired migrants or resident winter flocks and so on. These variables are difficult to assess but this paper estimates hunting success rate as the percentage of individual forays that result in prey capture (Johnsgard, P.A. 1990. *Hawks, Eagles and Falcons of North America*. Smithsonian Institute Press, Washington and London).

Apparently, few statistics have been documented on the hunting success rates of Merlins in the breeding season. Most statistics have been on the analysis of prey remains at nest sites. However, Bengtson (1975. Jaktbeteende och bytesval hos en islandsk population av stenfalk. *Fauna och Flora, Upps.* 70: 8-12) found that 11.4% of 61 hunts in Iceland were successful (9.8% by hunting pairs). In addition, there are a few published estimates on hunting forays in winter, often associated with large concentrations of prey. Rudebeck (1951. The choice of prey and modes of hunting of predatory birds with special reference to their selective effect. *Oikos* 3: 200-231) recorded 139 hunts by migrating Merlins in Sweden of which seven were successful giving a success rate of 5%. Meinertzhagen (1959. *Pirates and Predators*. London) observed 100 hunts in Iceland, Scandinavia, Britain, Egypt and Germany of which 15 (15%) were successful. Page & Whitacre (1975. Raptor predation and wintering shorebirds. *Condor* 77: 73-83) recorded 343 hunts on wintering wader flocks by one of the North American subspecies of *Falco columbarius* in California, and in this case

Table 1. Hunting success rates of Merlins.

No. of hunts	Prey	% success	Source
61	Breeding season birds	11.4	Bengtson 1975
139	Autumn migrants	5.0	Rudebeck 1951
100	Various species	15.0	Meinertzhagen 1959
343	Wintering waders	12.8	Page & Whitacre 1975
111	Wintering Dunlins	22.5	Buchanan <i>et al.</i> 1988
270	Wintering waders and passerines	10.0	Original observation
19	Passerines at roost	21.0	Original observation

**Table 2. Number and success of attacks on prey species by Merlins in west Galloway in autumn and winter 1965-92.**

Species attacked	Attacks (n)		Successful attacks (n)	
	blue	brown	blue	brown
Waders (1)	-	12	-	2
Thrushes (2)	1	5	1	1
Starling	2	19	-	4
Skylark	8	92	1	6
Finches (3)	23	47	2	5
Meadow Pipit	1	23	-	3
Others (4)	2	8	-	1
Unidentified small passerines	5	22	1	-
Totals	42	228	5	22

Blue = probably cock Merlin; Brown = juvenile or female

1. Includes Turnstone, Dunlin, Ringed Plover, Lapwing, Redshank and Curlew
2. Includes Redwing, Blackbird and Fieldfare
3. Includes Greenfinch, Redpoll, Linnet, Twite and Chaffinch
4. Includes Pied Wagtail, House Sparrow, Woodpigeon and rabbit

**Table 3. Number and success of attacks on prey species by Merlins at one of their winter roosts in west Galloway, 1970-91.**

Species attacked	No. of attacks		Successful attacks	
	blue	brown	blue	brown
Meadow Pipit	1	6	-	1
Redpoll	-	2	-	-
Skylark	-	1	-	1
Fieldfare	-	1	-	-
Starling	-	1	-	-
Unidentified small passerines	3	4	-	2
Totals	4	15	-	4

Blue = probably cock Merlin; Brown = juvenile or female.

12.8% were successful. Buchanan *et al.* (1988. Merlin predation of wintering Dunlin: hunting success and escape tactics. *Wilson Bull.* 100: 108-118) studied the success rates of Merlins hunting Dunlin *Calidris aplina* flocks in western Washington State and found a success rate of 22.5% from 111 observed hunts (Table 1).

In a study of the prey of Merlins in winter in west Galloway between 1965 and 1985 Dickson (1988; Dickson, R.C. 1989. Restricted winter range of a Merlin in west Galloway. *Scot. Birds* 15: 131-132) recorded 163 hunts of which 9.2% were successful. Further observations to March 1992 add another 107 hunts, giving a total of 270 of which 27 (10%) were successful (Table 2). The monthly differences in success rates in winter, however, ranged from 4.4 – 20% (August/September 20%, N=3; October 5.7%, N=3; November 17.5%, N=7; December 13.8%, N=4; January 11.1%,

N=5; February 4.4%, N=3; March 10%, N=2).

In west Galloway most hunting in winter is by day but occasionally at roosts where a higher success rate was recorded from a small sample. Of 19 hunts recorded at roosts, four or 21% were successful (Table 3). Sys (1982. Waarnemingen op een gemeenschappelijke slaappleats van Smelekens *Falco columbarius*. *Wielewall* 48: 360-367) also stated that Merlins had a greater hunt success at a roost in Belgium but gave no details. This higher rate might be because of the victims' lack of awareness of the presence of the falcon in the half-light, or because of the falcons' greater need to feed before roosting and hence greater vigour, or because of the Merlins' greater visual acuity than their prey.

These examples suggest that Merlins hunting birds have a low success rate in autumn and winter (5-22.5%, average 14%).

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### **Great Skuas attacking a flock of moulting Eiders**

On 17 August 1992 I saw two loose flocks of c.110 and c.360 moulting drake Eiders *Somateria mollissima* sleeping on the sea to the west of Sumburgh Head, Shetland. A few minutes later I noticed that the birds in the larger flock were alert and had gathered together in a tight formation typical of moulting Eiders when disturbed. The source of the disturbance became obvious when a circling Great Skua *Catharacta skua* suddenly plunge-dived into the middle of the flock, causing the nearest Eiders to dive and the birds on the edge of the flock to splash away from the skua in panic. A second skua soon joined in and the two repeatedly attacked the Eiders which kept diving, splitting into smaller flocks and regrouping. Typically the skuas simply crash-landed in the middle of a flock and tried to catch an

Eider before they dived too deep, mostly only submerging their head and neck in the attempt although occasionally all but the wingtips were underwater. Having failed at this, the skuas would then lunge a few times at the birds on the surface before taking off and circling over the flock again. In about 40 'plunge-attacks', I only once saw an Eider caught but the skua was almost completely underwater by that time and the Eider escaped. After 15 minutes of fairly continuous attack, the skuas remained sitting on the sea while the Eiders swam off around the southern tip of Sumburgh Head.

The increased predation of seabirds by Great Skuas in Shetland in recent years (Hamer, K.C., Furness, R.W. & Caldow, R.W.G. 1991. *J. Zool. Lond.* 223: 175-188) has led to some unusual observations,

including the killing of adult Gannets *Sula bassana* (D. Suddaby, pers. comm.), Great Black-backed Gulls *Larus marinus* (M. Mellor, pers. comm.), and even other adult Great Skuas (pers. obs.), while aerial chases

of waders and smaller gulls are now not uncommon sights. However, this was the first time I had seen determined attacks on a flock of moulting, flightless Eiders.

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### **Predation of birds' eggs and chicks by herbivorous mammals**

Furness (1989. The predation of Tern chicks by sheep. *Bird Study* 35: 199-202) described predation by sheep of chicks of Arctic Terns *Sterna paradisaea* and Arctic Skuas *Stercorarius parasiticus* on Foula, Shetland. He could find no similar instances in the literature except his own observations of predation of Manx Shearwaters *Puffinus puffinus* by red deer on Rhum (Furness, R.W. 1988. Predation of ground-nesting seabirds by island populations of red deer *Cervus elaphus* and sheep *Ovis*. *J. Zool., Lond.* 216: 565-573). However, MacDougall (MacDougall, P. 1992. Lesser Black-backed Gull corpse scavenged by sheep. *Brit. Birds* 85: 313.) pointed out that the habit of chewing the legs of tideline bird corpses is common amongst the native sheep on North Ronaldsay, Orkney. This habit was also recorded by Lockley (1938. *I know an Island*. London). Other observations show that predation by herbivorous mammals is widespread in the Northern Isles.

North Ronaldsay sheep remove the legs and frequently the bills of almost all tideline corpses on the island. They also eat Arctic Tern chicks (pers. obs.), and have been recorded eating the eggs of Ringed Plovers *Charadrius hiaticula* (Walker, K. 1966. The birds of the island. In: Scott, M. *Island Saga*. Aberdeen). This may be why many Ringed Plovers on the island nest in covered sites (Pennington 1992, Ringed Plovers nesting in covered sites. *Brit. Birds* 85:

498-499). Sheep may also take the eggs of other birds on North Ronaldsay, including Arctic Skua and Arctic Tern.

In Shetland, live and dead chicks of Arctic Terns and Arctic Skuas mutilated in the way described by Furness (1988, 1989) have been found many times over the past 15 years in a number of different localities, including Papa Stour and Whalsay (J.D. Okill pers. comm.). In an Arctic Tern colony on Unst, dead chicks found in 1991 were believed to be the victims of Shetland ponies (pers. obs.) while, during hide watches on Papa Stour in 1989, not only were sheep seen taking Arctic Tern chicks but on one occasion a rabbit dragged a chick down its burrow! (G.M. Scanlon pers. comm.). In 1990, on Hermaness, Unst, two small Guillemot *Uria aalge* colonies containing a total of over 600 individuals were completely abandoned by early June after predation by a trapped, hungry sheep. Many preyed eggs were found, crushed and punctured in a fashion consistent with the sheep's dentition.

These casual observations suggest that predation of birds' eggs and chicks by sheep and other herbivorous mammals is not unusual, at least in conditions where mineral deficiencies in the herbivores' diet are likely. Such deficiencies were suggested by Furness (1988, 1989) as the origins of such behaviour.

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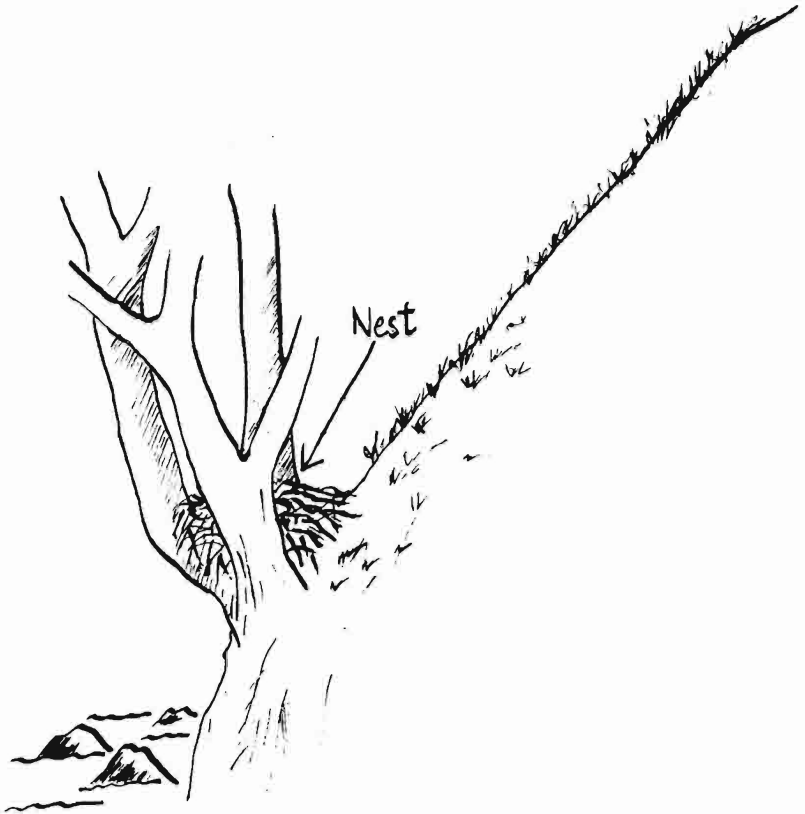
### Unusual Buzzard nest sites in Glen Roy

In 1985 I was shown the nest of a Buzzard *Buteo buteo* in Glen Roy. It was located amongst deciduous trees in a conifer plantation, but its position was unusual in that it was at ground level at the bottom of a bank overhanging a burn at the base of alder trees *Alnus glutinosa*. The bank extended for c.10 metres at a slope of about 45 with bracken *Pteridium aquilinum*, short purple moor grass *Molina caerulea* and various moss species growing on it. The nest was supported, cradle-like, principally by the alder trees (see diagram below). Although very occasionally nests are known to occur on steeply sloping ground (Cramp, S. & Simmons, R.E.L. (eds). 1980. *The Birds of the Western Palearctic*. Oxford.

Vol. 2), and in the Uists they have been recorded on flatter ground also (Newton, I. 1979. *Population Ecology of Raptors*. Poyser, London), such sites are clearly rare.

The trees around the Glen Roy site, although mature, did not contain suitable typical nesting places. In the years 1985-87, a total of three young fledged from the seven eggs laid in this nest. Only two eggs were lost to predation, both in 1986.

In 1988, a new nest was built on the opposite side of the burn but close to the first. This one was in a small birch *Betula pendula* about 2 metres above ground level. This is lower than the three metres normal minimum for tree nests (*BWP* Vol 2) though similar heights have been recorded in



Speyside (Brown, L. 1976. *British Birds of Prey*. Collins. London). A total of five young were fledged from this new nest in 1988 and 1990. Neither nest was used in 1991, nor in 1992.

In spite of the abundance of trees, a lack of suitable nest sites exists in this area, but this has clearly not prevented Buzzards from breeding successfully in these unusual places.

*Dominic Sargent, 'Cruach Innse', Roy Bridge, Inverness-shire PH31 4AJ*

### *Unripe grain, a major food for young finch-like birds*

D. Macdonald (1965, *Scott. Birds* 3: 235-246) wrote that the most frequent food items brought to nestling Corn Buntings *Miliaria calandra* in Sutherland were "green caterpillars and an unidentified whitish substance which was carried in large billfulls". While watching north-east Scottish nests in 1989 I noted that hens often fed their nestlings on a pale green or off-white paste. In Angus in 1990 I identified it. A hen with fledged young was feeding them mainly on grain. After taking a grain from the plant, she rolled it round inside her open bill, using her tongue to do so, whereupon the husks fell off, torn from the grain by hard ridges inside the bird's bill. I had often seen various bunting, finch and sparrow species do this while feeding on grain; each grain takes several seconds of bill-rolling, except for threshed wheat, which lacks husks. The hen Corn Bunting did this, grain by grain, until she had enough to feed to a chick, and then returned to the grain field to repeat the process. She often speeded up the act by taking several unhusked grains in her mouth, flying to a nearby tarmac road, and striking each grain against the road, whereupon the husks quickly fell off. While doing this she dropped some green bits but then picked them up before flying to the young. She often came to the road to husk grains, but once husked them by striking them against hard compacted earth at a field edge. A Linnet *Carduelis cannabina* repeatedly took grain paste from the tarmac road by the

grain field to feed young in a nest in gorse 400 metres away. Later I saw Corn Buntings striking greenish grains against the tops of posts, wire, stones and drystone walls, before feeding the paste to their young. Since then I have often seen Tree Sparrows, House Sparrows, Chaffinches, Greenfinches and Yellowhammers (*Passer montanus*, *P. domesticus*, *Fringilla coelebs*, *Carduelis chloris* and *Emberiza citrinella*) flying with grain paste to feed nestlings, and feeding fledged young on it at the edge of grain fields. It is one of the main foods taken by Corn Buntings to young in and out of the nest, often even from the day of hatching. It is particularly predominant in cold wet weather when insects are less available, but is less frequent in areas with very abundant insects.

Barley, wheat and oats are all used. Adult Corn Buntings prefer ripe grain for feeding themselves, but for their young they prefer grain with a slightly greenish tinge. Bright green, completely unripe grain, at a stage with a high liquid content, is not used. The material used has a higher protein and lower starch content than ripe grain, and so approximates more to the high-protein food available in insects. In north-east Scotland, winter barley provides this food in late May-mid July, winter wheat in mid June-mid September, and spring barley and spring oats in late June-September. Hence the season when this food is available starts much earlier if winter grain is present.

*Adam Watson, c/o Institute of Terrestrial Ecology, Banchory, Kincardineshire AB31 4BY.*

### ***Heron attacked by Osprey***

On 25 August 1990, we watched two Ospreys *Pandion haliaetus* sitting in a dead Scots pine on the far side of a lochan in Perthshire. This tree was about 500 metres from another pine in which their nest was situated. A Grey Heron *Ardea cinerea* was fishing on the edge of the lochan using the 'wade or walk slowly method' (Voisin, C. 1991. *The Herons of Europe*. Poyser, London). We watched until it disappeared behind a low rocky heather-covered promontory. Some time later we heard and saw a juvenile Osprey in the heather close to the nest tree. The young bird called persistently. An adult flew towards it and made rapid dives towards the water behind the promontory. These rapidly repeated dives were unlike the normal fishing behaviour which we have observed on many

occasions. The Heron came swimming from behind the promontory with the Osprey diving towards it. The Heron reacted to the diving Osprey by retracting its head and neck and continued swimming for the nearest shore from which it flew away from the lochan. It was not pursued by the Osprey which flew to a tree close to the young bird.

Grey Herons have been observed swallowing Mallard *Anas platyrhynchos* ducklings (*Scot. Birds* 16: 44), catching, killing and swallowing Hoopoe *Upupa epops* and eating birds as large as Redshank *Tringa totanus* and Ruff *Philomachus pugnax* (*Brit. Birds* 84: 57-68). However, whether the Osprey attacked the Heron because it was a competitor for food or a threat to its young we cannot say.

***Bruce M. Hobson and Elizabeth M. Hobson, Flat 7, 27 Castle Terrace, Edinburgh EH1 2EL***

### **Correction**

In the Short Note by Duncan, Cooper & Leitch (*Scot. Bird* 16: 22) on natal philopatry in female wigeons, the editors added a reference to the important article by Greenwood (*Anim. Behav.* 28, 1140-1167), but unfortunately the word 'female' dropped out in the printing process, thus inadvertently implying that natal philopatry is rare amongst birds generally, whereas the intention was to indicate that female birds are less philopatric than male

ones. Amongst birds males usually nest closer to their site of hatching than do females but, as stated in the note, a variety of duck species have been found to be an exception to this rule. As Greenwood showed, the situation is the opposite in mammals, where, in most species, females breed closer to their site of birth than do males. We apologise to the authors for this slip and thank Cliff Henty for pointing it out to us.

Eds.



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## Correspondence

(The Editor welcomes correspondence on suitable topics in *Scottish Birds*. It is essential, however, that all letters are

addressed to the Editor and that personal or libellous comments should be avoided.

Eds.)

## Letters

### *Baillon's Crake at Fair Isle*

We read with interest the article by Suddaby and Harvey in *Scottish Birds* 16(3): 211-214 about the occurrence last autumn of a juvenile Baillon's Crake *Porzana pusilla* at Fair Isle. The bird was found dead on 2 October and rumour has it that the specimen was prepared privately as a mount. This raises a general concern as to the fate of dead rarities over the recent past.

It was not long ago that it was the (almost) universal practice for Scottish rarities to be deposited at the Royal Museum of Scotland for incorporation into the national collection (for example see countless articles in *Annals of Scottish Natural History/Scottish Naturalist*, and various species accounts in Baxter and Rintoul (1953) *The Birds of Scotland* and Thom (1986) *Birds in Scotland*), which means that the material is freely accessible to any *bona fide* ornithologist, and easily compared with other series of skins. As mounted birds generally have a limited life and are difficult to store, most material is prepared as cabinet skins which store well and which are also convenient for posting locally and internationally. This widens their availability.

Skins in the museum are maintained in light-proof and insect-proof cabinets and remain in good condition indefinitely. Some specimens here are 200 years old yet remain in as good condition now as the day they were prepared. Furthermore, the

significance of particular specimens is not always recognised until later generations. Incidentally, the 1929 Fair Isle specimen, referred to by Suddaby and Harvey was deposited in the Museum by George Stout (Reg. no. NMSZ 1929.70).

There is no indication of the current location of the 1991 crake or, indeed, whether it is still in Scotland. If it has been mounted, will the possessor be willing to send it to others for examination and comparison? Is it free of light damage and pest attack? (Specimens exposed even to low levels of sunlight can be bleached within a year or two.) Where will the specimen be in 10, 50 or indeed 100 years time?.

We believe that the aims of ornithology are better served if rarities are deposited in permanent reference collections where they are freely available to interested parties. There have been several instances in the last few years where rarities have been retained by individuals. We suspect that, however well-intentioned this is, it is almost certain that these specimens will be lost to science in a few decades (or in any case after the death of the owner).

This letter has been written as a reminder that the Bird Section has a continuing need for new specimens, whether rare or common, for reference purposes. Perhaps the lack of public awareness of this reflects our own failure to make this requirement more widely known.

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*R. Y. McGowan & Andrew Kitchener, Bird Section, Department of Natural History, Royal Museum of Scotland, Chambers Street, Edinburgh EH1 1JF.*

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### ***Discoloured Peregrines in the north of Scotland***

The account by G.G. Bates of a pair of dark Peregrines *Falco peregrinus* in north Sutherland (*Scott. Birds* 16: 219) seems reminiscent of a number of similar reports eventually attributed to oiling by Fulmars *Fulmarus glacialis* in the early 1970s. They are discussed by Andrew Clarke (*J. Zool., Lond.* 181: 11-20), who was able to quote nine incidents all in the north of Scotland. Where details were supplied all were adults affected in the summer, and some of the birds died. Clarke speculated that the Peregrines may have become oiled either when they tried to prey upon the increasing

population of Fulmars, or because of consequent disputes between the two species over nest-sites.

The present incident seems increasingly serious because not only may both members of a pair of Peregrines have been affected, but they nested late and the eggs apparently failed to hatch, perhaps because if eggshells become oiled the embryo may suffocate. This might therefore provide one explanation for the decline of northern and western Peregrines reported in *Scottish Bird News* 26. Perhaps it is time for further investigation of the problem, and the early discouragement of any Fulmars settling near possible future Peregrine nest-sites before the falcons occupy them?

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Tillydrone Avenue, Aberdeen AB9 2TN.*

### ***Pied Wheatear in Shetland***

In our last issue under the heading 'Rare Migrants' (*Scottish Birds* 16: 214-216) it was stated that a Pied Wheatear *Oenanthe pieschanka* in Shetland on 9 October 1991 was the fifth record for Scotland. Several people have since written in to say that this bird was in fact the sixth record, and that a first winter female on Stronsay 16-20 October 1988 had been omitted from the list

at the end of the note. The bird was found by Dennis Garrett, was accepted by the British Birds Rarities Committee and became the second record for Orkney. The record is mentioned by M.J. Rogers and the Rarities Committee (1989) in 'Report on rare birds in Great Britain in 1988' (*British Birds* 82: 505-563). Our thanks to everyone who wrote in to put us right.

Eds.

## Research Index

The following is an index of fieldwork and research presently undertaken with specific Scottish interest. This index is updated every year and researchers are either listed alphabetically by the institutes where the research is based, or in two cases (SNH & RSPB) by the topics and species researched. If you are doing research in this area and not listed here, or know of someone who is, please put us right by sending details to the editor.

### Aberdeen University:

Cosgrove, P. The importance of conservation zones for bird populations in upland spruce forest, concentration on broadleaf strip, unplanted stream edges, marshes, etc. in otherwise unbroken conifer. Based at Kielder, Northumberland (PhD study).

Dunnet, G.M. The Fulmar on Eynhallow in Orkney (since 1950) concerned primarily with population dynamics, longevity and, recently, recruitment.

Dunnet, G.M. & Heubeck, Martin. Monitoring programme (since 1978) in breeding seabird populations in Shetland, as well as changes in seabird and waterfowl wintering populations in two areas: Yell Sound and Sullom Voe and the Bluemull/Colgrave Sounds area of north-east Shetland.

Gorman, Martyn L. & Reynolds, Peter. Feeding ecology of raptors (Short-eared Owl, Hen Harrier and Kestrel) in Orkney, particularly concerned with the effects of changes in land-use.

Patterson, I.J. & Fuchs, R.M.E. Management of grassland to provide reserves for wild geese; experiments with different mowing, grazing and fertiliser regimes at the RSPB reserve at the Loch of Strathbeg, Grampian.

Patterson, I.J. & Ollason, J.G. Bird population density and species diversity in upland spruce plantations, in relation to different management regimes

especially changes in compartment size; based at Kielder, Northumberland and Cowal, Argyll.

Patterson, I.J. & Laing, R. Monitoring of wildfowl and wader numbers on the Ythan estuary, Grampian. Twice-monthly counts throughout the year, with special emphasis on the Eider Duck in the breeding season.

Rae, S. Habitat use by Ptarmigan, especially in the breeding season, in relation to vegetation type and reproductivity, cover and other environmental factors (with SNH/Des Thompson, PhD study).

### Edinburgh University:

Carter, Adrian. Feeding behaviour and micro-habitat distribution of waders on rocky shores, especially in East Lothian (MPhil study).

Cresswell, Will. Behaviour and ecology of a predator-prey system: Sparrowhawks and Redshanks, concentrated on Tynninghame, East Lothian (PhD study).

Deag, John. Studies on communication and social organization in tits, with field work mainly at Ormiston, East Lothian (PhD study).

Hanna, Laurel. Barn Owl population genetics (PhD study).

McAfferty, Dominic. Ecological energetics of Barn Owl (PhD study).

Scott, Graham. Social behaviour and communication in Blue Tits (PhD study).

Taylor, Iain. Long-term study (started 1978) of Barn Owl ecology and conservation. Has been monitoring, since 1980, changes in Lapwing breeding density in relation to agriculture.

### Glasgow University

Askew, C. Survival rates and ecology of Great Skuas on Handa: comparison of a small and expanding population with the large decreasing one on Foula.

- Austin, G. The ecology of Buzzards in Argyll in relation to land use (PhD study).
- Barber, I. Breeding performance of seabirds on Handa in relation to industrial fishing development (MSc study).
- Bolton, M. Energetic costs of breeding in Storm Petrels.
- Calvo, B. Effects of agricultural land use on the breeding ecology of waders (PhD study).
- Calvo, B. & Furness, R.W. Endosteal lamellae in bird bones as a means of estimating the age of dead adult birds.
- Cohen, B.L., Wildon, R.H., Furness, R.W. & Willcox, S. Molecular studies of skua DNA to assess the evolutionary history of skuas.
- Crompton, D.W.T. & Huntingford, F.A. *Proflicollis botulus*: an Eider Duck parasite in the Clyde Estuary.
- Ensor, K. Breeding season diets of Great Skuas and gulls in relation to the activities of the whitefish fisheries around Scotland.
- Furness, R.W. Seabird interactions with fish stocks and fisheries, birds as monitors of environmental change, long term monitoring of seabird ecology on Foula, Shetland (since 1971), seabird energetics, body composition and moult.
- Furness, R.W., Hamer, K.C., Klomp, N.I. & Ratcliffe, N. Ecology of Great Skuas on Foula, Shetland: long term studies begun in 1960s.
- Hansell, M.H. A comparative study of nest building behaviour in birds.
- Horn, W. Diet selection and foraging economics in breeding terns (PhD study).
- Houston, D.C. Food quality and breeding performance in Blue Tits.
- Klomp, N.I. & Furness, R.W. Recruitment of immature Great Skuas into breeding colonies (comparative work with Professor E.C. Young, University of Auckland, in southern hemisphere skuas).
- Macedo, E. Effects of fisheries on seabird numbers: and assessment of net mortality and fishery-induced changes in food availability (MSc study).
- Madders, M. Hen Harrier ecology, especially their use of forestry plantations (PhD study).
- Metcalfe, N.B. Social behaviour and ecology of flocking birds: reproductive ecology of Pied Flycatchers.
- Monaghan, P. Population ecology of gulls.
- Monaghan, P., Burns, M. & Walton, P. Reproductive strategies in Black Guillemots.
- Monaghan, P., Burns, M., Uttley, J.D., Walton, P. & Austin, G. Effect of prey availability on reproductive and foraging strategies in Shetland seabirds.
- Monteiro, L. Heavy metal accumulation by petrels and shearwaters (PhD study).
- Muda, F. Nest material stealing in Shags (PhD study).
- Phillips, R. Population ecology of Arctic Skuas in relation to climate and variations in numbers and reproductive success of the species they rob of fish (PhD study).
- Purton, M.D. & Solomon, E.E. Eggshell formation in cage birds.
- Ratcliffe, N. Reproductive effort of Great Skuas of known ages from 4 to 30 years old: a test of predictions of life history theory (PhD study).
- Selman, R. The role of female body condition on egg production in birds (PhD study).
- Smith, R.D. Dispersal and behaviour of over-wintering Snow Buntings (PhD study).
- Solomon, S.E. Comparative study of the ultrastructure of eggshell formation in birds.
- Stewart, R.M. Uptake, storage and excretion of cadmium and lead by birds and an assessment of birds as monitors of cadmium and lead pollution (PhD study).
- Thomas, C. The ecology of Ravens in relation to land use (PhD study).

- Thomson, D.L. Energetics and ecology of Kittiwakes (PhD study).
- Thompson, D.R. & Furness, R.W. Analysis of stable isotope ratios of nitrogen, carbon and other elements in feathers of seabirds as a means of assessing their trophic relationships in marine ecosystems and changes in diet of the last 150 years.
- Walsh, P.M. Feeding ecology and mercury burdens of Gannets (PhD study).
- Williams, J. Birds as possible carriers of Lyme disease (PhD study).
- Zonfrillo, B. Breeding ecology of seabirds on Ailsa Craig (PhD study).

**Institute of Terrestrial Ecology, Banchory:**

- Bacon, P.J. & Palmer, S.C.F. (Oxford). Investigation and modelling of habitat utilisation by Red Grouse.
- Harris, M.P. & Nuttall, P. The importance of tick-borne diseases on seabird populations.
- Harris, M.P., Halley, D. (St Andrews) & Wernham, C. (Stirling). Long-term studies of numbers, survival, productivity and for some species, recruitment and body condition, of seabirds on the Isle of May in relation to food availability and environmental conditions.
- Marquiss, M., Carss, D. & Alexander, G. Does Goosander and Red-breasted Merganser predation have an impact on salmon populations.
- Moss, R., Parr, R., & Trenholm, I. Population regulation in Red Grouse. Roles of behaviour, dispersal and predation in determining population size.
- Moss, R., Picozzi, N. & Catt, D.C. Studies of habitat requirements, dispersal, numbers and distribution of Capercaillie; particularly the use made by Capercaillie of commercial woodland.
- Parr, R. A study of population size and productivity of moorland waders and Red Grouse in relation to afforestation.

- Wanless, S., Harris, M.P. & Hector, J.A.L. Reproductive and foraging energetics of Shags with particular emphasis on the influence of food availability and feeding habitat.

**Joint Nature Conservation Committee: Seabirds Team, Aberdeen**

- Mark Tasker, head of Seabird Team.  
Paul Walsh, Seabirds Colony Register - collates counts of seabirds at colonies throughout the U.K.

JNCC Seabirds at Sea Team (SAST). Studies the distribution of seabirds in the offshore waters around Britain throughout the year. Staff: Andy Webb (leader), Carolyn Stone (marine biologist), James Williams (data manager), Tim Barton and Ian Gordon (ornithologists).

Ian Carter, North Sea Database - compiling database of seabirds in the North Sea using data from seven countries bordering the North Sea.

**The Royal Society for the Protection of Birds:**

The RSPB undertakes extensive research into all aspects of birdlife. The following projects with particular Scottish interest are listed in order of topics and species involved. Staff and researchers involved are given in brackets. Further details may be had from the RSPB HQ, who produce an annual Project Register, which also gives details of projects on reserves ecology, too numerous to list here.

Fisheries statistics. Review of fisheries statistics, for countries fishing in EC waters (1992-93 J. Sears, S. Curran).  
Changes of Distribution of breeding birds (with BTO), using data gathered by the BTO atlas projects (1991-94 K.W. Smith, D. Gibbons BTO).

- Individual distinct bird calls. Investigation into the effectiveness of using call and song. Species include Bittern, Black-throated Diver and Corncrake (K.W. Smith, P. McGregor, G. Gilbert University of Nottingham PhD study 1990-93).
- Orkney and Shetland seabirds. Monitoring numbers, breeding success and body condition to contribute to the debate on the future of sandeel fishing and RSPB marine policy (1992-93 J. Sears, D. Suddaby, I. Sim).
- The effect of loch quality on the breeding productivity of Black-throated Divers and Slavonian Grebes (1992-95 R.W. Summers, D. Jackson).
- Loch Gruinart: Goose counting, reseeding and goose usage experiments (M. Peacock, J. Fleming, I. Bainbridge, G. Hiron, C. Evans, J. Welstead, S. Percival Durham University PhD Study 1992-95).
- Osprey population dynamics (1992-93 R.W. Summers/R.H. Dennis consultant).
- Causes of poor breeding success in White-tailed Eagle with JNCC. (1992 R.E. Green, K.W. Smith, A. Hughes).
- Golden Eagle home range use. Investigation of use of habitat by radio-tagged Golden Eagles; relating habitat use to prey abundance, cover and topography (1991-95 R.E. Green, M.J. McGrady, J. Grant).
- Merlins and land cover. Relating spacing, occupancy and breeding success at known Merlin sites to surrounding vegetation and topography through airphoto interpretation (1992-93 R.E. Green, R.W. Summers, G. Rebecca).
- Breeding success and habitat selection of Capercaillie, especially at the Abernethy reserve (1991-93 R.W. Summers/R. Proctor).
- Survey and monitoring of Capercaillie populations (with ITE, Game Conservancy, SNH and Forestry Commission) (1991-94 R.E. Green).
- Impact of mowing on Corncrake survival and productivity (with Irish Wildbird Council Project to estimate the effect of mowing at different times of year, at different mowing speeds and patterns (1992-95 R.E. Green, G.A. Tylor).
- Lowland breeding waders in Scotland and Northern Ireland. A joint project with SOC. Designed to be repeatable (1992-94 R.E. Green, K.W. Smith, M. O'Brian).
- Red-necked Phalarope ecology. Identification of habitat requirements, particularly those susceptible to management (1992-95 R.E. Green, M. O'Brian).
- Orkney and Shetland skua survey to assess Arctic and Great Skua population changes since previous surveys (1992-93 J. Sears, P. Ellis, E. Meek, D. Suddaby, I. Sim, H. Harrop, A. Williams, D. Steel, C. Whyte, R. Ribbands, RSPB and SNH wardens).
- Roseate Terns. A study to monitor the breeding range of the eastern Atlantic population, to identify its wintering range, and to study threats to the species. (1988-1994 A.J. del Nevo).
- Nightjar survey (1991-92), using amateur and professional fieldworkers, to count and map all Nightjars breeding in the UK, and to assess their requirements by detailed habitat measurements.
- Numbers of Crested Tits, Crossbills and Capercaillie in Highland pine woods to determine relative abundance, densities and tree preference (1992-95 R.W. Summers, G. Rebecca).
- Second international Chough survey (with Irish Wildbird Council, JNCC, Manx Chough Project and others). To estimate 1992 population in Ireland and Britain by a full survey (R.E. Green).
- St Andrews University**
- Adhikerana, A.S. Singing behaviour in Coal Tits (PhD study 1988-92).
- Graves, J.A. & Ortega-Ruano, J. Mating and reproductive success in Shags on the Isle of May.

- Halley, D. A study of recruitment in Guillemots on the Isle of May (PhD study 1988-92).
- Povey, Fiona & Jones, Alex. Aspects of song development in Zebra Finches in the laboratory (PhD studies).
- Slater, P.J.B. Field and laboratory studies on the development and organisation of bird vocalisations.

### Scottish Natural Heritage:

SNH is involved in a wide range of work on birds. Much of this is currently contracted out to other organisations, and some is managed on its behalf by the Joint Nature Conservation Committee (JNCC). Names of individual workers are not attached to the following list, although the key organisations involved are given, as is the appropriate contact person in SNH or JNCC. The first contact points for further information on these projects and other aspects of SNH's work on birds are Greg Mudge (agricultural/lowland birds) and Philip Whitfield (upland/peatland birds). Topics are given in order of the species involved.

- International site designations: review and assessment of bird numbers and distributions with respect to Special Protection Areas and Ramsar sites. JNCC. (Greg Mudge/Philip Whitfield/Colin Galbraith, JNCC).
- Services in ornithology. Including the Birds of Estuaries Enquiry; national bird ringing scheme; integrated population monitoring; monitoring birds of prey; monitoring of wetland birds; special surveys; habitat management research. JNCC/British Trust for Ornithology. (Greg Mudge/Colin Galbraith, JNCC).
- Monitoring of rare British breeding birds. JNCC/Rare Breeding Birds Panel. (Greg Mudge/David Stroud, JNCC).
- Conservation of vulnerable and dispersed species. Measures to protect birds

- outside protected areas in line with UK responsibilities under the EC Birds Directive. JNCC. (Colin Galbraith, JNCC).
- Services in wildfowl research, including the National Waterfowl Count scheme. JNCC/Wildfowl and Wetlands Trust. (Greg Mudge/David Stroud, JNCC).
- Conservation plans for migratory wildfowl under the Bonn Convention and Ramsar Convention. JNCC/International Wildfowl and Wetland Research Bureau. (David Stroud, JNCC).
- Moorland bird surveys; techniques and ecology. (Des Thompson/Andy Brown, English Nature).
- Moorland changes and influences on birds in the Northern Isles. (Angus MacDonald/Des Thompson).
- Population ecology and conservation of montane birds, notably Dotterel, Ptarmigan and Snow Bunting. Philip Whitfield/Des Thompson).
- Seabird colony register, Maintenance of a database of counts of seabird colonies. JNCC/Seabird Group. (Mark Tasker, JNCC).
- Seabird monitoring programme. Annual monitoring of breeding success at seabird colonies. JNCC/RSPB/SOTEAG. (Mark Tasker, JNCC).
- Seabirds at sea programme, phase 4. JNCC. (Andrew Webb, JNCC).
- Monitoring of Black-throated Divers. With RSPB. (Greg Mudge).
- Goose monitoring on Islay, Long-term monitoring of the numbers and feeding distribution of Greenland White-fronted and Barnacle Geese. With the Wildfowl and Wetland Trust. (Greg Mudge/David Stroud, JNCC).
- Comparative feeding ecology of predatory birds. Glasgow University. (Des Thompson/Colin Galbraith, JNCC).
- Re-introduction of Sea Eagles. Monitoring of the re-introduction population. With RSPB and JNCC. (Greg Mudge/Mike Pienkowski, JNCC).

- National survey of Golden Eagles. To update the results of the previous survey carried out in 1982-83. Joint project with RSPB and the Scottish Raptor Study Groups. (Philip Whitfield).
- Red Kite re-introduction: national and international co-ordination. JNCC/RSPB. (Greg Mudge/Colin Galbraith, JNCC).
- Effects of predators on Red Grouse and moorland waders in southern Scotland. Institute of Terrestrial Ecology. (Philip Whitfield).
- Past ecology of Ptarmigan in south Scotland. (Philip Whitfield).
- Capercaillie: status and habitat needs. Joint contract with RSPB to the Institute of Terrestrial Ecology. (Greg Mudge).
- Philopatry, fidelity, mating/social systems and conservation in waders (Philip Whitfield/Des Thompson).
- Long term study of Greenshanks in NW Scotland. (Des Thompson).
- Population trends of gulls and other seabirds on the Isle of May. Institute of Terrestrial Ecology. (Mark Tasker, JNCC).
- Co-existence on moorland passerines. A study of the effects of heather/bracken patchiness on the inter-relationship of breeding Meadow Pipits, Skylarks and Whinchats. University of York. (Des Thompson).
- Ecology and conservation of Pied Flycatchers in NW England. Leicester University. (Des Thompson).
- Ecology of Corn Buntings on the Outer Isles. Leicester University. (Des Thompson).

**Stirling University:**

- Alves, Marie-Alice. Behavioural ecology of Sand Martins (PhD study).
- Bell, Mike. Wildfowl counts. Breeding wader surveys. Raptor monitoring.
- Bryant, David. Energy requirements of wild birds. Populations and ecology of estuarine birds (especially Forth). Hirundine and Dipper breeding ecology.
- Jalil, Sari A. Effects of land use changes on waterfowl populations. A study based on freshwater lochs in central Scotland (PhD study).
- Johnstone, Ian. Territorial behaviour in Robins and Dippers (PhD study).
- Hashim, Rosli. Ecology and energy requirements of Great Tits in summer and winter (PhD study).
- Ward, Sally. Egg laying and incubation behaviour in Swallows and Dippers (PhD study).
- Wernham, Christine. Breeding ecology of Puffins (with ITE Banchory - PhD study).



## Items of Scottish Interest

Most of the following papers and reports on birds in Scotland are available in the Waterston Library at 21 Regent Terrace for reference, and include all that have come to notice in the period March to August 1992 (the most recent list of items of Scottish interest was in SB 16(3): 226-228). We would be glad to learn of anything that has been missed, and to receive reprints or copies of papers on any aspect of ornithology or natural history.

Bird reports marked with an asterisk are available from the SOC at the prices quoted, but please add 50p for postage and packing.

### Scientific papers

- Aebischer, N.J. & Wanless, J. 1992. Relationships between colony size, adult non-breeding and environmental conditions for Shags on the Isle of May, Scotland. *Bird Study* 39: 43-52.
- Baines, D. & Aebischer, N.J. 1992. Black Grouse: the effects of predator control and vegetation cover. *Game Conservancy Review* of 1991: 98-101.
- Booth, C.J. & Reynolds, R. 1992. Crossbill eating slug. *British Birds* 85: 245-246. Strange Orkney habits.
- Cobley, N. & Moss, R. 1992. Numbers and breeding success of Capercaille in 1991. *Game Conservancy Review* of 1991: 102-103.
- Corse, C. 1992. Wader studies in Orkney. *Wader Study Group Bulletin* 64: 37-39.
- Craik, J.C.A. & Becker, P.H. 1992. Temporal and spatial variations in body-weights of Common Terns and Arctic Terns. *Seabird* 14: 43-47.
- Danchin, E. 1992. Food shortage as a factor in the 1988 Kittiwake breeding failure in Shetland. *Ardea* 80: 93-98.
- Danchin, E. 1992. The incidence of the tick parasite *Ixodes uriae* in Kittiwake colonies in relation to the age of the colony, and a mechanism for infecting new colonies. *Ibis* 134: 134-141. Based on studies in three breeding areas including the Isle of May.
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## Bird Reports

- Argyll Bird Report no. 8 for 1991.* S.J. Petty (ed) 1992. 67 pp. A 49 pp systematic list and short papers on Barn Owls on Islay, Buzzard eyries on Colonsay, and Greylag Geese on Coll and Tiree. \* £3.50.
- Arran Birds* in 1991. M.H. Dunn & T. ap Rheinnallt (eds) 1992. 21 pp. This is the 12th bird report published for the Isle of Arran Natural History Society. It includes a special report on the Lesser Whitethroat in Arran. Available from Tristan ap Rheinnallt, Ashgrove, Pirnmill, Isle of Arran KA27 8HP. £1.50.
- Ayrshire Bird Report for 1991.* Angus Hogg (ed) 1992. 57 pp. A systematic list, and special articles on Garnock Estuary shorebirds, the Black-throated Diver in Ayrshire, Kestrels, waders and wildfowl. \* £2.75.
- Dumfries and Galloway Region Bird Report for 1991.* Paul Collin (ed) 1992. 34 pp. \* £2.00.
- Fair Isle Bird Observatory Report for 1991.* P. Harvey & V. Thom (eds) 1992. 76 pp. Includes a 25 pp systematic list and several short articles. \* £3.50.
- Islay Bird and Natural History Report for 1991.* M. Ogilvie (ed) 1992. \* £1.50.
- Isle of May Bird Observatory Report for 1990.* Ian Darling (ed) 1992. 48 pp. Includes a migration summary and a ringing report. \* £3.00.
- Moray and Nairn Bird Report for 1991.* Martin Cook (ed) 1992. 69 pp. \* £2.75.
- Orkney Bird Report for 1991.* C. Booth, M. Cuthbert & E. Meek (eds) 1992. 78 pp. Includes a short report from the North Ronaldsay Bird Observatory, and four short articles. \* £2.50.
- Outer Hebrides Bird Report for 1991.* T. Dix & P. Cunningham (eds) 1992. 88 pp. This is the second bird report in a new detailed format, published by the Outer Hebrides Ornithologists' Group. The 67 pp

systematic list includes bird records from St Kilda, and there is a special report on the spring passage of Skuas off Balranald.  
\* £4.00.

*Perthshire (Central and Southwest) Peregrines and Ravens in 1991*. P. Stirling-Aird 1992.

a 3 pp unpublished report in a long-running series.

*Shetland Bird Report for 1991*. K. Osborn (ed) for the Shetland Bird Club 1992. 104 pp. Includes six special articles and four pages of colour photographs.

***William G. Harper***  
***Librarian, Waterston Library***

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## European journals in the Waterston Library

The following selection of articles appeared in European journals received in the Waterston Library between April and September 1992, and thus follows on the list published in Vol 16 No 3. Articles are arranged in species order; square brackets indicate that the article is in the original language, other articles being in English. The reference, abbreviated for reasons of space, indicates merely the journal, its number and year of publication. Journals quoted are as follows:

- Netherlands: *Ardea*, *Limosa*, *Dutch Birding*  
 France: *Alauda*, *L'Oiseau*  
 Switzerland: *Nos Oiseaux*, *Der Ornithologische Beobachter*  
 Belgium: *Aves*, *Mergus*  
 Germany: *Die Vogelwelt*, *Limicola*, *Corax*, *Journal für Ornithologie*, *Seevögel*  
 Austria: *Egretta*  
 Italy: *Rivista Italiana di Ornitologia*  
 Spain: *Ardeola*  
 Sweden: *Vår Fågelvärld*, *Ornis Svecica*  
 Norway: *Vår Fuglefauna*, *Cinclus*  
 Denmark: *Ornis Scandinavica*, *Dansk Ornitologisk Forenings Tidsskrift*  
 Finland: *Ornis Fennica*, *Lintumies*

### Divers to Ducks:

- Iborra, O. *et al.* [Wintering of Black-necked Grebe on the Étang de Berre, S.E. France] - *Alauda* 4/91.  
 Debout, G. [Use of resting places and roosts by Cormorants in the non-breeding period] - *L'Oiseau* 1/92.  
 Frederikson, M. [Breeding population of Grey Heron in Denmark 1991] - *Dansk Orn. For. Tidsskr.* 1-2/92.  
 Struwe, B. & Nehls H-W. [Results of the International Waterfowl Count on the Baltic coast of Germany January 1990] - *Seevögel* 2/92.

- Follestad, E. [Census of Greylag Geese in Norway Autumn 1991] - *Vår Fuglefauna* 2/92.  
 Persson, H. [Impact of shooting on breeding populations of Greylag Geese] - *Limosa* 2/92.  
 Gauter, B. [Numbers and distribution of Barnacle Geese on North Sea coast of Germany] - *Corax* 1/92.  
 Ebbinge, B.S. Regulation of numbers of Dark-bellied Brent Geese on Spring staging sites - *Ardea* 2/92.  
 Grusso, M. & Meloni, R. [The Ruddy Duck in Europe and its first occurrence in Italy] - *Riv. It. di Orn.* 1-2/91.

### Birds of Prey:

- Bavoux, C. *et al.* [Variations in juvenile plumage in Marsh Harriers in Charente Maritime] - *Alauda* 4/91.  
 Forsman, D. [Ageing and sexing of Rough-Legged Buzzards] - *Lintumies* 1/92.  
 Jenny, D. [Reproduction and regulation of density in an Alpine population of Golden Eagles] - *Orn. Beob.* 1/92.  
 Steen, O.F. [The Peregrine in S.E. Norway 1990/91] - *Vår Fuglefauna* 1/92.  
 Kéry, M. [Resistance of Peregrine eggs and chicks to prolonged absence of adults] - *Nos Oiseaux* 5/92.

### Grouse to Cranes:

- Renard, F. [The behaviour of Black Grouse attacked by Hen Harriers on lekking areas] - *Aves* 2-3/91.  
 Willebrand, T. Breeding and age in female Black Grouse - *Orn. Scand.* 1/92.

### Waders to Auks

- Girard, O. [Migration of waders in Continental France] - *Alauda* 1/92.  
 Barbosa, A. [Identification key to European waders on the basis of cranial morphology] - *Ardeola* 2/91.

- Pulliainen, E. & Saari, L. Breeding biology of the Dotterel in Eastern Lapland - *Orn. Fenn.* 2/92.
- Gebauer, E. & Nadler, T. [Behaviour and voice of Lesser Sand Plover] - *Limicola* 3/92.
- OAG Münster & OAG Schleswig-Holstein [Numbers of Ruff on migration in Germany 1990] - *Vogelwelt* 3/92.
- Achtermann, S. [Identification of Lesser and Greater Yellowlegs] - *Limicola* 2/92.
- Blokpoel, H. *et al.* Population dynamics of Lari in relation to food resources (Proceedings of an international workshop) - special issue of *Ardea* 1/92.
- Mierauskas, P. & Greimas, E. Taxonomic status of yellow-legged Herring Gulls in the Eastern Baltic - *Dutch Birding* 3/92.
- Kilpi, M. *et al.* Change in clutch size in the Arctic Tern in the Northern Baltic - *Orn. Fenn.* 2/92.
- Skov, H. *et al.* [Distribution and numbers of Guillemots in the Skagerrak in late summer] - *Dansk Orn. For. Tidsskr.* 1-2/92.
- Lust, P. [Influx of Little Auks on coast of Flanders 1990-91] - *Mergus* 4/91.
- Pigeons to Woodpeckers:**
- Schulze-Hagen, K. [Parasitism and egg losses due to Cuckoo in Reed and Marsh Warblers in Central and Western Europe] - *Jour. für Orn.* 3/92.
- Michelat, D. & Giraudoux, P. [Nocturnal activity of Barn Owl and hunting strategy at nest site] - *Alauda* 1/92.
- Schaden, G. [Influence of early experience on choice of nest site by Barn Owl] - *Egretta* 1/92 (special edition devoted to owls and diurnal raptors)
- van Manen, W. [Selection of territory and nest site by Long-eared Owls] - *Limosa* 1/92.
- Hansson, L. Requirements of Great Spotted Woodpecker for a suburban life - *Orn. Svec.* 1/92.
- Virkkala, R. [Distribution of White-backed Woodpecker in Finland 1990-91] - *Lintumies* 3/92.
- Passerines:**
- Ullman, M. [The Shore Lark] - *Vår Fågelvärld* 3/92.
- Mild, K. [The Thrush Nightingale and Nightingale] - *Vår Fågelvärld* 4/92.
- Königstedt, D.G.W. *et al.* [Field identification of Isabelline Wheatear] - *Limicola* 1/92.
- Königstedt, D.G.W. & Robel, I.D. [The Isabelline Wheatear in the Balkans] - *Limicola* 1/92.
- Schulze-Hagen, K. *et al.* [Reed and Marsh Warblers in the same habitat: laying time, clutch size and breeding success] - *Vogelwelt* 2/92.
- Folvik, A. Norwegian records of Yellow-browed Warbler - *Cinclus* 2/92.
- Järvinen, A. Spatial pattern of nest-box occupancy by the Pied Flycatcher in mountain birch forest - *Orn. Fenn.* 1/92.
- Grimby, A. & Roer, J.E. [Colonisation of Norway by Lesser Redpoll 1962-91] - *Cinclus* 2/92.
- de Souza, J.A. [The Snow Bunting in the Iberian Peninsula] - *Ardeola* 2/91.
- Jukema, J. & Fokkema, J. [Origin of Snow Buntings wintering in the Netherlands] - *Limosa* 2/92.

Michael Murphy

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## Advice to Contributors

Authors should bear in mind that only a small proportion of the *Scottish Birds* readership is science-trained, and should aim to present their material concisely, interestingly and clearly. Unfamiliar technical terms and symbols should be avoided wherever possible and if deemed essential should be explained. Supporting statistics should be kept to a minimum. All papers and short notes are accepted on the understanding that they have not been offered for publication elsewhere and that they will be subject to editing. Papers will be acknowledged on receipt and will be reviewed by at least two members of the editorial panel, and in some cases also by an independent referee, before being accepted. They will normally be published in order of acceptance of fully revised manuscripts. The editors will be happy to advise authors on the preparation of papers.

Reference should be made to recent issues of *Scottish Birds* for guidance on style of presentation, use of capitals, form of references, etc. **Papers should be typed on one side of the paper only, double-spaced and with wide margins; two copies are required and the author should also retain one.** Headings should NOT be underlined, nor typed entirely in capitals. Scientific names in

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For details of writing Research Progress Reports, please contact the editor in advance.

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