

# Scottish Birds

Summer 1994

THE JOURNAL OF  
THE SCOTTISH  
ORNITHOLOGISTS'  
CLUB



Vol. 17 No. 3

ISSN 0036 9144

# Scottish Birds

## The Journal of the Scottish Ornithologists' Club

**Editor:** Anne-Marie Smout

**Assisted by:** Professor D. Jenkins, Dr J.B. Nelson and Professor P.J.B. Slater

**Business Editor:** The Secretary, SOC, 21 Regent Terrace, Edinburgh EH7 5BT  
(tel. 031-556 6042).

**Scottish Birds**, the official journal of the Scottish Ornithologists' Club, publishes original material relating to ornithology in Scotland. Papers and notes should be sent to The Editor, *Scottish Birds*, 21 Regent Terrace, Edinburgh EH7 5BT.

Two issues of *Scottish Birds* are published each year, in June and in December. *Scottish Birds* is issued free to members of the Scottish Ornithologists' Club, who also receive the quarterly newsletter *Scottish Bird News* and the annual *Scottish Bird Report*. These are available to non-members at a subscription rate (1992) of £30.

**The Scottish Ornithologists' Club** was formed in 1936 to encourage all aspects of ornithology in Scotland. It has local branches which meet in Aberdeen, Ayr, the Borders, Dumfries, Dundee, Edinburgh, Glasgow, Inverness, New Galloway, Orkney, St Andrews, Stirling, Stranraer and Thurso, each with its own programme of field meetings and winter lectures. The Waterston Library at the Club's headquarters at 21 Regent Terrace, Edinburgh EH7 5BT is the most comprehensive ornithological library in Scotland, and is available for reference during office hours (Monday to Friday, 9.00 - 17.00 hrs). (But please phone beforehand). A comprehensive stock of Scottish local bird reports is held at headquarters and may be purchased by mail order.

### SOC annual membership subscription rates

Adult.....	£15.00
Family (husband & wife, & children under 18).....	£22.50
Junior (under 18, or student under 25).....	£6.00
Pensioner/unwaged.....	£8.50
Pensioner family.....	£12.00
Life.....	£300.00
Life family.....	£450.00

All subscriptions may be paid by Banker's Order and Covenanted. Subscriptions paid this way will greatly assist the Club.

## Research Progress Report

I.J. PATTERSON & J.G. OLLASON

### *The density and species diversity of songbird populations in northern upland spruce plantations*

The Forestry Authority (FA) has a statutory duty to promote a reasonable balance between timber production and nature conservation. The FA financed the research described here because of its desire to diversify upland conifer forests as wildlife habitats, and to safeguard rare and sensitive species.

There have been several studies of bird populations in conifer forests in Britain, but most were based on small samples in restricted areas with few in the north. Most studies have also concentrated on first generation crops in extensive new afforestation. There was thus a need for study of second generation crops and of mosaics of different aged patches of forest as bird habitat because these were relatively neglected. There was also a need for study of winter bird populations, which may be important in determining subsequent breeding numbers and which may also have an important influence on the abundance of invertebrate pests of conifers.

The aim of this study was to measure the bird density and species diversity in upland spruce forests in relation to forest habitat variables, and to develop a computer model to predict how the bird populations were likely to change under different forest management regimes.

In each of two study areas, at Cowal, Argyll and Kielder, Northumberland, 88 study plots were selected randomly from 24 combinations of tree age (0-8, 9-15, 16-25 and over 25 years), plot size (1-2, 2.1-5 and over 5 ha) and altitude (above or below 250m). Both pure sitka spruce and mixed conifers were included, as were first and second rotation crops.

Point counts, at up to five per plot, were used to estimate bird populations, and in larger plots additional edge points allowed the comparison of plot centres and edges. At each point, a five-minute settling-down period was followed by a five-minute count period. Birds were detected by both sight and sound, up to a limit of 60m. Counts were made from 1990 - 1992 in winter (mid-November to mid-March), early spring (mid-April to mid-May) and late spring (mid-May to mid-June). Each plot was visited once in each period. The counting method was found to give consistent results both within and between days at the same count points.

There was strong and significant variation in bird numbers and diversity with tree age, both being highest in older trees in winter and in 9-25 year old trees in spring. All of the common species (Chaffinch *Fringilla coelebs*, Coal Tit *Parus ater*, Crossbill *Loxia curvirostra*,

Dunnock *Prunella modularis*, Goldcrest *Regulus regulus*, Meadow Pipit *Anthus pratensis*, Robin *Erithacus rubecula*, Redpoll *Acanthis flammea*, Siskin *Carduelis spinus*, Song Thrush *Turdus philomelos*, Tree Pipit *Anthus trivialis*, Wren *Troglodytes troglodytes* and Willow Warbler *Phylloscopus trochilus*) showed significant variation in their abundance between tree age categories, with all except Meadow Pipit occurring at their lowest density in the youngest trees and at their highest densities in 9-25 year old trees.

The number of individual birds detected was consistently higher at the edges than in the centres of the same plots, particularly in the first ten metres from the edge, but the type of habitat outside the plot had little effect on this. There was little detectable effect of plot size, altitude, admixture of other conifer species or planting generation on either bird numbers or species diversity.

Spring numbers of most of those common species, which were resident also in winter, were significantly correlated with their winter numbers, but the correlations were weak (particularly in 1992) and had little predictive value.

The two study areas and the two years were very similar in the way in which bird numbers and diversity varied with forest characteristics, suggesting that the conclusions may be of wide relevance. Bird numbers tended to be higher in 1991 than in 1992, due mainly to there being more Crossbills and Siskins in 1991, when there was a very high cone crop.

A computer model has been developed to predict how bird populations would be expected to change as such forests are managed to change the size and age distributions of the plots of trees.

The study clearly identified tree age and closeness to the forest edge as the two main factors affecting the number and diversity of songbirds in upland spruce plantations. This suggests that the greatest number and diversity of songbirds could be encouraged by creating mosaics of small patches (i.e. with a high ratio of edge habitat), with a mixture of tree ages, including a large proportion of 9-25 year old trees.

***I.J. Patterson and J.G. Ollason  
Zoology Department, University of  
Aberdeen.***

## Research Progress Report

R. MOSS

### *Research on Capercaillie and their habitat*

Capercaillie *Tetrao urogallus* are now scarce in Scotland. The number shot for sport in Scotland declined roughly fourfold in the late 1970s and fell still further in the 1980s (Baines, Goddard & Hudson 1991). Bag records are a fair reflection of the number of birds on the ground where shooting is done (Moss, Weir & Jones 1979) and so this was a reliable indication of a widespread decline. At one estate on Speyside, where birds were counted each year from 1975-85, densities fell from about 20 birds km<sup>2</sup> in winter 1979-80 to 8 km<sup>2</sup> in 1984-85 (Moss & Weir 1987). This was particularly worrying as the forests of Speyside are one of the Capercaillie's main Highland strongholds.

Concern about falling Capercaillie numbers has given rise to a big increase in the amount of research on them. This report summarises what is being done.

#### **Numbers and breeding success**

The present distribution of Capercaillie in Scotland is being mapped and numbers estimated in a three-year project, due to end in 1994. This is being conducted, financed or supported jointly by the Institute of Terrestrial Ecology, the Forestry Commission, the Game Conservancy, the Royal Society for the Protection of Birds, the Scottish Landowners Federation, Scottish Natural Heritage and the Scottish Office. The project is also comparing

the breeding performance of Capercaillie in a number of different forests, where factors such as forest type and the numbers of gamekeepers vary. The intention of this survey is to relate habitat and the level of predator control to the success of hens in rearing chicks.

Predator control is an emotive issue. Despite anecdotal evidence suggesting that active control of predators by gamekeepers is associated with better breeding performance by Capercaillie, better information is required before conservation bodies and landowners can reach rational conclusions on the topic. As well as participating in the above survey, the RSPB has begun an experimental programme at their Abernethy reserve to determine the importance of predation by different predators on Capercaillie populations, and the effects on these populations of predator control.

Throughout the study (1991-93), breeding has been poor so the outlook has not improved. I have been monitoring breeding performance and numbers since 1975 at one estate in Deeside, and there the last year of good breeding was 1989.

#### **Habitat and diet**

Capercaillie are usually thought of as birds of

old forest where they rely largely on pine needles for their winter diet. However, Rolstad & Wegge (1987) concluded that old forest seems favourable 'simply because it offers the necessary physical structure and key food elements' and not because it is old. A comparison of the winter diets of different populations of Capercaillie throughout their range in the western Palaearctic with the proportion of different native trees species in the habitat shows that they prefer eating pine (such as Scots or arolla pine) to fir (such as white fir), and fir to Norway spruce. However, they subsist on fir in the absence of pine, and spruce in the absence of fir and pine.

The inference that the structure of a forest is more important than its age or tree species composition has important implications. Young forests of, for example, sitka spruce might support Capercaillie if they are of the right structure, if sitka spruce is an adequate winter food, and if the forest floor supports enough blaeberry or other ground vegetation to provide the chicks with food and cover. Research by ITE, funded in part by the Forestry Commission, the Scottish Forestry Trust, Eagle Star and Horsens Folkeblad (a Danish company with forestry interests in Scotland) is looking at the question of whether plantation forests can be managed to support Capercaillie. Results so far confirm that Capercaillie do live in some sitka-dominated forests where in winter they eat sitka spruce as readily as Scots pine. Whether such forests can also provide good brood habitat is still an open question. Management guidelines for Capercaillie will be summarised in a Forestry Commission Bulletin, written by Robert Moss and Nick Picozzi, due to be published in 1994.

The concept of forest structure has hitherto been fairly vague and embodied in terms

such as pre-thicket, thicket, pole stage, high-canopy (mature) and semi-natural forest. These terms bring an image to the mind of somebody who has been shown examples on the ground, but are not quantitative. To assess the association between forest structure and Capercaillie numbers more rigorously, ITE developed a new measure of forest structure (Picozzi, Catt & Moss 1992). These authors confirmed an association between Capercaillie numbers and old forest, and suggested that this is largely because the open structure of such forests allows enough light to reach the ground to support heather and especially blaeberry, which is an important chick food. The RSPB are using this measure of forest structure in a detailed study of habitat preferences at their Abernethy reserve (R.W. Summers & R. Proctor, in progress).

Blaeberry leaves and berries are important chick foods, and blaeberry also supports many of the arthropods upon which the chicks feed in their first weeks. Most plantations which support good populations of Capercaillie also have much blaeberry. Work in Norway (Kastdalen & Wegge 1985) indicated that in their first month about half the food of chicks (by volume) comprised arthropods and about half vegetation. The vegetation in their study was mainly blaeberry leaves, and many of the arthropods caterpillars of geometrid moths such as the winter moth (they also eat spiders and harvestmen). The Game Conservancy is conducting extensive sampling of larval abundance in relation to such factors as longitude and the level of grazing by large herbivores, and the RSPB is measuring larval abundance in relation to Capercaillie breeding performance on the Abernethy reserve, as is ITE at one of their intensive study areas in Deeside.

There is, however, very little information on

what Scottish Capercaillie chicks actually eat. A particularly important question is whether other foods can substitute for blaeberry and geometrid larvae and, if so, what. ITE and the Forestry Commission began to study this topic in 1993. The answer will be relevant to future forest management. If alternative foods, such as low-growing willow and birch scrub, for example, can support chicks, then encouraging these plants might become a valuable management procedure.

### Fences

A radio-tracking study by ITE confirmed earlier work (Moss 1987) showing that collisions with forest fences are an important cause of Capercaillie mortality. Concerned about this, the RSPB began monitoring fence lines in Abernethy, verified that woodland grouse frequently hit fences (Catt *et al.* 1994), and then removed most of their deer fences. This work also suggested that fence strikes occurred more frequently along some stretches of fence than along others. The characteristics of such 'hot spots' are currently being investigated by continued co-operative work between the Forestry Commission, the Game Conservancy, ITE, RSPB and SNH. This has confirmed that deaths of grouse and Capercaillie from hitting fences are widespread as well as frequent in some places.

In one forest, such deaths continued even after the hot spots along a deer fence were marked with a broad band of brightly coloured plastic. It is possible that the strike rate was reduced by the plastic, but the data were not sufficient to test this possibility. In principle, steps should now be taken to do experimental work on how to reduce bird strikes by re-siting and marking fences. In practice, the scale upon which this work would need to be done may make a rigorous scientific study

expensive. Sensible measures meantime include removing fences as soon as they have served their purpose; identifying hot spots and re-siting fences along less dangerous lines; and, if re-siting is impracticable, marking hot spots to make them obvious to the birds.

### Scale

Capercaillie are big birds with large home ranges and can disperse long distances. In Scotland (Picozzi *et al.* 1992), as elsewhere (Wegge & Rolstad 1986), leks are spaced at approximately 2 km intervals in continuous forest, indicating that a lekking population of cocks occupies an area of 3-4 km<sup>2</sup>. But current radio-tracking studies by ITE with the Forestry Commission are showing that adult cocks may visit more than one lek and one hen visited at least five different leks in one spring. ITE with RSPB are studying natal dispersal in Capercaillie by means of radio-tracking. Samples so far are fairly small but 3 of 22 hens tagged as poults in Deeside have moved more than 20 km before settling. One hen tagged as a poult at Abernethy was later recovered near Braemar, presumably having flown over the Cairngorms.

All this means that forest management for Capercaillie needs to be strategically planned on a large scale, such as entire catchments, rather than on a local forest or estate level. A reasonable guess is that it would take a minimum of 1000 ha of good habitat (3-4 leks) to support a population of breeding Capercaillie. Good habitat need not be continuous but must provide for both adults and chicks.

### Population ecology

It may be presumed that chick production is

the key to Capercaillie numbers and that a reduction in breeding success is the root cause of the present low numbers. In turn, one may speculate that wetter summers, heavier predation and overgrazing of forest vegetation by deer have contributed to this decline. However, the evidence from two continuing long-term ITE population studies which started in 1975 is not obviously consistent with these suggestions.

At an estate in Deeside, there was a big decline in shooting bags between 1970 and 1974. Shooting ended in 1982 but counts in summer and autumn showed no long-term trend in density of hens between 1975 and 1993. For most of this period chick production generally exceeded the number needed to replace adult mortality and the population seemed to have been regulated by density-dependent dispersal of young birds (Moss & Oswald 1985). This meant that the more birds there were present, the bigger the proportion that left the area: so the density of breeding hens remained at about 5.5 km<sup>2</sup>. More recently, breeding has been poor but adult numbers have still not declined further.

Shooting bags at an estate in Speyside also declined in the early 1970s, and a further decline in numbers there in the early 1980s was associated with a decrease in the recruitment of young birds to the population. However, this failure of recruitment was apparently not due to an absolute shortage of young birds. Breeding remained good during the decline and the evidence suggests that there was net dispersal of young birds away from this Speyside population (Moss & Weir 1987), as at the Deeside estate.

The observations are consistent with a core/sink model in which the best 'core' habitats produce an excess of young which move to

the poorer 'sink' habitats where breeding is poor and mortality high. When conditions worsen in the sink habitats, density there may drop and more birds may disperse out of the core habitats into sink habitats, resulting in a decline in both core and sink habitats.

The model is speculative but implies an important danger. It is correct, the still wide distribution of the Capercaillie may give a false idea of its security as the entire Scottish population might depend upon a relatively small area of core habitat. If the core habitat is destroyed or allowed to deteriorate, then the birds in the sink habitats might go too. Thus, a sensible conservation strategy for Capercaillie would be to safeguard their core habitats - pinewoods with blaeberry - while improving the quality of sink habitats, such as other coniferous plantations.

### Acknowledgements

I thank I.P. Bainbridge, D. Baines, A. Hinde, G.P. Mudge, S.J. Petty, N. Picozzi and R.W. Summers for helpful comments.

### References

- Baines, D., Goddard, J. & Hudson, P.J. (1990). Capercaillie in Scotland. *Game Conservancy Annual Review of 1990*, pp. 153-156. The Game Conservancy, Fordingbridge.
- Catt, D.C., Dugan, D., Green, R.E., Moncrieff, R.W., Moss, R., Picozzi, N., Summers, R.W., & Tyler, G.A. (1994). Collisions against fences by woodland grouse in Scotland. *Forestry*, 00: 000-000.
- Kastdalen, L. & Wegge, P. (1985). Animal food in Capercaillie and Black Grouse chicks in south east Norway - a preliminary report. *Proc. int. Symp. Grouse 3*: 499-513.
- Moss R. (1987). Demography of Capercaillie



- Tetrao urogallus in north-east Scotland II. Age and sex distribution. *Ornis Scand.* 18: 135-140.
- Moss, R. & Oswald, J. (1985). Population dynamics of Capercaillie in a North-east Scottish glen. *Ornis Scand.* 16: 229-238.
- Moss, R & Weir, D.N. (1987). Demography of Capercaillie Tetrao urogallus in north-east Scotland III. Production and recruitment of young. *Ornis Scand.* 18: 141-145.
- Moss, R., Weir, D. & Jones, A.M. (1979). Capercaillie management in Scotland. *Proc. int. Symp. Grouse* 1: 140-155.
- Picozzi, N., Catt, D.C. & Moss, R. (1992). Evaluation of Capercaillie habitat. *J. appl Ecol.*, 29: 751-762.
- Rolstad, J. & Wegge, P. (1987). Capercaillie habitat: a critical assessment of the role of old forest. *Proc. int. Symp. Grouse* 4: 235-250.
- Wegge, P. & Rolstad, J. (1986). Size and spacing of Capercaillie leks in relation to social behaviour and habitat. *Behav. Ecol. Sociob.* 19: 401-408.

**Robert Moss, Institute of Terrestrial Ecology (N), Hill of Brathens, Banchory, Kincardineshire AB31 4BY.**

## Prey remains at Osprey nests in Tayside and Grampian, 1987-1993

D.N. Carss & K. Brockie

*Prey remains were collected from twenty Osprey nests in Tayside and three in Grampian during 1987-1993. All remains were from fishes and included scales, pieces of skin and fins, and cranial keybones. Methods were devised to identify these keybones to species and to determine the original sizes of prey. Overall, 104 prey records were collected, the most numerous being brown and rainbow trout (37%), followed by roach (21%), perch (18%), grayling (13%), pike (11%) and flounder (1%), but proportions varied throughout the study. The mean length of all measurable fishes (n = 113) was 34cm and the corresponding weight 480g, but mean size varied with species. We could find no previous record of grayling as Osprey prey anywhere, and roach has apparently not previously been recorded as prey of Ospreys in Scotland. The diet of Ospreys in Tayside and Grampian is discussed in relation to other studies, the Scottish fish fauna and current fishery practices.*

### Introduction

The decline and subsequent recovery of the Osprey *Pandion haliaetus* population in Scotland is well documented. The species ceased to breed about 1916 and although nesting attempts were recorded in the 1950s, breeding was not successful until 1954. Thereafter, the population increased gradually to 13 pairs in 1972, 25 pairs in 1981, 50 pairs in 1986 and 76 pairs in 1992; there were 86 breeding pairs in 1993 (Osprey Study Group pers. comm.). Despite this rapid recolonisation there has been relatively little published on diet in Scotland (Poole 1989). Throughout its range the Osprey is primarily piscivorous, taking a wide variety of fishes near the surface depending on their relative availability (Cramp & Simmons 1980). However, apart from an intensive study at a single nest site in Speyside (Green 1976) and observations of foraging

birds and their prey remains in an area of north-east Scotland (McLeod & Duncan 1984), little is published on the diet of the species elsewhere in Scotland.

Most Ospreys return to the same nest and forage in the same habitats for many consecutive years (Postupalsky 1989). Such nesting and foraging site fidelity could mean that samples of prey from the same few nests spanning several years are less representative of the general diet of a population than samples from a larger number of nests. This paper reports on the analysis of prey remains collected from 23 Osprey nests in Tayside and Grampian Regions of Scotland between 1987 and 1993.

**TABLE 1. Numbers of nest samples taken each year from 23 Osprey nest sites in Tayside and Grampian, 1987-93. Each asterisk indicates at least one visit between May-August in any one year.**

Region and site number	1987	1988	Year 1989	1990	1991	1992	1993
Tayside							
1	*			*	*		
2	*			*	*	*	
3	*			*			
4	*	*	*	*			
5	*	*	*	*		*	*
6	*	*		*	*	*	*
7		*					
8			*	*		*	*
9				*	*		
10				*	*		
11				*		*	*
12						*	
13		*					
14						*	
15						*	*
16						*	
17							*
18							*
19							*
20							*
Grampian							
21				*		*	*
22				*	*	*	*
23							*
Total no. samples	6	5	3	12	6	11	12

## Study area and methods

### Nest material

Twenty nests in Tayside and three in Grampian were visited during the study period (Table 1). These solitary nests were usually visited once or twice, but occasionally more often, during the breeding season (May-August) to record nest contents and to count and ring nestlings. During these visits a handful of material was scraped from the lining of the nest and any uneaten food in, and under, the nest was collected. In cases where more than one collection was made from the same nest in one season, samples were combined for analysis. Nest 'scrapes' were dried at room temperature for 24-48 hours and all prey remains extracted for examination.

### Prey identification and measurement

Prey remains were analysed in two ways: (1) the presence of all identifiable material (skin, fins, scales and bones) was recorded and identified using keys (Maitland 1972, Steinmetz & Muller 1992) and a reference collection, and (2) 'keybones', which could be assigned to individual fish, were counted, identified and measured (Fig. 1). These included salmonid first (atlas) vertebrae and cleithra (paired bones on either side of the head supporting the gill arches), lower jaws (pike *Esox lucius*, perch *Perca fluviatilis*, and salmonids), opercular and preopercular bones (perch and roach *Rutilus rutilus*). These bones were also used to determine the original sizes of fishes using a series of regression equations derived from intact specimens (see Table 3). Flounder *Platichthys flesus* was

**TABLE 2. Length:weight relationships for five fish species, Wt = wet weight (g), L = fork length (cm).**

Species	Relationship	Source
Perch	$Wt = 0.0135 L^{3.0}$	Craig (1974)
Pike	$Wt = 0.005248 L^{3.09}$	Frost & Kipling (1967)
Roach	$Wt = 0.009303 L^{3.1513}$	Mills (1969)
Brown trout	$Wt = 0.0195 L^{2.822}$	Clelland (1979)
Rainbow trout	$Wt = 0.0101 L^{3.05}$	Carss (1993b)
Flounder	$Wt = 0.01481 L^{2.925}$	Summers (1979)

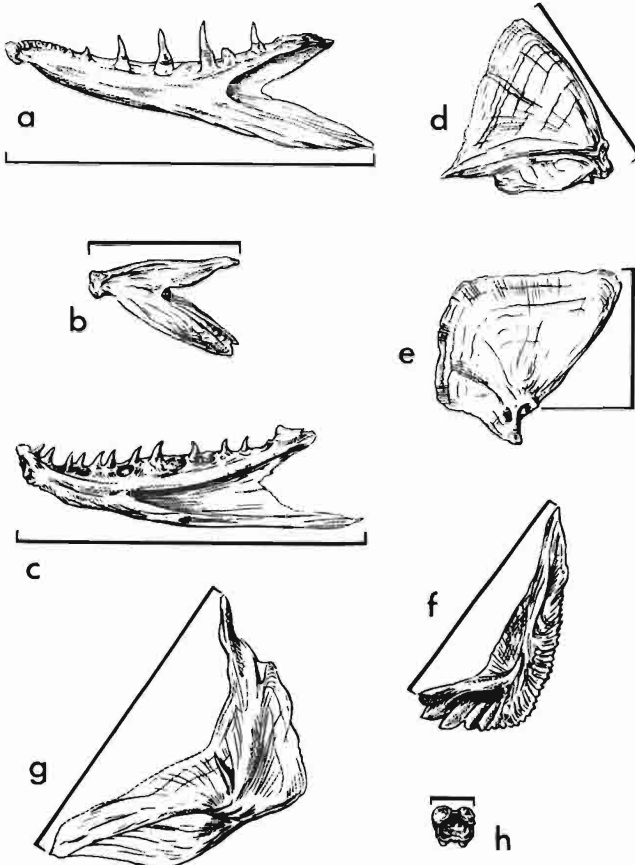
identified from a single bone and the original fish size estimated from a reference collection.

Intact fish were collected and measured from the snout to the fork of the tail (fork length, mm) and their heads were removed and digested in a saturated solution of biological washing powder for 4-5 days. The resulting bones were rinsed and dried and the various

keybones extracted and measured (mm) (Fig. 1). These measurements were regressed against original fork lengths to produce a series of conversion equations. In the case of roach opercular bones, a published equation (Mann 1973) was used. The original size of broken bones was estimated by comparison with reference material. Prey lengths were converted to weights by a series of regression equations (Table 2).

Figure 1. Keybones and the position of the measurements used to determine the original length of fishes. Lower jaws: pike (a), perch (b), salmonid (c); opercular bones: perch (d), roach (e); perch preoperculum (f), salmonid cleithrum (g) and atlas vertebra (h).

FIGURE 1



**TABLE 3. Regression equations for various pike, perch, brown and rainbow trout keybone measurements (mm) against fork length (FL, cm).**

Keybone	N	Range (cm)	$r^2$	Relationship
Pike lower jaw	31	11-53	0.99	Log FL = -0.192 + 1.01 Log J
Perch lower jaw	17	9-36	0.99	Log FL = 0.0684 + 1.01 Log J
Perch preoperculum	17	9-36	0.97	Log FL = 0.0014 + 0.955 Log P
Perch operculum	17	9-36	0.98	Log FL = 0.207 + 0.873 Log Op
Salmonid lower jaw	103	10-56	0.97	Log FL = 0.0664 + 0.982 Log J
Salmonid atlas	100	10-56	0.98	Log FL = 0.761 + 1.08 Log At
Brown trout cleithra	60	10-56	0.98	Log FL = -0.0475 + 1.04 Log Cl
Rainbow trout cleithra	40	10-55	0.94	Fog FL = 0.0298 + 0.96 Log Cl

### Distinguishing salmonids and estimating the accuracy of diagnostic features

Pike, perch, roach and salmonid keybones were very different from one another but brown trout *Salmo trutta* and rainbow trout *Oncorhynchus mykiss* could not be distinguished easily. Thus a method was devised to separate these species by closer examination of their keybones. This was later tested by one experienced and two inexperienced observers examining a mixed sample of brown and rainbow trout lower jaws, cleithra and atlas vertebrae (n = 40 of each).

### Results

#### Distinguishing brown and rainbow trout and estimating the accuracy of their identification

Brown and rainbow trout atlas vertebrae, cleithra and lower jaws could each be distinguished using only a small number of characteristics:

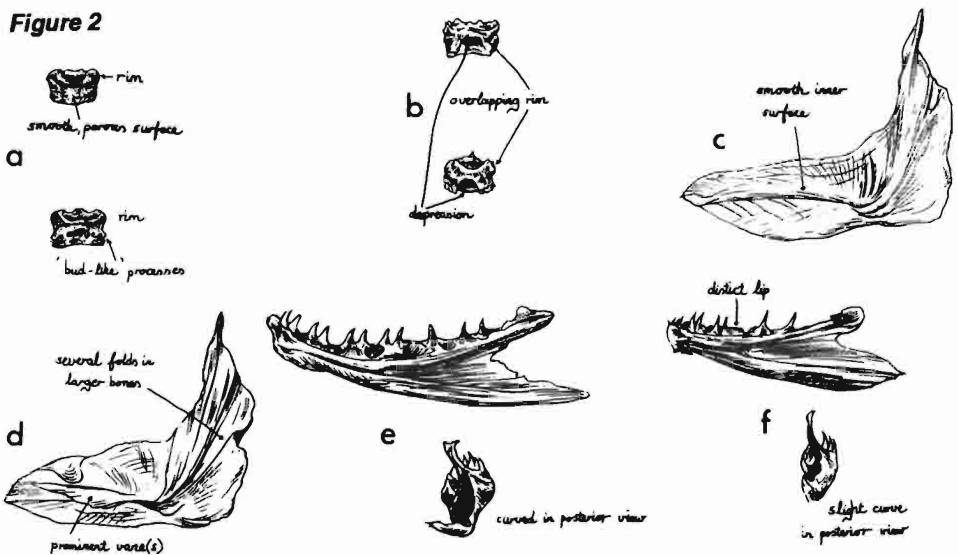
(a) The dorsal surface of the brown trout atlas appears separated from the anterior surface by a distinct rim. It is porous and relatively smooth, sometimes having a pair of small 'bud-like' processes emerging from it. These processes are not connected to the rim of the vertebra (Fig. 2a). The dorsal surface of the rainbow trout atlas is often grossly overlapped by the rim separating it from the anterior surface. Large, smooth processes originate from this rim and often extend posteriorly beyond the body of the atlas. Below this the dorsal surface is smooth, usually leading to a deep depression between, and below, the processes (Fig. 2b).

(b) The inner surface of the brown trout cleithrum is relatively smooth (Fig. 2c) whilst that of rainbow trout has one, and occasionally two, prominent antero-posterior vanes whilst the posterior portion of bones from larger fish also have several folds (Fig. 2d).

(c) Viewed from the inner side, brown trout lower jaws appear relatively deep compared to the length of the narrow surface from which the teeth emerge. There is also no 'lip' of bone on the outer edge of the teeth. Viewed posteriorly the jaw is sharply curved, its lower plane is almost perpendicular to the tooth-bearing axis (Fig. 2e). Viewed from the inner side, rainbow trout lower jaws appear relatively shallow compared to the length occupied by the teeth. The teeth emerge from a broad surface and there is a distinct 'lip' of bone on their outer edge which is clearly visible between them. Viewed posteriorly, the jaw is only slightly curved (Fig. 2f). The shape, number and exact position of the teeth, and holes marking the position of broken teeth, varied greatly between individuals and no consistent patterns were observed within, or between, species.

Figure 2. Characteristic features used to distinguish brown and rainbow trout keybones: dorsal surfaces of the two types of brown (a) and rainbow trout (b) atlas vertebrae; inner surfaces of brown (c) and rainbow trout (d) cleithra; lower jaws of brown (e) and rainbow trout (f) with posterior profiles.

**Figure 2**



These characters could be used to distinguish brown and rainbow trout in 83% (atlas), 95% (cleithrum) and 93% (lower jaw) of cases by an experienced observer. Corresponding figures for two inexperienced observers were 80%, 92%, 78% and 70%, 92%, 88%, respectively, with observers consistently making more correct identifications based on cleithra than the other two keybones.

### Keybone regression equations

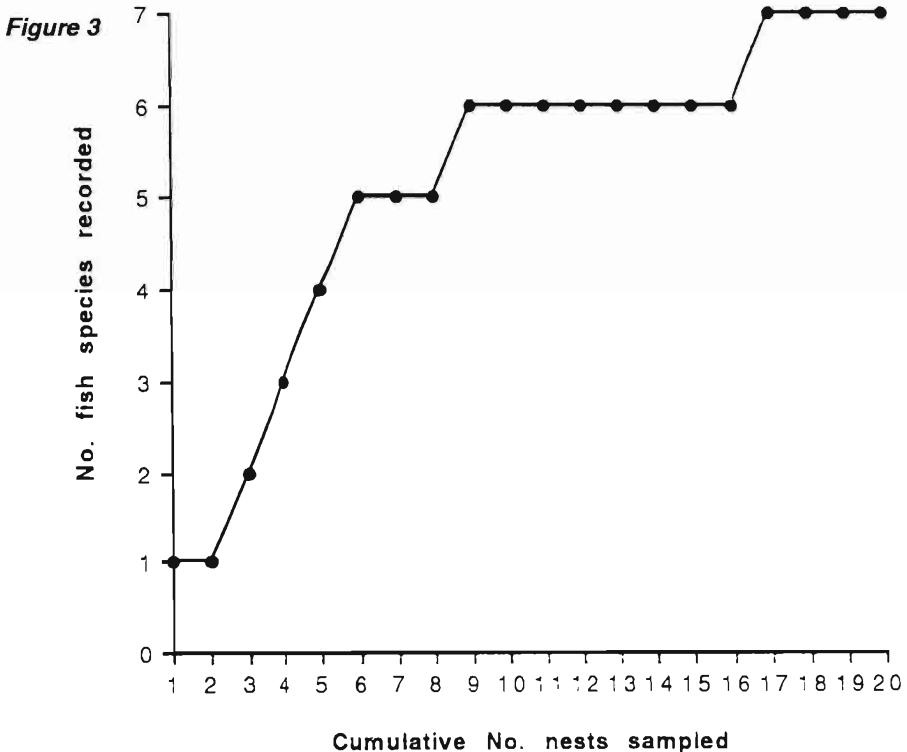
The relationships of keybone measurements to original fish length were linear, those for the lower jaws and atlas vertebrae of brown and rainbow trout ('salmonid') could each be described by a single equation (Table 3).

### Species and sizes of fish from Osprey nests

Seven fish species, roach, perch, pike, grayling *Thymallus thymallus*, brown trout, rainbow trout, and flounder were identified from nest samples (Table 4). The three Grampian nests yielded remains of brown trout, rainbow trout, pike and perch. Site and seasonal variation in prey remains were investigated in the Tayside samples.

For Tayside, cumulative records showed that six of the seven fish species were recorded after nine of the 20 sites had been sampled, the single flounder being recorded in 1993 after 17 nests had been sampled (Fig. 3).

Figure 3. The cumulative number of nest sites sampled during the study and the number of fish species recorded.





**TABLE 4. The fish species recorded at each nest site during the study period. Numbers refer to specific nests, as given in Table 1.**

Prey	Year						
	1987	1988	1989	1990	1991	1992	1993
Roach	1,2,3,4,5	4,5	4,5,8	1,3,4,5,8 9,10,11	1,12	16	11
Perch	4,5,6	None	4,5	2,9,10	2,6	2,8,14 15,21	8,15,17,18 21
Pike	5	7	5	6,21	18	5,8,15,21	15,18,20,21
Salmonids	3,4,6	4,6,13	4,5,8	1,4,5,6,8 9,10,11 22	2,6,12 22	2,6,8,11 12,14,15 16,21,22	5,6,8,11 15,17,18 20,22,23
Grayling	None	None	4	8,11	2,9	2,5,11,12	5,11,19,20
Flounder	None	None	None	None	None	None	20
No. records	12	6	10	24	11	24	25
No. sites	6	5	3	12	6	11	12

Overall, 104 prey records were collected; the most numerous were salmonids (37%), followed by roach (21%), perch (18%), grayling (13%), pike (11%) and flounder (1%). Proportions of salmonid, roach and 'other fishes' remains were similar in 1987-89 and 1990-93, but within the 'other fishes' category, proportions of grayling increased throughout the study (Table 5).

Most (69.8%) of the salmonids identified from keybones ( $n=63$ ) were brown trout, the remainder (30.2%) being rainbow trout. Proportions of rainbow trout varied annually and in years when at least ten measurable salmonids were recorded, proportions were 40.0% (1987,  $n=10$  salmonids), 71.4% (1990,  $n=14$ ) and 7.4% (1992,  $n=27$ ).

The mean length of all measurable fishes ( $n=113$ ) was 34cm and the corresponding weight was 475g. However, mean sizes varied with species (Table 6). Ignoring the single flounder (ca. 27cm, 288g), there were significant differences in mean fish lengths ( $F_{4,107}=13.92$ ,  $P<0.001$ ) with the 'long-bodied' fishes, salmonids and pike, being significantly longer (mean = 36cm, SE = 0.8) than the 'deep-bodied' fishes perch and roach (mean = 26cm, SE = 1.0) ( $t=6.64$ ,  $df=110$ ,  $P<0.001$ ). Mean fish weights were also significantly different ( $F_{4,107}=8.42$ ,  $P<0.001$ ) with the salmonids being significantly heavier (mean = 630g, SE = 47.3) than the other fishes (mean = 301g, SE = 27.9) ( $t=5.62$ ,  $df=110$ ,  $P<0.001$ ).

## Discussion

### Methodology

Assessments of Osprey diet have been obtained by several methods, for example collecting uneaten remains from nests and feeding perches (e.g. Hakkinen 1978), observing foraging birds (e.g. Edwards 1988), and recording fish delivered to the nest (eg. Jamieson *et al.* 1982, Mclean & Byrd 1991). The latter method has the disadvantage that it is labour intensive and may often be restricted to a small number of nests. Moreover, as with observations of foraging birds, identifications are likely to be biased in favour of distinctively shaped or coloured fishes and, as a result, considerable proportions of prey may be unidentified. For example, 68% of all Bald Eagle *Haliaeetus leucocephalus* open-water captures could not be identified by Mersmann *et al.* (1992).

The remains of prey taken extremely rarely may not be found. We have for instance a reliable field record of an Osprey carrying an eel *Anguilla anguilla* to a nest in Tayside but found no remains of this species in over 45 samples. Prey remains could be lost to scavengers such as foxes *Vulpes vulpes*, Crows *Corvus corone* and Magpies *Pica pica*, but this would result in bias (i.e. an incorrect representation of the true proportions) only if they removed an unrepresentative sample of items. Two types of bias can occur: (1) in species, because fishes whose scales are relatively large and easily lost during manipulation, or large bony species, may be over-represented in samples and (2) in size, because small scales and pieces of fish skin may decompose faster than larger diagnostic bones, particularly over time. This is particularly relevant if samples are collected infrequently.

**TABLE 5.** *Top: the number of records of roach, salmonids and 'other fishes', these were similar in 1989 and 1990-93 ( $\chi^2 = 4.39$ ,  $df = 2$ , NS). Bottom: the number of nests where Grayling were either present or absent in each year. There was a significant increase in grayling records throughout the study period (Snedecor & Cochran's test for a linear trend in proportions,  $z = 2.54$ ,  $P = 0.011$ ).*

Prey recorded	Year						
	1987	1988	1989	1990	1991	1992	1993
Roach	5	2	3	8	2	1	1
Salmonids	3	3	3	8	3	8	8
'Other fishes'	4	1	4	6	4	11	12
Total no. records	12	6	10	22	9	20	21
Grayling absent	6	5	2	8	3	5	5
Grayling present	0	0	1	2	2	4	4
Total no. nests	6	5	3	10	5	9	9

In the present study of prey remains, there was thus probably some bias but the method had the advantage that it required little effort per nest and so several nests could be sampled each season. Nevertheless sample sizes were rather small: only nine out of 23 nests were visited in more than three years and only two visited in six years. Fourteen (more than half of the nests) were visited only in one or two years and possibly only once. Furthermore, as few remains (bones and skin) were collected at each visit, it was not possible to determine such things as the variation in diet at particular nests or the quality of the fish delivered. However, despite the potential for bias it was thought data were sufficient to determine diet and size of prey in general terms.

### General diet

Ospreys are presumed to feed on the most abundant and available fish species in any particular area (Poole 1989) and data from the present study were not inconsistent with this view. Seven fish species were recorded but it was not possible to infer the foraging habitat of Ospreys as all the fishes taken are known to inhabit both running and standing freshwaters (Maitland & Campbell 1992). However, the species recorded were as expected from the status and distribution of Scottish freshwater fishes.

The Scottish freshwater fish fauna is impoverished compared with that of continental Europe (Maitland & Campbell 1992) and is dominated by the salmonids. These are northern hemisphere fishes, well-adapted to cold waters (Wheeler 1978) and include the indigenous Atlantic salmon *S. salar* and brown trout and the rainbow trout introduced from North America. The two trout

species formed the largest proportion of measurable remains collected (54.9%), of which over two-thirds were brown trout. The remains of the four largest salmonids appeared from skin colouration and keybone features to be those of brown trout but it was possible that they came from the closely-related salmon. Returning adult salmon, which may be as small as 50cm (D. Hay, SOAFD, pers. comm.), enter freshwater throughout the year although spawning does not take place until the autumn. Furthermore, there are two lochs in Tayside which are stocked with a few hundred salmon (1.4-2.7kg) each year for angling purposes. Ospreys have been seen scavenging moribund salmon here on at least one occasion (C. Langton pers. comm.).

The cyprinid family is the largest group of freshwater fishes in Europe (Wheeler 1978) and in continental Europe Osprey diet includes at least 11 species (Cramp & Simmons 1980). Furthermore, species such as bream *Abramis brama*, silver bream *Blicca bjoerkna*, and roach often comprise the largest single dietary component. However, cyprinids are scarce in Scotland, particularly north of the Forth-Clyde Canal (Mills 1969, Maitland 1972). Apart from the minnow *Phoxinus phoxinus* roach is the most widely distributed cyprinid in Scotland and it was the only one recorded in the present study. Cyprinids have not been recorded previously in studies of Osprey diet in Scotland (Green 1976, McLeod & Duncan 1984), presumably because of their relative scarcity and patchy distribution.

Piscivorous fishes are thought to be swifter and harder to capture than entic-feeding or non piscivorous limnetic fishes (Swenson 1979), and are relatively scarce in Osprey dietary studies. For example perch and pike have been found to comprise no more than

16% and 37%, respectively, of the prey items examined in European studies (Cramp & Simmons 1980). Similarly, corresponding

figures for the present study were low (18% and 11%, respectively).

**TABLE 6. Length and weight details of fishes caught by Ospreys.**

Prey	N	Length (cm)			Weight (g)		
		Mean	SE	Range	Mean	SE	Range
Perch	16	25	0.9	18-30	213	22.0	79-365
Pike	25	33	1.2	24-44	326	40.4	110-966
Roach	9	28	2.3	18-38	388	91.4	84-885
Brown trout	44	38	1.3	23-60	636	59.1	136-2032
Rainbow trout	18	36	1.4	29-48	614	78.1	262-1355
Salmonids, pike	87	36	0.8	23-60	-	-	-
Perch, roach	25	26	1.0	18-38	-	-	-
Salmonids	6	-	-	-	630	473	136-2032
Perch, roach, pike	50	-	-	-	301	27.9	79-996
All fishes	113	34	0.8	18-60	481	32.6	79-2032

We could find no previous record of grayling in the diet of European Ospreys (Cramp & Simmons 1980, McLeod & Duncan 1984, Eriksson 1986). The Grayling was introduced to Scotland in the nineteenth century and has a limited distribution. North of the Forth-Clyde Canal, the only Grayling populations are currently in the River Tay system: the rivers Tummel, Isla and Earn and at least two Tayside lochs (Gardiner 1992). The increase in grayling occurrences in remains could be a reflection of the increase in Osprey numbers, and their spread throughout Tayside, with birds visiting more of the available freshwaters and possibly foraging more on rivers than previously. An alternative, but not mutually exclusive, explanation is that grayling abundance has increased in recent years. There is known to be year to year variation in grayling numbers leading to dominant year classes, and catches on the R. Tummel have allegedly increased over the 1970s and 1980s (R. Gardiner pers. comm.). As there have been no further fish introductions there in recent years, the overall distribution of grayling in the area is unlikely to have changed (R. Gardiner SOAFD pers. comm.).

### Size of prey

The perch and roach recorded in the present study were smaller than the other fishes but all the fishes taken were similar in size and weight to those reported for the same species in other studies (Cramp & Simmons 1980, Poole 1989). The two salmonids had different length distributions, possibly associated with the size structure of their populations in the wild. Brown trout exhibited a natural, multi-modal frequency distribution which was positively skewed towards larger (>40cm) fish but also included smaller (<30cm) individuals. The rainbow trout length

distribution, although positively skewed, lacked any of these smaller fish and was typical of stocked fish populations. Most rainbow trout sport fisheries are maintained by regular introductions of hatchery-reared fish which are grown-on before release, until large enough to be caught by anglers. Most of these fish are about 35cm on release and only a few are less than 30cm long. This was certainly the case at one fishery known to be visited by Osprey from at least four of the nests in the present study. The largest fish recorded, a 60cm/2032g brown trout, was possibly scavenged as carrion, a rare, but not unrecorded, phenomenon (Dunstan 1974).

Although piscivorous fish are relatively scarce prey items for Ospreys, pike and perch do dominate the diet of birds in one area of north-east Scotland where there are few, if any, trout (McLeod & Duncan 1984, Carss 1993a). Here, perch ( $n = 173$ ) and pike ( $n = 239$ ) of between 13-41cm and 18-48cm, respectively, have been recorded taken by Ospreys (Carss 1993a). These size ranges are strikingly similar to those taken by Ospreys in Tayside in the present study (18-30cm and 22-44cm, respectively) which were obviously taken by birds foraging in a number of different sites.

### The future

As Ospreys increase in Scotland, they may come into conflict with man. As present the species is recorded visiting a few pond trout farms each year but such predation can be prevented by placing nets over small ponds (NCC 1990). However, in 1993 there were several reports of birds feeding regularly at small lochs stocked with rainbow trout and in such circumstances the birds may be competing directly with anglers for fish (Carss & Marquiss 1992). As a result, in one area, the RSPB, SNH and other conservation bodies

were approached by a fisheries manager requesting financial compensation for losses to Ospreys (I. Francis pers. comm.). As conflicts are extremely difficult to resolve, and compensation payments are highly unlikely, it seems inevitable that such complaints will increase. Protecting the relatively large areas of water involved is impractical, whilst the birds themselves receive legal protection. In some cases, predation of stocked trout could possibly be reduced by altering the timing of stocking to allowing introduced fish time to acclimatise before Ospreys arrive or by increasing cover by providing floating islands and encouraging bankside vegetation (R. Dennis pers. comm.).

So far, breeding Ospreys have been carefully guarded in Scotland and this has discouraged intensive research (Poole 1989) because of the risk to a small and vulnerable population. However the continued increase in Osprey numbers means that the small risks involved become increasingly acceptable, enabling the species to be studied in greater detail. Such studies could include further work on diet, foraging energetics in different habitats (e.g. natural and stocked lochs, seashores and estuaries, and associated river systems), and post-fledging dispersal.

### Acknowledgements

We would like to thank the appropriate landowners for access to nest sites throughout the study. Apart from KB, Steve Cooper, Keith Duncan, Stuart Rae and Bradly Yule also collected nest samples. Peter Maitland, Alan Youngson, Willie Wilson and Peter Cubby kindly provided us with some of the reference fish specimens and Gavin Alexander and Mick Marquiss acted as inexperienced

observers whilst distinguishing salmonid keybones. Ross Gardiner and Chris Langton provided information on fish distribution and abundance in Tayside. Mick Marquiss, Ian Newton and Roy Dennis commented on an earlier draft of the manuscript.

### References

- Carss, D.N. 1993a. Osprey predation on a simple fish community. *Institute of Terrestrial Ecology Annual Report*, 1992-93; 76-78.
- Carss, D.N. 1993b. Grey Heron, *Ardea cinerea* L., predation at cage fish farms in Argyll western Scotland. *Aquaculture and Fisheries Management* 24: 29-45.
- Carss, D.N. & Marquiss, M. 1992. Avian predation at farmed and natural fisheries. *Proc. 22 Inst. Fish. Mgmt. Ann. Study Course*: 179-196, Institute of Fisheries Management.
- Clelland, B.E. 1979. A trout population survey of the major tributaries in August 1979. *Loch Leven Research Group Report* 1978-79.
- Craig, J.F. 1974. Population dynamics of Perch, *Perca fluviatilis* L., in Slapton Ley, Devon. *Freshwat. Biol.* 4: 417-431.
- Cramp, S. & Simmons, K.E.L. (Eds) 1980. *The Birds of the Western Palearctic*; 265-277, Oxford.
- Dunstan, T.C. 1974. Feeding activities of Ospreys in Minnesota. *Wilson Bulletin* 86: 74-76.
- Edwards, T.C. 1988. Temporal variation of prey preference patterns of adult Ospreys. *Auk* 105: 244-251.
- Eriksson, M.O.G. 1986. Fish delivery, production of young, and nest density of Osprey (*Pandion haeliatus*) in southwest Sweden. *Can. J. Zool.* 64: 1961-1965.
- Frost, W.E. & Kipling, C. 1967. A study of reproduction, early life, weight-length relationship and growth of pike, *Esox lucius* L., in Windermere. *J. Anim. Ecol.* 36: 651-693.

- Gardiner, R. 1992. Scottish Grayling: history and biology of populations. *Proc. 22 Inst. Fish Mgmt. Ann Study Course*: 171-178, Institute of Fisheries Management.
- Green, R. 1976. Breeding behaviour of the Osprey *Pandion haeliatus* in Scotland. *Ibis* 118: 475-490.
- Hakkinen, I. 1978. Diet of Ospreys in Finland. *Ornis Scand.* 9: 111-116.
- Jamieson, I., Seymour, N.R. & Bancroft, R.P. 1982. Use of two habitats related to changes in prey availability in a population of Ospreys in northeastern Nova Scotia. *Wilson Bulletin* 94: 557-564.
- Maitland, P.S. 1972. A key to the freshwater fishes of the British Isles. *Sci. Publ. Freshwat. Biol. Ass.* 27: 1-137.
- Maitland, P.S. & Campbell, R.N. 1993. *Freshwater Fishes*. Collins New Naturalist Series, Harper Collins, London, pp368.
- Mann, R.H.K. 1973. Observations on the age, growth, reproduction and food of the Roach *Rutilus rutilus* (L.) in two rivers in southern England. *J. Fish. Biol.* 6: 237-253.
- Mersmann, T.J., Buehler, D.A., Fraser, J.D. and Seegar, J.K.D. 1992. Assessing bias in studies of Bald Eagle food habits. *J. Wildl. Mgmt.* 56(1): 73-78.
- Mills, D.H. 1969. The growth and population densities of Roach in some Scottish waters. *Proc. Brit. Coarse Fish Conf.* 4: 50-57.
- McLean, P.K. & Byrd, M.A. 1991. The diet of Chesapeake Bay Ospreys and their impact on a local fishery. *J. Raptor Res.* 25 (4): 109-112.
- McLeod, I.C. & Duncan, K. 1984. Prey of the Osprey (*Pandion haeliatus*) in north-east Scotland. *Grampian Ringing Group Report* 4: 12-20.
- NCC. 1990. *Fish farming and the Scottish Freshwater Environment*. NCC, Edinburgh.
- Poole, A.F. 1989. *Ospreys: a Natural and Unnatural History*. Cambridge University Press, Cambridge.
- Postupalsky, S. 1989. Ospreys. In Newton, I. (ed) *Lifetime reproduction in Birds*. Academic Press, London.
- Steinmetz, B. & Muller, R. 1992. *An Atlas of Fish Scales and Other Bony Structures Used For Age Determination*. Samara, Cardigan.
- Summers, R.W. 1979. The Ecology of the Flounder. Unpublished PhD thesis, University of Aberdeen.
- Swenson, J.E. 1979. The relationship between prey species and ecology and dive success in Ospreys. *Auk* 96: 408-413.
- Wheeler, A. 1978. *Key to the Fishes of Northern Europe*. Warne, London.

**D.N. Carss, Institute of Terrestrial Ecology, Hill of Brathens,  
Glassel, Banchory, Kincardineshire, AB31 4BY.  
K. Brockie, Iolaire, Dron Farm, by Invergowrie, Dundee, DD2 5LH.**

*(Revised typescript received 3 March 1994)*

## Scottish List

Several attempts have been made in the past by various people to produce a list of Scottish Birds, but none of these lists have been updated on a regular basis. It became obvious to many people that a need existed for a formal Scottish List and that an organisation (not an individual) was required to take responsibility for such a list.

At its annual meeting held in November 1991 the Scottish Birds Records Committee (a sub-committee of the SOCs Council) agreed to commence work on the preparation of a draft for such a list. Ken Shaw volunteered to prepare an initial draft which was circulated around all SBRC members for comment, following which a second draft was prepared and further amendments made. A third draft was then circulated around all Local Recorders for their comments during the first few months of 1993.

At an SOC Council meeting in July 1993, it was agreed to adopt a fourth draft as forming the basis of an official SOC produced Scottish List and the Club accepted responsibility for its continued maintenance. It was further agreed to delegate to SBRC responsibility for maintaining the list and publishing regular amendments. This list which has been further updated is now published for the first time. It is the intention of SBRC to publish amendments on a regular basis and from time to time to publish revised versions of the list.

Each species has been categorised, depending on the criteria for its admission to the Scottish List and the category (A, B or C) appears before the English name. Species in category D do not form part of the main list and are listed separately at the end. The categories are defined as follows:

**Category A.** Species which have been recorded in an apparently wild state in Scotland at least once since 1958.

**Category B.** Species which were recorded in an apparently wild state in Scotland at least once up to 31 December 1957, but have not been recorded subsequently.

**Category C.** Species which, although originally introduced by man, have now established a regular feral breeding stock which apparently maintains itself without necessary recourse to further introduction.

**Category D.** Species which would otherwise appear in Category A or B except that :

(D1) there is a reasonable doubt that they have ever occurred in a wild state, or

(D2) they have certainly arrived with a combination of ship or human assistance, including provision of food and shelter, or

(D3) they have only ever been found dead, or

(D4) species that would otherwise appear in category C except that the feral population may or may not be self-supporting.



We have used several principles in establishing the list:-

1. We have used identical categories (A,B,C and D) to the British Ornithologists' Union who are responsible for maintaining the official list of birds recorded in Britain and Ireland.

2. We have in no instance given a bird on our list a higher category than the BOU (e.g. if a species appears in Category B on their list it cannot appear as Category A on our list) and have not included any species which do not appear on the British List.

3. We have used the same systematics as the BOU (e.g. we have not given species status to Yellow-legged Gull as the BOU have not yet done so).

4. We have only accepted a species in Category A if either :-

i) It appears on the British Birds Rarities List and the British Birds Rarities Committee have accepted at least one Scottish Record (they were formed in 1958 and the BOU have therefore for that reason decided that a bird must have occurred in Britain or Ireland since 1 January 1958 to be in Category A of their list).

ii) It does not appear on the British Birds Rarities List and we are satisfied that it has occurred in a wild state in Scotland since 1958.

A few species are assigned more than one category. With the exception of Capercaillie, these are all either dual A and C or dual A and D4 to reflect the situation where records of

genuinely wild birds are supplemented by birds from stock originally introduced by man. In the case of Capercaillie (dual B and C) a natural population became extinct in the 18th century, with the present feral population being introduced during the 19th century.

The choice of English bird names used in the list should in no way be taken as reflecting a particular view. The SOC do not wish at this stage to become involved in the present debate on English names and have decided to continue with existing names at least for the time being. We have therefore on the whole stuck to conventional English bird names.

All species appearing on the main British and Irish List (i.e. Categories A, B and C) which have not been admitted to the Scottish List (Categories A, B and C), appear on the BBRC List and would therefore require to be accepted by them prior to being admitted to the Scottish List, with the exception of Egyptian Goose, Lady Amherst's Pheasant and Rose-ringed Parakeet.

The Scottish List stands at 469 species (there are now 550 species on the British and Irish List). The 12 species which are in category D only, do not form part of the main List.

Category A	450
Category B	13
Category C	6

	469
Category D	12
	481

The list will require regular revision and at any one time there is likely to be more than one record held pending which if accepted would affect the list. Among other decisions awaited at present are those by the BOU which could add Brown Flycatcher to the Scottish List and change the category for Pallid Harrier.

The Scottish Birds Records Committee which is responsible for maintaining the Scottish List, now consists of Bernard Zonfrillo (Chairman), Pete Gordon, Angus Hogg, Ken Shaw, Eric Meek, Kevin Osborn and Ron Forrester (Secretary).

Ken Shaw was responsible for a large part of the work associated with producing this list and the Committee wish to thank all those who commented on the early drafts. Bernie Zonfrillo has commenced work on the production of a list of all sub-species recorded in Scotland, which when complete, is expected to supplement this present list.

**Ronald W. Forrester**  
**Secretary**  
**Scottish Birds Records Committee.**

## Systematic List

A	Red-throated Diver	<i>Gavia stellata</i>
A	Black-throated Diver	<i>Gavia arctica</i>
A	Great Northern Diver	<i>Gavia immer</i>
A	White-billed Diver	<i>Gavia adamsii</i>
A	Pied-billed Grebe	<i>Podilymbus podiceps</i>
A	Little Grebe	<i>Tachybaptus ruficollis</i>
A	Great Crested Grebe	<i>Podiceps cristatus</i>
A	Red-necked Grebe	<i>Podiceps grisegena</i>
A	Slavonian Grebe	<i>Podiceps auritus</i>
A	Black-necked Grebe	<i>Podiceps nigricollis</i>
A	Black-browed Albatross	<i>Diomedea melanophris</i>
A	Fulmar	<i>Fulmarus glacialis</i>
A	Cory's Shearwater	<i>Calonectris diomedea</i>
A	Great Shearwater	<i>Puffinus gravis</i>
A	Sooty Shearwater	<i>Puffinus griseus</i>
A	Manx Shearwater	<i>Puffinus puffinus</i>
A	Mediterranean Shearwater	<i>Puffinus yelkouan</i>
A	Little Shearwater	<i>Puffinus assimilis</i>
A	Wilson's Petrel	<i>Oceanites oceanicus</i>
B	White-faced (Frigate) Petrel	<i>Pelagodroma marina</i>
A	Storm Petrel	<i>Hydrobates pelagicus</i>
A	Leach's Petrel	<i>Oceanodroma leucorhoa</i>
A	Gannet	<i>Morus bassanus</i>

A	Cormorant	<i>Phalacrocorax carbo</i>
A	Shag	<i>Phalacrocorax aristotelis</i>
B	Magnificent Frigatebird	<i>Fregata magnificens</i>
A	Bittern	<i>Botaurus stellaris</i>
A	American Bittern	<i>Botaurus lentiginosus</i>
A	Little Bittern	<i>Ixobrychus minutus</i>
A	Night Heron	<i>Nycticorax nycticorax</i>
B	Squacco Heron	<i>Ardeola ralloides</i>
A	Cattle Egret	<i>Bubulcus ibis</i>
A	Little Egret	<i>Egretta garzetta</i>
A	Great White Egret	<i>Egretta alba</i>
A	Grey Heron	<i>Ardea cinerea</i>
A	Purple Heron	<i>Ardea purpurea</i>
A	Black Stork	<i>Ciconia nigra</i>
A	White Stork	<i>Ciconia ciconia</i>
A	Glossy Ibis	<i>Plegadis falcinellus</i>
A	Spoonbill	<i>Platalea leucorodia</i>
A,C	Mute Swan	<i>Cygnus olor</i>
A	Bewick's Swan	<i>Cygnus columbianus</i>
A	Whooper Swan	<i>Cygnus cygnus</i>
A	Bean Goose	<i>Anser fabalis</i>
A,D4	Pink-footed Goose	<i>Anser brachyrhynchus</i>
A	White-fronted Goose	<i>Anser albifrons</i>
A	Lesser White-fronted Goose	<i>Anser erythropus</i>
A,C	Greylag Goose	<i>Anser anser</i>
A,D4	Snow Goose	<i>Anser caerulescens</i>
A,C	Canada Goose	<i>Branta canadensis</i>
A,D4	Barnacle Goose	<i>Branta leucopsis</i>
A	Brent Goose	<i>Branta bernicla</i>
A	Red-breasted Goose	<i>Branta ruficollis</i>
B	Ruddy Shelduck	<i>Tadorna ferruginea</i>
A	Shelduck	<i>Tadorna tadorna</i>
C	Mandarin	<i>Aix galericulata</i>
A	Wigeon	<i>Anas penelope</i>
A	American Wigeon	<i>Anas americana</i>
A,C	Gadwall	<i>Anas strepera</i>
A	Teal	<i>Anas crecca</i>
A,C	Mallard	<i>Anas platyrhynchos</i>
A	Black Duck	<i>Anas rubripes</i>
A	Pintail	<i>Anas acuta</i>
A	Garganey	<i>Anas querquedula</i>
A	Blue-winged Teal	<i>Anas discors</i>
A	Shoveler	<i>Anas clypeata</i>
A,D4	Red-crested Pochard	<i>Netta rufina</i>

A	Pochard	<i>Aythya ferina</i>
A	Ring-necked Duck	<i>Aythya collaris</i>
A	Ferruginous Duck	<i>Aythya nyroca</i>
A	Tufted Duck	<i>Aythya fuligula</i>
A	Scaup	<i>Aythya marila</i>
A	Eider	<i>Somateria mollissima</i>
A	King Eider	<i>Somateria spectabilis</i>
A	Steller's Eider	<i>Polysticta stelleri</i>
A	Harlequin Duck	<i>Histrionicus histrionicus</i>
A	Long-tailed Duck	<i>Clangula hyemalis</i>
A	Common Scoter	<i>Melanitta nigra</i>
A	Surf Scoter	<i>Melanitta perspicillata</i>
A	Velvet Scoter	<i>Melanitta fusca</i>
A	Bufflehead	<i>Bucephala albeola</i>
A	Barrow's Goldeneye	<i>Bucephala islandica</i>
A	Goldeneye	<i>Bucephala clangula</i>
A	Smew	<i>Mergus albellus</i>
A	Red-breasted Merganser	<i>Mergus serrator</i>
A	Goosander	<i>Mergus merganser</i>
C	Ruddy Duck	<i>Oxyura jamaicensis</i>
A	Honey Buzzard	<i>Pernis apivorus</i>
A	Black Kite	<i>Milvus migrans</i>
A,D4	Red Kite	<i>Milvus milvus</i>
A,D4	White-tailed Eagle	<i>Haliaeetus albicilla</i>
A	Marsh Harrier	<i>Circus aeruginosus</i>
A	Hen Harrier	<i>Circus cyaneus</i>
B	Pallid Harrier	<i>Circus macrourus</i>
A	Montagu's Harrier	<i>Circus pygargus</i>
A,C	Goshawk	<i>Accipiter gentilis</i>
A	Sparrowhawk	<i>Accipiter nisus</i>
A	Buzzard	<i>Buteo buteo</i>
A	Rough-legged Buzzard	<i>Buteo lagopus</i>
A	Golden Eagle	<i>Aquila chrysaetos</i>
A	Osprey	<i>Pandion haliaetus</i>
A	Lesser Kestrel	<i>Falco naumanni</i>
A	Kestrel	<i>Falco tinnunculus</i>
A	American Kestrel	<i>Falco sparverius</i>
A	Red-footed Falcon	<i>Falco vespertinus</i>
A	Merlin	<i>Falco columbarius</i>
A	Hobby	<i>Falco subbuteo</i>
A	Eleonora's Falcon	<i>Falco eleonora</i>
A	Gyr Falcon	<i>Falco rusticolus</i>
A	Peregrine	<i>Falco peregrinus</i>
A	Red Grouse	<i>Lagopus lagopus</i>

A	Ptarmigan	<i>Lagopus mutus</i>
A	Black Grouse	<i>Tetrao tetrix</i>
B,C	Capercaillie	<i>Tetrao urogallus</i>
C	Red-legged Partridge	<i>Alectoris rufa</i>
A,C	Grey Partridge	<i>Perdix perdix</i>
A	Quail	<i>Coturnix coturnix</i>
C	Pheasant	<i>Phasianus colchicus</i>
C	Golden Pheasant	<i>Chrysolophus pictus</i>
A	Water Rail	<i>Rallus aquaticus</i>
A	Spotted Crake	<i>Porzana porzana</i>
A	Sora	<i>Porzana carolina</i>
A	Little Crake	<i>Porzana parva</i>
A	Baillon's Crake	<i>Porzana pusilla</i>
A	Corncrake	<i>Crex crex</i>
A	Moorhen	<i>Gallinula chloropus</i>
A	Coot	<i>Fulica atra</i>
A	Crane	<i>Grus grus</i>
A	Sandhill Crane	<i>Grus canadensis</i>
A	Little Bustard	<i>Tetrax tetrax</i>
B	Houbara Bustard	<i>Chlamydotis undulata</i>
A	Great Bustard	<i>Otis tarda</i>
A	Oystercatcher	<i>Haematopus ostralegus</i>
A	Black-winged Stilt	<i>Himantopus himantopus</i>
A	Avocet	<i>Recurvirostra avosetta</i>
A	Stone-curlew	<i>Burhinus oediconemus</i>
A	Cream-coloured Courser	<i>Cursorius cursor</i>
A	Collared Pratincole	<i>Glareola pratincola</i>
A	Black-winged Pratincole	<i>Glareola nordmanni</i>
A	Little Ringed Plover	<i>Charadrius dubius</i>
A	Ringed Plover	<i>Charadrius hiaticula</i>
A	Killdeer	<i>Charadrius vociferus</i>
A	Kentish Plover	<i>Charadrius alexandrinus</i>
A	Greater Sand Plover	<i>Charadrius leschenaultii</i>
A	Caspian Plover	<i>Charadrius asiaticus</i>
A	Dotterel	<i>Charadrius morinellus</i>
A	American Golden Plover	<i>Pluvialis dominica</i>
A	Pacific Golden Plover	<i>Pluvialis fulva</i>
A	Golden Plover	<i>Pluvialis apricaria</i>
A	Grey Plover	<i>Pluvialis squatarola</i>
A	Sociable Plover	<i>Chettusia gregaria</i>
A	Lapwing	<i>Vanellus vanellus</i>
A	Great Knot	<i>Calidris tenuirostris</i>
A	Knot	<i>Calidris canutus</i>
A	Sanderling	<i>Calidris alba</i>

A	Semipalmated Sandpiper	<i>Calidris pusilla</i>
A	Western Sandpiper	<i>Calidris mauri</i>
A	Little Stint	<i>Calidris minuta</i>
A	Temminck's Stint	<i>Calidris temminckii</i>
A	Least Sandpiper	<i>Calidris minutilla</i>
A	White-rumped Sandpiper	<i>Calidris fuscicollis</i>
A	Baird's Sandpiper	<i>Calidris bairdii</i>
A	Pectoral Sandpiper	<i>Calidris melanotos</i>
A	Sharp-tailed Sandpiper	<i>Calidris acuminata</i>
A	Curlew Sandpiper	<i>Calidris ferruginea</i>
A	Purple Sandpiper	<i>Calidris maritima</i>
A	Dunlin	<i>Calidris alpina</i>
A	Broad-billed Sandpiper	<i>Limicola falcinellus</i>
A	Stilt Sandpiper	<i>Micropalama himantopus</i>
A	Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>
A	Ruff	<i>Philomachus pugnax</i>
A	Jack Snipe	<i>Lymnocyptes minimus</i>
A	Snipe	<i>Gallinago gallinago</i>
A	Great Snipe	<i>Gallinago media</i>
A	Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
A	Woodcock	<i>Scolopax rusticola</i>
A	Black-tailed Godwit	<i>Limosa limosa</i>
A	Bar-tailed Godwit	<i>Limosa lapponica</i>
B	Eskimo Curlew	<i>Numenius borealis</i>
A	Whimbrel	<i>Numenius phaeopus</i>
A	Curlew	<i>Numenius arquata</i>
A	Upland Sandpiper	<i>Bartramia longicauda</i>
A	Spotted Redshank	<i>Tringa erythropus</i>
A	Redshank	<i>Tringa totanus</i>
A	Marsh Sandpiper	<i>Tringa stagnatilis</i>
A	Greenshank	<i>Tringa nebularia</i>
A	Greater Yellowlegs	<i>Tringa melanoleuca</i>
A	Lesser Yellowlegs	<i>Tringa flavipes</i>
A	Solitary Sandpiper	<i>Tringa solitaria</i>
A	Green Sandpiper	<i>Tringa ochropus</i>
A	Wood Sandpiper	<i>Tringa glareola</i>
A	Terek Sandpiper	<i>Xenus cinereus</i>
A	Common Sandpiper	<i>Actitis hypoleucos</i>
A	Spotted Sandpiper	<i>Actitis macularia</i>
A	Turnstone	<i>Arenaria interpres</i>
A	Wilson's Phalarope	<i>Phalaropus tricolor</i>
A	Red-necked Phalarope	<i>Phalaropus lobatus</i>
A	Grey Phalarope	<i>Phalaropus fulicarius</i>
A	Pomarine Skua	<i>Stercorarius pomarinus</i>

A	Arctic Skua	<i>Stercorarius parasiticus</i>
A	Long-tailed Skua	<i>Stercorarius longicaudus</i>
A	Great Skua	<i>Stercorarius skua</i>
A	Mediterranean Gull	<i>Larus melanocephalus</i>
A	Laughing Gull	<i>Larus atricilla</i>
A	Franklin's Gull	<i>Larus pipixcan</i>
A	Little Gull	<i>Larus minutus</i>
A	Sabine's Gull	<i>Larus sabini</i>
A	Bonaparte's Gull	<i>Larus philadelphia</i>
A	Black-headed Gull	<i>Larus ridibundus</i>
A	Ring-billed Gull	<i>Larus delawarensis</i>
A	Common Gull	<i>Larus canus</i>
A	Lesser Black-backed Gull	<i>Larus fuscus</i>
A	Herring Gull	<i>Larus argentatus</i>
A	Iceland Gull	<i>Larus glaucoides</i>
A	Glaucous Gull	<i>Larus hyperboreus</i>
A	Great Black-backed Gull	<i>Larus marinus</i>
A	Ross's Gull	<i>Rhodostethia rosea</i>
A	Kittiwake	<i>Rissa tridactyla</i>
A	Ivory Gull	<i>Pagophila eburnea</i>
A	Gull-billed Tern	<i>Gelochelidon nilotica</i>
A	Caspian Tern	<i>Sterna caspia</i>
A	Lesser Crested Tern	<i>Sterna bengalensis</i>
A	Sandwich Tern	<i>Sterna sandvicensis</i>
A	Roseate Tern	<i>Sterna dougallii</i>
A	Common Tern	<i>Sterna hirundo</i>
A	Arctic Tern	<i>Sterna paradisaea</i>
A	Forster's Tern	<i>Sterna forsteri</i>
A	Bridled Tern	<i>Sterna anaethetus</i>
B	Sooty Tern	<i>Sterna fuscata</i>
A	Little Tern	<i>Sterna albibronis</i>
B	Whiskered Tern	<i>Chlidonias hybridus</i>
A	Black Tern	<i>Chlidonias niger</i>
A	White-winged Black Tern	<i>Chlidonias leucopterus</i>
A	Guillemot	<i>Uria aalge</i>
A	Brünnich's Guillemot	<i>Uria lomvia</i>
A	Razorbill	<i>Alca torda</i>
B	Great Auk	<i>Pinguinus impennis</i>
A	Black Guillemot	<i>Cepphus grylle</i>
A	Little Auk	<i>Alle alle</i>
A	Puffin	<i>Fratercula arctica</i>
A	Pallas's Sandgrouse	<i>Syrphantes paradoxus</i>
A,C	Rock Dove	<i>Columba livia</i>
A	Stock Dove	<i>Columba oenas</i>

A	Wood Pigeon	<i>Columba palumbus</i>
A	Collared Dove	<i>Streptopelia decaocto</i>
A	Turtle Dove	<i>Streptopelia turtur</i>
A	Rufous Turtle Dove	<i>Streptopelia orientalis</i>
A	Great Spotted Cuckoo	<i>Clamator glandarius</i>
A	Cuckoo	<i>Cuculus canorus</i>
B	Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
A	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
A	Barn Owl	<i>Tyto alba</i>
A	Scops Owl	<i>Otus scops</i>
B	Eagle Owl	<i>Bubo bubo</i>
A	Snowy Owl	<i>Nyctea scandiaca</i>
A	Hawk Owl	<i>Surnia ulula</i>
C	Little Owl	<i>Athene noctua</i>
A	Tawny Owl	<i>Strix aluco</i>
A	Long-eared Owl	<i>Asio otus</i>
A	Short-eared Owl	<i>Asio flammeus</i>
A	Tengmalm's Owl	<i>Aegolius funereus</i>
A	Nightjar	<i>Caprimulgus europaeus</i>
A	Common Nighthawk	<i>Chordeiles minor</i>
A	Chimney Swift	<i>Chaetura pelagica</i>
A	Needle-tailed Swift	<i>Hirundapus caudacutus</i>
A	Swift	<i>Apus apus</i>
A	Alpine Swift	<i>Apus melba</i>
A	Little Swift	<i>Apus affinis</i>
A	Kingfisher	<i>Alcedo atthis</i>
A	Bee-eater	<i>Merops apiaster</i>
A	Roller	<i>Coracias garrulus</i>
A	Hoopoe	<i>Upupa epops</i>
A	Wryneck	<i>Jynx torquilla</i>
A	Green Woodpecker	<i>Picus viridis</i>
A	Great Spotted Woodpecker	<i>Dendrocopos major</i>
A	Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>
A	Calandra Lark	<i>Melanocorypha calandra</i>
A	Bimaculated Lark	<i>Melanocorypha bimaculata</i>
A	Short-toed Lark	<i>Calandrella brachydactyla</i>
A	Crested Lark	<i>Galerida cristata</i>
A	Woodlark	<i>Lullula arborea</i>
A	Skylark	<i>Alauda arvensis</i>
A	Shore Lark	<i>Eremophila alpestris</i>
A	Sand Martin	<i>Riparia riparia</i>
A	Swallow	<i>Hirundo rustica</i>
A	Red-rumped Swallow	<i>Hirundo daurica</i>
A	House Martin	<i>Delichon urbica</i>



A	Richard's Pipit	<i>Anthus novaeseelandiae</i>
A	Tawny Pipit	<i>Anthus campestris</i>
A	Olive-backed Pipit	<i>Anthus hodgsoni</i>
A	Tree Pipit	<i>Anthus trivialis</i>
A	Pechora Pipit	<i>Anthus gustavi</i>
A	Meadow Pipit	<i>Anthus pratensis</i>
A	Red-throated Pipit	<i>Anthus cervinus</i>
A	Rock Pipit	<i>Anthus petrosus</i>
A	Water Pipit	<i>Anthus spinoletta</i>
A	Buff-bellied Pipit	<i>Anthus rubescens</i>
A	Yellow Wagtail	<i>Motacilla flava</i>
A	Citrine Wagtail	<i>Motacilla citreola</i>
A	Grey Wagtail	<i>Motacilla cinerea</i>
A	Pied Wagtail	<i>Motacilla alba</i>
A	Waxwing	<i>Bombycilla garrulus</i>
A	Dipper	<i>Cinclus cinclus</i>
A	Wren	<i>Troglodytes troglodytes</i>
A	Dunnock	<i>Prunella modularis</i>
A	Alpine Accentor	<i>Prunella collaris</i>
A	Robin	<i>Erithacus rubecula</i>
A	Thrush Nightingale	<i>Luscinia luscinia</i>
A	Nightingale	<i>Luscinia megarhynchos</i>
A	Siberian Rubythroat	<i>Luscinia calliope</i>
A	Bluethroat	<i>Luscinia svecica</i>
A	Red-flanked Bluetail	<i>Tarsiger cyanurus</i>
A	Black Redstart	<i>Phoenicurus ochruros</i>
A	Redstart	<i>Phoenicurus phoenicurus</i>
A	Whinchat	<i>Saxicola rubetra</i>
A	Stonechat	<i>Saxicola torquata</i>
A	Isabelline Wheatear	<i>Oenanthe isabellina</i>
A	Wheatear	<i>Oenanthe oenanthe</i>
A	Pied Wheatear	<i>Oenanthe pleschanka</i>
A	Black-eared Wheatear	<i>Oenanthe hispanica</i>
A	Desert Wheatear	<i>Oenanthe deserti</i>
A	Rock Thrush	<i>Monticola saxatilis</i>
A	Blue Rock Thrush	<i>Monticola solitarius</i>
A	White's Thrush	<i>Zoothera dauma</i>
A	Siberian Thrush	<i>Zoothera sibirica</i>
A	Hermit Thrush	<i>Catharus guttatus</i>
A	Swainson's Thrush	<i>Catharus ustulatus</i>
A	Grey-cheeked Thrush	<i>Catharus minimus</i>
A	Ring Ouzel	<i>Turdus torquatus</i>
A	Blackbird	<i>Turdus merula</i>
A	Eye-browed Thrush	<i>Turdus obscurus</i>

A	Dusky Thrush	<i>Turdus naumanni</i>
A	Black-throated Thrush	<i>Turdus ruficollis</i>
A	Fieldfare	<i>Turdus pilaris</i>
A	Song Thrush	<i>Turdus philomelos</i>
A	Redwing	<i>Turdus iliacus</i>
A	Mistle Thrush	<i>Turdus viscivorus</i>
A	American Robin	<i>Turdus migratorius</i>
A	Cetti's Warbler	<i>Cettia cetti</i>
A	Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>
A	Lanceolated Warbler	<i>Locustella lanceolata</i>
A	Grasshopper Warbler	<i>Locustella naevia</i>
A	River Warbler	<i>Locustella fluviatilis</i>
A	Savi's Warbler	<i>Locustella luscinioides</i>
A	Aquatic Warbler	<i>Acrocephalus paludicola</i>
A	Sedge Warbler	<i>Acrocephalus schoenobaenus</i>
A	Paddyfield Warbler	<i>Acrocephalus agricola</i>
A	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>
A	Marsh Warbler	<i>Acrocephalus palustris</i>
A	Reed Warbler	<i>Acrocephalus scirpaceus</i>
A	Great Reed Warbler	<i>Acrocephalus arundinaceus</i>
A	Thick-billed Warbler	<i>Acrocephalus aedon</i>
A	Olivaceous Warbler	<i>Hippolais pallida</i>
A	Booted Warbler	<i>Hippolais caligata</i>
A	Icterine Warbler	<i>Hippolais icterina</i>
A	Melodious Warbler	<i>Hippolais polyglotta</i>
A	Dartford Warbler	<i>Sylvia undata</i>
A	Subalpine Warbler	<i>Sylvia cantillans</i>
A	Sardinian Warbler	<i>Sylvia melanocephala</i>
A	Rüppell's Warbler	<i>Sylvia rueppelli</i>
A	Orphean Warbler	<i>Sylvia hortensis</i>
A	Barred Warbler	<i>Sylvia nisoria</i>
A	Lesser Whitethroat	<i>Sylvia curruca</i>
A	Whitethroat	<i>Sylvia communis</i>
A	Garden Warbler	<i>Sylvia borin</i>
A	Blackcap	<i>Sylvia atricapilla</i>
A	Greenish Warbler	<i>Phylloscopus trochiloides</i>
A	Arctic Warbler	<i>Phylloscopus borealis</i>
A	Pallas's Warbler	<i>Phylloscopus proregulus</i>
A	Yellow-browed Warbler	<i>Phylloscopus inornatus</i>
A	Radde's Warbler	<i>Phylloscopus schwarzi</i>
A	Dusky Warbler	<i>Phylloscopus fuscatus</i>
A	Bonelli's Warbler	<i>Phylloscopus bonelli</i>
A	Wood Warbler	<i>Phylloscopus sibilatrix</i>
A	Chiffchaff	<i>Phylloscopus collybita</i>



## F I F E N A T U R E

Since 1992, a local Biological Records Centre "Fife Nature" has been established in Fife. Through special surveys and a network of official local recorders, the centre collects, analyses and monitors information on as many biological groups as possible, as well as on habitats and sites of natural history interest within the region. Information is stored electronically and is available for purposes of conservation, planning, research, education and general interest.

A "Survey Pack" is available free by request from "Fife Nature", and the centre also produces provisional atlases, which will eventually lead to a series of fully illustrated books. Available at present are

*The Dragonflies of Fife: A Provisional Atlas £2 (incl. p.+p.)*

*The Butterflies of Fife: A Provisional Atlas £2.50*

*The Mammals of Fife: A Provisional Atlas (June 1994 - price on inquiry)*

*Others planned are A Fife Flora, a Bumble Bee Atlas and an Amphibian/Reptile Atlas.*

The centre is also involved with the Fife Ornithological Atlas Group, which is currently (1991-95) carrying out surveys leading to a Fife Breeding Bird Atlas and Monthly Distribution Atlas of Birds in Fife.

Further information is available from Anne Marie Smout, Fife Nature, Department of Economic Development and Planning, Fife House, Glenrothes, Fife KY7 5LT. Tel 0592 754411 ext 3793.





*Female Mandarin Aix galericulata First breeding record in Scotland*

*Steve Petty*



*Semi-palmated Sandpiper Calidris pusilla On Stronsay 7th June 1993*

*Painting by John Holloway*



*Joe Eggeling on his last visit to the Isle of May in June 1989*

*Keith Brockie*



*Pallid Harrier Circus macrourus  
15th September 1993 Shetland*



*Dennis Coutts*

Colour separations by PAR GRAPHICS



## CHARTER FOR THE ENVIRONMENT

*Fife's Environmental Charter highlights the Regional Council's approach to tackling environmental issues and sets out the basis for the Regional Council's existing and future environmental policies. The Charter is now accompanied by the third action programme which outlines projects the Regional Council is in undertaking itself or in partnership with others: a **Nature Conservation Fund**, a **Community Planting Scheme**, and a **Community Environmental Improvement Fund** and a **Schools Environmental Awards Scheme** have been established, and a four monthly **Environmental Events Diary** is produced.*

*Through the Charter, the Council has made a commitment to publish further items in the Fife Heritage Series as a means of raising awareness of the rich natural and historic environment. Titles currently available from the Dept. of Economic Development and Planning are:*

*Fife's Early Archaeological Heritage - A Guide £2.50*

*Castles of Fife - A Heritage Guide £4.00*

*Topics to be published early in 1994 include:- Landforms, Townscapes, Abbeys and Churches and a Heritage Guide to Inverkeithing.*

*For further information about the Fife Environmental Charter, please contact Grace MacDonald or Andy Hills on 0592 754411 extension 6337*



## FIFE ARCHAEOLOGICAL SERVICE

*Fife contains a wealth of archaeological sites ranging in date from prehistoric settlements and forts dating back some 8,000 years, to industrial and military remains of more recent times. Environmental archaeology has become a key concern of the Regional Council as it can provide information about how the natural environment has been altered by our ancestors. The Archaeological Service is currently working with Scottish Natural Heritage to study and interpret the settlement remains on the Isle of May National Nature Reserve.*

*The Regional Council are keen to promote the conservation of this rich heritage and have published guides to sites which have been studied. These include:-*

*Balfarg - The Prehistoric Ceremonial Complex £3.00*

*St Monans Salt pans and the Lost Industrial Landscape £1.00*

*The Capital in the Kingdom: The Archaeology of Medieval Dunfermline £3.00*

*The Regional Council has an Archaeological Service based in the Department of Economic Development and Planning, and is pleased to offer advice on all aspects of the conservation of the historic environment. To receive advice please contact Peter Yeoman or Sarah Govan on 0592 754411 Ext. 6153.*

A	Willow Warbler	<i>Phylloscopus trochilus</i>
A	Goldcrest	<i>Regulus regulus</i>
A	Firecrest	<i>Regulus ignicapillus</i>
A	Spotted Flycatcher	<i>Muscicapa striata</i>
A	Red-breasted Flycatcher	<i>Ficedula parva</i>
A	Collared Flycatcher	<i>Ficedula albicollis</i>
A	Pied Flycatcher	<i>Ficedula hypoleuca</i>
A	Bearded Tit	<i>Panurus biarmicus</i>
A	Long-tailed Tit	<i>Aegithalos caudatus</i>
A	Marsh Tit	<i>Parus palustris</i>
A	Willow Tit	<i>Parus montanus</i>
A	Crested Tit	<i>Parus cristatus</i>
A	Coal Tit	<i>Parus ater</i>
A	Blue Tit	<i>Parus caeruleus</i>
A	Great Tit	<i>Parus major</i>
A	Nuthatch	<i>Sitta europaea</i>
A	Treecreeper	<i>Certhia familiaris</i>
A	Golden Oriole	<i>Oriolus oriolus</i>
A	Brown Shrike	<i>Lanius cristatus</i>
A	Isabelline Shrike	<i>Lanius isabellinus</i>
A	Red-backed Shrike	<i>Lanius collurio</i>
A	Lesser Grey Shrike	<i>Lanius minor</i>
A	Great Grey Shrike	<i>Lanius excubitor</i>
A	Woodchat Shrike	<i>Lanius senator</i>
A	Jay	<i>Garrulus glandarius</i>
A	Magpie	<i>Pica pica</i>
A	Nutcracker	<i>Nucifraga caryocatactes</i>
A	Chough	<i>Pyrrhocorax pyrrhocorax</i>
A	Jackdaw	<i>Corvus monedula</i>
A	Rook	<i>Corvus frugilegus</i>
A	Carrion/Hooded Crow	<i>Corvus corone</i>
A	Raven	<i>Corvus corax</i>
A	Daurian Starling	<i>Sturnus sturninus</i>
A	Starling	<i>Sturnus vulgaris</i>
A	Rose-coloured Starling	<i>Sturnus roseus</i>
A	House Sparrow	<i>Passer domesticus</i>
A	Tree Sparrow	<i>Passer montanus</i>
A	Red-eyed Vireo	<i>Vireo olivaceus</i>
A	Chaffinch	<i>Fringilla coelebs</i>
A	Brambling	<i>Fringilla montifringilla</i>
A	Serín	<i>Serinus serinus</i>
A	Greenfinch	<i>Carduelis chloris</i>
A	Goldfinch	<i>Carduelis carduelis</i>
A	Siskin	<i>Carduelis spinus</i>

A	Linnet	<i>Carduelis cannabina</i>
A	Twite	<i>Carduelis flavirostris</i>
A	Redpoll	<i>Carduelis flammea</i>
A	Arctic Redpoll	<i>Carduelis hornemanni</i>
A	Two-barred Crossbill	<i>Loxia leucoptera</i>
A	Common Crossbill	<i>Loxia curvirostra</i>
A	Scottish Crossbill	<i>Loxia scotica</i>
A	Parrot Crossbill	<i>Loxia pytyopsittacus</i>
A	Trumpeter Finch	<i>Bucanetes githagineus</i>
A	Scarlet Rosefinch	<i>Carpodacus erythrinus</i>
A	Pine Grosbeak	<i>Pinicola enucleator</i>
A	Bullfinch	<i>Pyrrhula pyrrhula</i>
A	Hawfinch	<i>Coccothraustes coccothraustes</i>
A	Evening Grosbeak	<i>Hesperiphona vespertina</i>
B	Black-and-white Warbler	<i>Mniotilta varia</i>
A	Tennessee Warbler	<i>Vermivora peregrina</i>
A	Yellow Warbler	<i>Dendroica petechia</i>
A	Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>
A	Blackburnian Warbler	<i>Dendroica fusca</i>
A	Cape May Warbler	<i>Dendroica tigrina</i>
A	Yellow-rumped Warbler	<i>Dendroica coronata</i>
A	Blackpoll Warbler	<i>Dendroica striata</i>
A	American Redstart	<i>Setophaga ruticilla</i>
A	Ovenbird	<i>Seiurus aurocapillus</i>
A	Common Yellowthroat	<i>Geothlypis trichas</i>
A	Hooded Warbler	<i>Wilsonia citrina</i>
A	Savannah Sparrow	<i>Ammodramus sandwichensis</i>
A	Song Sparrow	<i>Zonotrichia melodia</i>
A	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
A	White-throated Sparrow	<i>Zonotrichia albicollis</i>
A	Dark-eyed Junco	<i>Junco hyemalis</i>
A	Lapland Longspur	<i>Calcarius lapponicus</i>
A	Snow Bunting	<i>Plectrophenax nivalis</i>
A	Pine Bunting	<i>Emberiza leucocephalos</i>
A	Yellowhammer	<i>Emberiza citrinella</i>
A	Cirl Bunting	<i>Emberiza cirlus</i>
A	Ortolan Bunting	<i>Emberiza hortulana</i>
A	Cretzschmar's Bunting	<i>Emberiza caesia</i>
A	Yellow-browed Bunting	<i>Emberiza chrysophrys</i>
A	Rustic Bunting	<i>Emberiza rustica</i>
A	Little Bunting	<i>Emberiza pusilla</i>
A	Yellow-breasted Bunting	<i>Emberiza aureola</i>
A	Reed Bunting	<i>Emberiza schoeniclus</i>
A	Pallas's Reed Bunting	<i>Emberiza pallasii</i>



A	Black-headed Bunting	<i>Emberiza melanocephala</i>
A	Corn Bunting	<i>Miliaria calandra</i>
A	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
A	Bobolink	<i>Dolichonyx oryzivorus</i>
A	Brown-headed Cowbird	<i>Molothrus ater</i>
A	Northern Oriole	<i>Icterus galbula</i>

#### Category D

D1	White Pelican	<i>Pelecanus onocrotalus</i>
D1	Greater Flamingo	<i>Phoenicopterus ruber</i>
D1	Egyptian Goose	<i>Alopochen aegyptiacus</i>
D1	Baikal Teal	<i>Anas formosa</i>
D1	Saker Falcon	<i>Falco cherrug</i>
D2	Northern Flicker	<i>Colaptes auratus</i>
D1	Cedar Waxwing	<i>Bombycilla cedrorum</i>
D1	Chestnut Bunting	<i>Emberiza rutila</i>
D1	Red-headed Bunting	<i>Emberiza bruniceps</i>
D1	Blue Grosbeak	<i>Guiraca caerulea</i>
D1	Indigo Bunting	<i>Passerina cyanea</i>
D1	Painted Bunting	<i>Passerina ciris</i>

*Typescript received 25 January 1994*

## Short Notes

### *Mating times of Merlins*

There are few British data on the mating times of Merlins *Falco columbarius*. In the North American subspecies, however, Laing (1985. Food habits and breeding biology of Merlins in Alaska. *Raptor Research* 19:42-51) observed Merlins copulating 11 times during 16.3 hours of observations (0.67 copulations/hour) in Alaska. Sodhi (1991. Pair copulation, extra pair copulation and intraspecific nest intrusions in Merlins. *Condor* 93:433-437) also noted 41 copulations in 679 hours of observations (0.06 copulations/hour) in a rather atypical urban population in Canada. Because so little had been published on this subject, I timed and logged the number of copulations seen in three breeding areas in upland Galloway in 1973-74 and 1977-78.

In Galloway, observed matings usually occurred on boulders or on the ground near nest sites but not on the nest itself. No elaborate rituals preceded matings but either sex would initiate copulations by calling and sometimes bowing beforehand. Males mounted females from behind, usually dropping down slowly from a higher perch with wings held in a 'V' position, and with tail spread and legs lowered. Females responded by crouching with wings held slightly down and tail fanned. Copulations usually lasted 10-15 seconds, the males slowly flapping their wings. The first copulations occurred some 30 days before egg laying (the fertile period: pre-laying and egg laying) but none was recorded after clutches were completed (the non-fertile period: incubation, nestling and fledging).

The total number of matings recorded overall was 22 copulations during 80 hours observations (0.28 copulations/hour) lower than Laing's records but similar to Sodhi's findings in the fertile period (Table 1). Fifteen copulations (68%) occurred during 34 hours observations in the mornings (0730-1200 hours), five (23%) in 39.3 hours in the afternoon (1200-1700 hours) and two (9%) in 6.3 hours in the evening (1700 hours to sunset). It would seem that copulation times during the day do differ significantly in Galloway, with more than expected occurring in the morning and less in the afternoon/evenings ( $X^2 = 5.85$ , 1 df,  $p < 0.02$ ) (Siegel, S. 1956. *Nonparametric statistics for the behavioural sciences*. McGraw-Hill, New York). Twelve copulations in 56.3 hours observations (0.21 copulations/hour) were recorded during the early stages of pair formation (pre-laying 1 - 23 April) and ten copulations in 23.3 hours (0.43 copulations/hour) were recorded just prior to egg laying (27 April - 1 May). Thus Merlins appear to copulate at a high frequency a day or two before the first eggs are laid and nearly twice as much as in the pre-laying period.

Sodhi thought it was unlikely that females traded copulations for food in Canada and the same conclusion seemed to be the case in Galloway: of 22 copulations, only three (13.6%) occurred after males brought prey to females. However, copulations seemed to be associated with nest selection because ten (45.4%) occurred before and after visits to

**Table 1.** Number of copulations per hour during non-fertile (incubation, nestling and fledging) and fertile (pre-laying and laying) periods in the Merlin in various localities.

Locality	No. of Copulations/hour	No. of Copulations/hour Non-fertile periods	No. of Copulation/hour Fertile periods	Source
Denali National Park Alaska	0.67	-	0.67	Laing 1985
Saskatoon Canada (urban)	0.06	0.03	0.20	Sodhi 1991
Upland Galloway	0.28	NIL	0.28	This study

nests by either sex. There was no evidence of extra-pair copulations nor was there any interference during copulations; the only evidence of an extra bird present was when a strange male flew over a resident male on 1 April 1973, and when a male and female chased a second female in another year outwith this study. Most copulations occurred before noon. This agrees with the times

recorded in other falcons e.g. Kestrel *Falco tinnunculus* (Village, A. 1990. *The Kestrel*. Poyser, London) and the Peregrine Falcon *Falco peregrinus* (Ratcliffe, D. 1980, 1993. *The Peregrine Falcon*. Poyser, Calton and London). I would like to thank Dr. Jim Reid for kindly carrying out the statistical analysis.

**R.C. Dickson, Lismore, New Luce,  
Newton Stewart DG8 0AJ.**

### ***Merlin chick killed by adder***

Merlins *Falco columbarius* may suffer higher rates of egg and brood predation from ground nests than in tree nests (Little, B. & Davison, M. 1990. *Bird Study* 39: 13-16). Predation accounted for 43% of 104 nest failures in a Grampian study (Rebecca, G.W. *et al.* 1992. *Scot. Birds* 16: 165-183), where four species of mammal predators were identified. On drier moors, adders *Vipera berus* share the habitat with Merlins, and are potential predators: MacIntyre (1936. *Wildlife in the Highlands*. Batchworth, London) found Merlin eggs inside an adder which he killed at a nest. Predation by adders may be under-recorded, since no evidence is left at the nest. This note reports that losses to adders can continue into the later nestling stages.

On 30 June 1993, in the Galloway Forest Park area of south-west Scotland, I visited a Merlin nest immediately following a prey delivery. The nest comprised a roughly circular platform of thin heather twigs, tramped flat, in tall heather. An adult male adder was basking in the centre of the platform, sheltered from the wind while two c. 3-week old Merlin chicks were at the edge, about 10cm from the adder, which moved off when I stood at the nest, revealing an addled egg. One of the two chicks was freshly dead and still warm with no visible injury other than a small amount of

fresh blood on its crown. It was in good condition, weighing 152g with outer primaries 20-25mm emerged. A *post mortem* examination at a later date confirmed that the chick had 'suffered acute death', consistent with an adder bite.

Burgess *et al.* (1990. *RSPB Cons. Review* 4: 32-35) found that small areas of bare ground, cleared on heathland to provide nest sites for Nightjars *Caprimulgus caprimulgus*, were used as basking sites by adders. In the Galloway Forest Park R.C. Dickson (*pers. comm.*) also disturbed an adder from a Merlin nest (from which small young had previously disappeared), in 1977. In the present instance, it seems likely that the reptile was making use of the nest platform as a sheltered basking site in the deep heather. Intentional predation was improbable, since the adder was incapable of swallowing a prey item as large as the Merlin chick, and may have struck at it in a defensive response.

I am grateful to Neil A. Forbes, of the Clock House Veterinary Hospital at Stroud, for *post mortem* examination of the carcass, and to G.W. Rebecca and R.C. Dickson for helpful comments on an earlier draft.

**Geoff Shaw, Forest Enterprise,  
South Scotland Region,  
55-57 Moffat Road, Dumfries. DG1 1NP.**

### **Site fidelity of Jack Snipe on migration?**

Freshwater Haven, one mile north-east of Gullane, is a typical East Lothian bay, backed by a double line of sand dunes stabilised by marram grass. The deep trough between the two dune-lines is normally totally dry, and was so on 7 August 1991 when I flushed a Jack Snipe *Lymnocyptes minimus* there. It was there again on almost every one of the next 11 days until 18 August.

This record on its own is mildly noteworthy for two reasons:- the habitat was totally atypical (though something similar was recorded almost 100 years ago at the St. Andrews links - *Zoologist* 1901: 108), and the date was unusually early. One sees few Jack Snipe in this country before October. Indeed a bird seen at an undisclosed locality in Britain between 13-23 August 1977 was included in the annual report 'Rare breeding birds in the United Kingdom in 1978' (*Brit. Birds* 73:19). There was no reason to suspect breeding in the present case, but there is a curious twist to the story.

At the east end of the trough between the two dune-lines there is in some years a small pool of water which accumulates by underground seepage from the spring, 50 yards further inland, which gives the bay its name. There had been such a pool in the spring of 1991 when on 11 April I flushed the first Jack Snipe

that I had ever recorded in this area. It was from this same, now totally dry, hollow that I first flushed the August bird, although on all subsequent occasions I found it resting a few yards away, higher up on the dune slopes.

These records raise interesting speculations. At the simplest level, it is surprising that the August bird should choose to day-roost (for there can be no question of its feeding there) for 12 days at precisely the same spot where it was so regularly disturbed. More intriguing is the possibility that (as seems highly likely in view of the unsuitability of the habitat) the same individual was involved in both the April and the August records. *BWP* (3: 403-409) has nothing to say about the site fidelity of Jack Snipe either on their breeding grounds or in their wintering quarters, although evidence of the latter is provided by the recoveries of 'two ringed in Wigtown and Shetland and recovered in the same areas, in November and March, one and three years later', quoted in *Birds in Scotland*: 189. Perhaps these East Lothian records provide the first tentative evidence that this site fidelity may also extend to stopping places on migration?

**Dougal G. Andrew**  
**Muirfield Gate**  
**Gullane**  
**East Lothian EH31 2EG**

### **First breeding records of the Mandarin in Argyll**

The Mandarin *Aix galericulata* occurs naturally in north-east Asia and Japan (Cramp & Simmons 1977. *The Birds of the Western Palearctic*, Vol.1 Oxford). The population in Britain originates mainly from introductions earlier the century (Lever 1977. *Naturalised animals of the British Isles*. Hutchinson). Their present breeding range is expanding and concentrated in south-east England (Davies 1998. *Bird Study* 35: 203-208). Davies (*Loc. cit.*) estimated their population at just under 7000 birds. The breeding population in Scotland is much smaller and centred on the River Tay, but with sporadic records elsewhere (Thom 1986. *Birds in Scotland*. Poyser). Observations of birds on Loch Lomond in the 1970s were the closest to Argyll and thought to have come from a local collection (Thom *Loc. cit.*).

In each of the years 1991-93 one pair of Mandarins successfully bred at Loch Eck, in Cowal, south Argyll (Table 1). All breeding attempts were in Tawny Owl *Strix aluco* nestboxes (Petty 1987. *Quarterly Journal of Forestry* 81: 103-109). They used two boxes 20m apart, that were fixed to oak trees facing out over the loch. The first breeding attempt in 1991 occurred after the box was last checked on 11 April. When the box was checked for the first time in 1992, four old unhatched eggs in a down nest were discovered. The presence of egg fragments and membranes indicated that an unknown number of eggs had hatched in 1991. The number of eggs hatching in 1992 and 1993 was ten and five respectively (Table 1).

**Table 1. Details of three breeding records by the Mandarin at Loch Eck in Argyll.**

Parameter	1991	1992	1993
Nest box number	T261B	T261A	T261A
Clutch size	-	14	13
Unhatched eggs	4	4	8
Hatched eggs	-	10	5
Laying date *	-	18 April	-
Egg length cm (SE)	5.26(0.03)	5.23(0.04)	5.25(0.04)
Egg width cm (SE)	4.00(0.01)	3.91(0.04)	3.95(0.01)

\* date when the first egg was laid, based on an interval of one day between laying (Cramp & Simmons 1977).

The egg measurements in 1991 were from the unhatched eggs only.

The low hatching success in 1993 appears to have been influenced by a Goosander *Mergus merganser* that laid one egg in the box part-way through the laying period of the Mandarin. Two Mandarin eggs were found to be cracked after the appearance of the Goosander egg, suggesting that the Goosander may have been responsible. Goosander eggs are much bigger than Mandarin eggs, and because of this size difference, the Mandarin may have been less able to incubate the clutch, resulting in the low hatch-rate. The Goosander egg did not hatch.

The female Mandarin was hand-caught in the nest box towards the end of incubation in 1992 and 1993. She was ringed when first caught in 1992, and the same bird was recaptured in 1993. (Plate no. 1). There were no other marks on the duck to indicate her origin. Nor have we been able to locate wildfowl collections in south and mid-Argyll that admit to losing Mandarins, thus the origin of this pair is unknown.

The nestboxes used for breeding had been in place since 1988, and many other boxes suitable for Mandarins had been available since 1983 and checked annually (Petty 1992. *Ecology of the Tawny Owl Strix aluco in the spruce forests of Northumberland and Argyll*. Ph.D. Thesis, The Open University). Therefore, we consider these breeding attempts at Loch Eck to be a recent phenomenon, rather than one that had been under-recorded in the past.

However, it should be noted that Mandarins are difficult to detect, even in an area with a high breeding density, and particularly when breeding in natural tree cavities (Davies 1985. *BTO News* 136:12). Away from the nest we have only seen Mandarins three times in three years, in an area where we undertake much fieldwork on other species. It will be interesting to see if these successful breeding attempts result in the colonisation of suitable habitat elsewhere in Argyll.

**S.J. Petty and D.I.K. Anderson, Wildlife Ecology Branch,  
Forestry Authority, Ardentinny, Dunoan, Argyll PA23 8TS.**

### **Discovery of the first British clutch of Slavonian Grebe eggs in a museum collection**

Major William Stirling of Fairburn (1859-1914) gained a reputation for his ability to find the nests of such secretive species as Siskin *Carduelis spinus*, Scottish Crossbill *Loxia scotica*, and Greenshank *Tringa nebularia*. He collected the eggs of these and other species on his estate in Easter Ross (Highland Region) and neighbouring districts between 1895 and 1910, both for his own collection and to be exchanged with other collectors of the eggs of foreign species. Sir Roderick Stirling, William Stirling's grandson, donated the substantial collection and uncompleted catalogue to Inverness Museum and Art Gallery in 1983.

Since August 1992 I have sorted out all the clutches and catalogued the entire collection during the course of which work I discovered a clutch of three heavily stained grebe eggs, with fragments of nest material still attached, which were not listed in the original catalogue. Although three eggs would form an unusually small clutch for any grebe, incubation was well advanced to judge from the degree of staining of the eggs from nest vegetation, and the clutch must have been completed. The damaged state of one of the eggs could indicate that the clutch had been larger but some eggs had been broken. One of the eggs bears the following mark in William Stirling's hand:

*Pod. auritus*  
Loch Laite  
Inverness  
W.S  
17.V.09

which implies that the eggs are those of the Slavonian Grebe *Podiceps auritus*, and were collected by William Stirling (W.S) at Loch Laite, on 17 May 1909. The other two eggs, one of which is cracked, bear the 'set mark' 17.V.1909. The measurements of the eggs (45.25 x 30.10, 45.80 x 30.20, ? x 30.70, to the nearest 0.05mm) agree well with those published for Slavonian Grebe eggs (Cramp & Simmons 1977. *The Birds of the Western Palearctic*. Oxford. Vol 1). There is no Loch Laite in Inverness-shire, but there is a Loch Laide (pronounced 'Latch') with an adjacent settlement called Lochlait, which would appear to be the locality from which the eggs were collected.

The original reference regarding early breeding attempts by Slavonian Grebe (Ogilvie-Grant, W.R. 1910. *Bull. Br. Orn. Club*. 25: 75-76) state that a bird with a nest but no eggs was shot and stuffed in 1908, after being seen in June of the same year by a Mr. H.M. Warrand. The locality given was "a small reedy sheet of water in the hills of Inverness-shire", a description which applies to Loch Laide as well now as it surely would have done in 1908 (it should be noted that this description does not readily apply to Loch Ruthven, which is traditionally regarded as the Slavonian Grebe's centre of distribution in Scotland).



Ogilvie-Grant, still quoting Warrant, writes:

*"I was cheered, however, to learn the following year(1909) that one or two pairs had appeared at the same loch, but soon afterwards heard that the nests had been ruthlessly robbed by a private collector'.*

Given that no other Slavonian Grebe breeding territories were known in 1909, it would appear that the 'private collector' was William Stirling. None of the other breeding attempts prior to 1909 had produced eggs (Barra 1898 and Arisaig 1907 in Inverness-shire; see Ogilvie-Grant 1910) and the reported breeding near Gairloch (Wester Ross, Highland Region) in the 1880s and early 1890s supposedly referred to the Little Grebe *Tachybaptus ruficollis* (Evans, A.H. 1892. *Ann. Scot. Nat. Hist.* 192: 171-172), although I suggest this reidentification is open to some doubt given that the birds were seen by the great H.E. Dresser. Stirling's clutch of three eggs therefore represents the first proven egg laying event (or at least the second, if there were indeed two pairs in 1909) for the Slavonian Grebe in Britain.

The acknowledged 1908 date for first breeding, cited in *BWP*, would appear to be based on the presence of a single bird with a nest which was never seen to have a mate or to lay eggs; this date should not be accepted.

### **Acknowledgements**

I must thank the following for their help: Stephen Moran (Assistant Curator, Natural Sciences) of Inverness Museum for encouraging my work on the collection; the librarian at the George Waterston Library for sending me a copy of Ogilvie-Grant's paper, Malcolm Harvey and Roy Dennis for their comments. Sir Roderick Stirling, who generously donated the collection, read a draft of this paper.

**Henry A. McGhie,  
Nurse's House  
West Road  
Muir-of-Ord  
Ross-shire IV6 7TD.**

### Rook flight-line across Firth of Forth

In winter, Rooks *Corvus frugilegus* feed in dispersed flocks by day and fly to large communal roosts for the night, often via intermediate points where flocks may join others before going to the final roost. Usually, each roost is large, comprising birds from a number of rookeries in the surrounding area (Munro, 1971. Scottish winter Rook roost survey - southern Scotland. *Scott. Birds* 6: 438-443; Coombs, 1978. *The Crows, a study of the corvids of Europe*. Batsford, London; Goodwin, 1986. *Crows of the world*. British Museum (Natural History), London.).

There appears to be a regular winter flight-line across the Firth of Forth. In late afternoons, I have seen Rooks arrive at the Lothian coast from somewhere south of Dalmeny House. Then from the shore at NT174777 near Long Green, usually after descending temporarily into trees, they set out over the water keeping a straight n.e. direction over Inchcolm island and on to the Fife mainland. This flight crosses 7.5km of water. The following observations were made after doing shore-bird counts; I made no attempt to watch Rooks over constant time periods or at particular times of day.

Date	Time	numbers of Rooks
13.10.91	Before dusk.	some.
10.11.91	Near dusk.	some.
8.12.91	Near dusk and during darkness.	400 in groups, plus more continuing while getting dark.
19.1.92	Late afternoon.	some.
14.11.92	Near dusk.	groups of 5-15.
12.12.92	Before dusk.	none.
30.1.93	Near dusk (4-4.30pm).	280 in groups of 12-100.

Rooks were not seen crossing the Forth earlier during the day on these dates or on other days. The observations should not be taken to indicate the numbers of Rooks which may be involved, as birds could have passed before or after, but they do suggest that a regular movement was occurring.

Jackdaws *Corvus monedula* accompanied the Rooks crossing the Forth in October, November and December 1991, including about 100 Jackdaws on 8 December 1991. No Carrion Crows *Corvus corone* were seen with these flights, although not infrequently

single or pairs of Carrion Crows do cross the Forth by day.

Rook winter roosts for all of Lothian were surveyed and mapped by Munro (1948. Rook roosts in the Lothians, winter 1946-47. *Scott. Nat.* 60: 20-9) who showed that Rooks from Cramond then roosted near West Calder and Rooks from South Queensferry near Bathgate. Neither he nor Smout (1986. *The Birds of Fife*. Donald, Edinburgh) mention Rooks crossing the Firth of Forth.

**H.E.M. Dott, 70 Findhorn Place  
Edinburgh EH9 2NW.**

### ***The diet of nestling Corn Buntings on North Uist - insects not grain.***

Watson states that the diet of nestling Corn Buntings, *Miliaria calandra*, is not well known but that he has observed adults provisioning their young with unripe grain on numerous occasions (Watson 1992. *Scott. Birds* 16: 287). The nestling diet for this species has also been described vaguely as small beetles (Walpole-Bond 1938. *A History of Sussex Birds* Vol.1), green caterpillars, craneflies and an 'unidentified whitish substance' (MacDonald 1965. *Scott. Birds* 3: 235-246), and grasshoppers, grubs and caterpillars (Ryves & Ryves 1934. *Brit. Birds* 28: 2-26 & 154-164). The only real attempt to quantify the diet of nestlings comes from work in Germany by Schmidt and Gliemann (in Gliemann 1972. *Die Grauammer*) who, in two separate studies, used neck collars on a total of four broods of chicks to assess food intake. The major food items found in their studies were caterpillars (Lepidoptera larvae) (30.2% of items), grasshoppers (Orthoptera) (13.6%), Lepidoptera pupae (11.3%), beetles (Coleoptera) (9.9%), earwigs (Dermaptera) (8.5%) and wheat seeds (16.1%).

In the summer of 1989 we carried out a study of nestling diet in Corn Buntings at Balranald, North Uist. We quantified the diet using faecal sample analyses from nestlings and also six gizzard samples taken from chicks which died naturally in the nest. Sixty-two faecal samples were collected from 23 nests. The overall proportions of food types were similar in both the gizzard and faecal samples, so we can assume that the results of faecal sample analysis closely reflect the diet of the nestlings.

We found that the diet consisted of harvestmen (Opiliones; found in 67.7% of samples), craneflies (Tipulidae; 61.3%), plant material (61.3%), hoverflies (Syrphidae; 51.6%), adult beetles (Coleoptera; 56.5%), adult moths (Lepidoptera; 29.0%), other flies (Diptera; 25.8%), caterpillars (Lepidoptera; 25.8%), grasshoppers (Acrididae; 24.2%), pupae (Lepidoptera; 17.7%) and small numbers of sawflies (Hymenoptera), earwigs (Dermaptera), beetle larvae (Coleoptera), spiders (Aranaea), terrestrial snails (Gastropoda) and plant hoppers (Homoptera). Nearly all the harvestmen (Opiliones) were *Mitopus morio* (F.) and most of the hoverflies (Syrphidae) were *Helophilus* sp. or *Rhingia campestris*. The beetles were represented by members of the families Scarabaeidae and Curculionidae. Much of the plant material was pollen, mainly from grasses, and was recorded in 29 samples (46.8%), usually in only small amounts. Seeds of any kind were rare and most often absent.

The results show that Corn Bunting nestlings on North Uist are fed a range of invertebrates, mainly harvestmen, craneflies, hoverflies and beetles. It is perhaps surprising to find hoverflies playing so large a role in the diet as these tend to be fast flying and highly manoeuvrable insects, as are grasshoppers and plant hoppers. A possible explanation is that hoverflies are taken early in the day before they are warm enough to fly, and this may also apply to the craneflies. The high incidence of harvestmen is also of interest because these animals are generally considered to be distasteful due to the secretion of noxious chemicals from their coxal glands.

Watson found that unripe grain was more often provided on cold days or when insects were not abundant, and the point of this note is to show that, under different conditions, Corn Buntings will prefer to select invertebrate food when provisioning their nestlings. On North Uist the agricultural regime tends to be non-intensive and pesticide sprays are less commonly used than on the mainland, so invertebrates may be more available than at Watson's study site. Cereal crops were

available to forage from if the parents had preferred to provide seeds to their nestlings. Perhaps these observations provide a partial explanation for the decline of the Corn Bunting over most of Britain. If young elsewhere are generally being reared on suboptimal food then we would expect to see a decline in chick survival and recruitment in comparison with the North Uist population, where chick starvation is a relatively rare form of nest failure (Hartley & Shepherd 1994 *Ardea* in press).

***Ian R. Hartley, Department of Zoology, University of Cambridge,  
Downing Street, Cambridge CB2 3EJ.***

***Donald L.J. Quicke, Department of Biology, Imperial College at  
Silwood Park, Ascot, Berkshire SL5 7PY.***

---

## 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)

### *Pink and polluted Peregrines*

Since I am possibly the only person around who has seen both the Mediterranean and Cape Verde Peregrine *Falco peregrinus brookei* and *F.p. madens* and their ally the Barbary Falcon *Falco pelegrinoides*, may I comment on Mike Trubridge's report of a potentially similar pink Peregrine and chicks seen in Central Scotland (*Scott. Birds* 17: 68-69)? While these birds are normally rufous or cinnamon around the head and flanks, the colour did not appear either 'bright salmon pink' or concentrated on the underparts, and in *brookei* at least the chicks are not noticeably pink either. Therefore, as in the case of the birds potentially oiled by Fulmars *Fulmarus glacialis* (*Scott. Birds* 16: 290, 46-48, 17: 69), could this also be due to contamination by some red substance, possibly sheep-marker or paint, left in the nest or some place frequented by Peregrines, or used in some misguided marking experiment or practical joke, and transferred to the chicks when they were brooded?

While so far I have failed to detect any oiled Peregrines along the north-east Scottish coast, one plucking-station on a projecting bank is regularly littered with not only the remains of gulls and auks but also Fulmars in varying states of decay, so that it would appear the Peregrines must be quite capable of catching Fulmars safely, and any pollution with their oil may arise through squabbling over nest-sites. It is noticeable that, while there are a limited number of huge, old-established, but sharply-localised Fulmar colonies within the breeding range of the Peregrine around Arctic North America, the two species have only recently started to come into wide contact during the breeding season in Europe, so that any extensive interaction between them must be a very new development.

**W.R.P. Bourne, Department of Zoology, Aberdeen University,  
Tillydrone Avenue, Aberdeen AB9 2TN.**

### ***Spring passage of Skuas in Outer Hebrides***

R.D. Murray is not altogether correct in saying (*Scott. Birds* 17:110) that the spring passage of skuas off the Western Isles was overlooked until recently. Harvie-Brown & Buckley (*A Vertebrate Fauna of the Outer Hebrides*. 1888. p. 151) include the following in their account of the Pomarine Skua *Stercorarius pomarinus*: 'There cannot be any doubt as to its frequent, if not regular, summer visits to the coasts of these islands, and the seas to the west of Lewis, most of such birds proving to be old birds in most perfect plumage. It frequents the harbour of Carloway on the west of Lewis,

and the seas over the great cod-banks between that and the Flannan Islands, as also still further to the westward, where we have shot them from the deck of our yacht'. Harvie-Brown later added the further comment that 'These birds appear to frequent the ocean and seas of the Outer Hebrides in some numbers every summer of late years. The line of their migration towards the north appears to be further west than the shores of the Outer Hebrides' (*Annals of Scot. Nat. Hist.* 1903: 17).

***Dougal G. Andrew, Muirfield Gate, Gullane, East Lothian EH31 2EG***

## Rare Migrants

(It has been decided by the Editorial Committee that full descriptions will appear in *Scottish Birds* only of species which are new, or at most second records, for Scotland. Eds)

### ***Semi-palmated Sandpiper on Stronsay; second Scottish record***

Whilst filming seals during the afternoon of 7 June 1993, Mike and Lynn Johnson noticed a small party of waders flying towards them. Fortunately the birds settled in the 'frame' and Mike continued filming the group as they fed along the shoreline.

Three were obviously adult Dunlin *Calidris alpina* but the fourth bird was considerably smaller and, not being sure of the identification, Mike and Lynn returned to the Stronsay Bird Reserve where they were staying and showed the film to myself and Joyce Maples who was also staying on the reserve. The bird looked very interesting to say the least, lacking any of the bright rufous found in summer Little Stint *Calidris minuta* and we decided to have a hasty tea and return to the site.

The bird was relocated at approx 2030hrs and watched until 2200hrs during which time we managed to obtain excellent views down to 20ft for prolonged periods. It was obviously very small with an attenuated rear-end and knowing some of the problems of stint and peep identification we collected as much detail as we could before poor light forced us to return to 'Castle', where my wife Sue had been searching all available literature to assist with the identification.

After much searching, we came to the conclusion that our bird was a Semi-palmated Sandpiper *Calidris pusilla* and the following day Mike Johnson obtained excellent views

of the webbing between the toes which eliminated all others except Western Sandpiper *Calidris mauri*. Western had already been eliminated on bill shape and length and lack of any rufous to the upperparts. Although the bird was present up until mid-afternoon on 8 June, it could not be located later that day and was not seen again.

#### **Description**

Small calidris wader similar in size to Little Stint but 'rear-end' more attenuated, wing-tips level with tip of tail.

General appearance rather greyish-fawn with no rufous in plumage. Some warm brown in cheeks and sides of crown and tertial edges rather brighter-edged than rest of wing feathers. One row of scapulars very dark-centred, contrasting with rest of upperparts and one row of lower scapulars with distinct anchor-shaped marks. Underparts white with fine dark streaking to breast and breast-sides and a few dark marks onto flanks. The mantle was rather plain with streaks, lacking the bright pale braces of Little Stint. There was a large dark spot immediately before the eye. The tertials covered all but the very tips of the primaries.

In flight the bird showed a rather indistinct pale wing-bar, less obvious than that of Little Stint.

The legs appeared black but when seen at very close range were in fact an extremely dark green. (This seems to contradict the generally held view that this species is one of the black-legged stints, but e.g. Hollom. 1960 *The Popular Handbook of Rarer British Birds* states : 'legs very dark green, appearing black'.)

The bill was very distinct when viewed head-on. It was very broad-based and had a spatulate tip. Viewed from the side it appeared deep-based and ended in a 'droop-tip'.

The feeding action was quite distinct, being generally rather plover-like, slower and more deliberate than Little Stint.

### ***Pallid Harrier in Shetland; second Scottish record***

On 15 September 1993 at Exnaboe, Shetland, Dennis and John Coutts found a 'ringtail' Harrier *Circus sp.* flying over the main road at Toab, South Mainland, Shetland. Their attention was immediately drawn to the bird's relatively small size, bright rusty-orange underparts and almost wholly dark secondaries and inner primaries. Their initial thought was that the bird was perhaps a juvenile Montagu's Harrier *C. pygargus*. They followed the bird until it perched on a fence post in nearby Exnaboe where they watched it for 15 minutes, noting the well marked facial pattern, consisting of a black loreal line continuing through the eye and joining a broad patch at the ear coverts which connected the lores, with a whitish patch below the eye and unmarked rusty-orange underparts. They informed me of their discovery, and we were able to relocate the bird, which, from their description, I suspected might be a juvenile Pallid Harrier, *C.*

The call was heard on several occasions when the bird took to the wing. It was a rather dry 'drrrp', completely different to the normal 'chit' of Little Stint, rather husky and flat.

The record was accepted by the BBRC and constitutes the first occurrence of the species in Orkney and only the second for Scotland. The usual range of the species is North America. It is interesting to note that Semi-palmated Sandpipers were recorded in East Anglia (May '93) and Spitzbergen (late June '93). Perhaps the same bird?

**John Holloway,  
'Castle', Stronsay,  
Orkney.**

*macrourus*. I noted the unstreaked underparts and a brief glimpse of the head pattern showed both the broadness and the paleness of the collar which encircled the head. As it flew around the field, I scribbled down some notes and mentally compared it to all the juvenile Montagu's I had seen when I was involved in protection work on that species in Norfolk in 1986. The flight of this bird was slightly heavier and less buoyant than that of a Montagu's, with a fairly broad wing base that lacked the raised hand associated with Montagu's, the hand itself appearing relatively short and the scapular and covert fringes and tips on our bird looking tan-buff, not rufous as on Montagu's. We saw the bird briefly on two other occasions we did not, however at this stage note dark semi-collar that borders the pale collar, which was the most important feature. When John Clifton arrived with a visiting birder John Miller, the bird was flushed again in poor light. Overnight, I read the literature (see references) associated with the Hen Harrier of the North American race *C.c. hudsonius* and with the rare rufous morph



juvenile *cyaneus* and checked and re-checked my field notes against descriptions of harriers I had built up over the years. The bird was found shortly after dawn the following morning, distantly perched side on. I noted the extent of the dark semi-collar indicating that it was a Pallid, but we really needed to see it in more favourable light. Unfortunately, I had work commitments and left the scene. Eventually however, Mick Mellor and Nick Dymond had superb views as it flew over the road exhibiting all the features described, including the semi-collar. At 1600hrs it was last seen drifting north.

### Description

**General Size and Structure:** a lightly built harrier with slim tail and absolutely no bulk to underbody. Similar in size and shape to Montagu's Harrier, although direct comparison was only made with a perched Hooded Crow *Corvus corone comix*, with which it appeared to be about the same size, but obviously much longer winged. The flight was light, but not as buoyant as Montagu's, probably due to the shorter wings making it look more 'compact'. The usual flight consisted of gliding on slightly raised wings but also sometimes almost level wings.

**Head:** well defined facial pattern consisting of blackish lores extending through eye to form eye-stripe which joined a broad blackish patch on the rear ear-covert region which also continued to meet the lores, forming a complete ear-covert surround. Thus surround was at its broadest on the outer and lower edge. A white patch below the eye gave a strong contrast with this surround. A narrow creamy-white, but distinctive supercilium extended from the creamy-white lower forehead to the upper rear of the dark ear covert surround, where it joined an obvious and broad whitish collar, which bordered the lower edge of the ear-coverts and extended beneath the lores and also extended around the back of the head, where it formed a slight inverted 'V'. A uniform dark brown broad band from the nape extended around the sides of

the neck, forming a semi-collar, which contrasted strongly with the pale collar.

**Upperparts:** mantle dark brown with thin but distinct warm buff tips and fringes to feathers. Back dark brown with traces of buff fringes and tips to feathers. Obvious white rump patch, appearing as broad as Hen Harrier. Long thin tail, with at least four thin dark tail-bars contrasting with greyish brown bars. A broader dark brownish-black subterminal band was bordered on the posterior edge by creamy-white tip.

**Underparts:** throat, breast, belly, flanks, ventral region and undertail coverts unmarked bright orange-rufous.

**Upperwing:** scapulars, lesser, median, greater and primary coverts dark brown with distinct warm buff tips, although the scapulars were both fringed and tipped warm buff, and because of the relative small size these feathers formed a striking upperwing panel in flight. The greater coverts were noticeable darker than the other coverts, appearing almost black. Dark brown tertials with warm buff fringes and tips. Secondaries appeared wholly blackish on the closed wing, but in flight exhibited thin buff tips forming a trailing edge. Thin whitish tips to blackish primaries. Three, sometimes four prominent primaries were exposed on the open wing in flight.

**Underwing:** underwing coverts bright rusty orange contrasting strongly with almost wholly black secondaries. Silver-white primaries with dark transverse barring across whole width except at base where they appeared unmarked forming a distinct pale area which contrasted with dark tips to the primary coverts. Tips to the three or four 'exposed' primaries were blackish.

**Bare parts:** views attained could not allow much bill detail to be noted although it appeared to be small harrier-type bill with yellow on upper mandible and greyish on lower mandible contrasting with dark tip. Legs and feet dark yellow. Eye appeared dark.

### **Range and Status**

Pallid Harrier breeds in dry temperate steppe zones in a belt that extends from eastern Europe across the USSR to central Asia and winters chiefly in Africa and southern Asia. It is a rare, but increasingly regular vagrant to western Europe, particularly Scandinavia and the low countries. If accepted by The British Birds Rarities Committee, this bird will constitute the second record for Scotland and the fourth record for Britain and Ireland. The three previous accepted British records are as follows (Dymond *et al.* 1989):

Shetland: Fair Isle, male, from about 24 April to 8 May 1931 (shot).

Dorset: Studland, male, 11 April 1938.

Yorkshire: Hutton Cranswick, immature male, shot on 2 October 1952.

### **Summary**

A juvenile Pallid Harrier *Circus macronus* was present in the Sumburgh and Dunrossness area of Shetland from 15-16 September 1993. Upon acceptance by BBRC, this bird will constitute the second record for Scotland and the fourth for Britain and Ireland.

### ***Cetti's Warbler in Edinburgh: a new bird for Scotland***

On 5 October 1993 Mike Shepherd was handed a freshly dead bird that had been found beneath a window of the Scottish Natural Heritage offices at 2 Anderson Place in Leith, Edinburgh. Incredibly the bird turned out to be a Cetti's Warbler *Cettia cetti* that had presumably flown into

### **References**

- Dymond, J.N., Fraser, P.A. & Gantlett, S.J.M., 1989. *Rare Birds in Britain and Ireland*. Calton.
- Forsman, D. Hybridising Harriers. *Birding World* 6:313.
- Jonsson, L. 1992 *Birds of Europe*. London.
- Porter, R.F., Willis, I., Christenson, S. & Pors Nielson, B. 1986. *Flight Identification of European Raptors*. Calton.

### **Acknowledgements**

Thanks are due to Dennis and John Coutts for initially informing me of the bird's presence, as are thanks to Steve Gantlett and Mick Mellor for useful discussion on juvenile Harrier identification.

***Hugh Harrop, Fairview,  
Scatness, Virkie, Shetland ZE3 9JW.***

a window the night before and even more remarkably bore a French ring. It was later found to have been ringed as a first-year bird at Wissant, between Cap Gris-Nez and Calais, on 24 August 1993 (P. Rauvel & C. Duponcheel pers. comm.).

The bird was taken to the Royal Museum of Scotland, Edinburgh where it is now preserved as skin number NMSZ 1993.181. Here the

specimen was compared with several text books and a number of other skins in the collection from Spain, Italy and Turkey. The bird was clearly a small individual with all measurements at the low end of the published range and was less bright rufous than all other specimens in the collection. The bill was also finer and narrower than other specimens.

### **Description**

**Upperparts:** uniform rufous brown, becoming darker brown on the upper tail coverts and crown and greyer on the sides of the breast.

**Underparts:** under tail coverts brown and broadly tipped off white. Vent, flanks and sides of breast brownish grey, becoming greyer on the breast. Centre of belly off white, greyer across the breast. Throat white.

**Head:** whitish supercilium from bill to behind eye, where it was broader and more prominent. Also white feathering on lower eye lid. Dark line through the eye to above the ear coverts.

**Wings:** darker brown than mantle, with a more rufous panel on the closed wing. The wings were short with a length of 56mm.

**Tail:** dark brown, as wings. There were 10 tail feathers, that were slightly worn. The tail measured 57m.

**Eye colour:** darkest brown.

**Bill:** fine and rather narrow at base compared with other skins. Dark brown above with purplish pink base to lower mandible. Measured as 13mm from bill tip to skull and 9mm from tip of feathering.

**Tarsus:** transparent flesh/pink in colour and measured as 19.3mm.

**Ankle and feet:** transparent purplish pink.

**Weight:** 10.8g, but it may have lost about 1g before weighing. Stomach empty, but in good condition with good amount of subcutaneous and deposited fat (3 on a score of 1 to 3).

**Age/sex:** on dissection the bird was found to be a male and the skull was fully ossified, indicating it was an adult.

Note that measurements and the colour of the bare parts were noted by the taxidermist when the bird was fresh.

For Scotland's first Cetti's Warbler to turn up as a corpse beneath a window in Edinburgh was unexpected, to say the least. It is the longest distance travelled by a Cetti's Warbler ringed at the Wissant site, and also now the furthest north record in the UK after one at Hornsea (North Humberside) on 2-3 November 1972. The date of its arrival is certainly typical of migrant Cetti's Warblers arriving in southern England from the continent, but why it should have ended up in Leith can only be guessed at. The site is only 1.5km from the coast and although adjacent to the Water of Leith there is no suitable habitat nearby. Central Edinburgh also hosted a Hoopoe *Upupa epops* on 21 October and a Firecrest *Regulus ignicapillus* on 28 November - perhaps the East Lothian coast is not the best place to look for migrants after all!

### **Acknowledgement**

I am grateful to Mike Shepherd for allowing me, as Local Recorder, to write up the occurrence and Bob McGowan at the Royal Museum of Scotland for supplying information on the bird's soft-part colouration and measurements.

**Ian J. Andrews, 39 Clayknowes Drive,  
Musselburgh, Midlothian EH21 6UW.**

## Obituary

### Dr W.J. Eggeling CBE FRSE

Joe Eggeling, who died in February 1994, was one of the most outstanding figures in Scottish conservation and ornithology. Born the son of a GP in Fife in 1909, he progressed to distinguished careers as a student of forestry at the Universities of Edinburgh and Oxford and then as a practitioner of it in Africa, joining the Colonial Forestry Service in 1931. Both in Uganda where he became Conservator in 1946 and in Tanganyika to which he moved in 1950 and where he rose to be Chief Conservator, he made an exceptional contribution to the survey and management of these countries' natural resources.

Retiring from forestry at the age of 45 in 1954 he returned to Scotland and cast about for a new career. He recalled an incident years before when he was wildfowling at Cameron Reservoir in Fife and had shot a goose with a private ringing scheme ring on its leg. He returned the ring with a note saying 'I shot a curious Canada-type goose with your ring on it. Sorry.' It was indeed a curious goose, a 'Barnada': a cross between a Barnacle gander and a Canada goose, part of the wildfowl collection at Tayport.

Now he wrote again to the owner of the goose, Dr John Berry, then Director in Scotland of the Nature Conservancy: 'You may remember me as the man who shot your goose. If there are any posts going in the Nature Conservancy I hope you will consider me.' He was considered. He was enthusiastically appointed to a post as a Scientific Officer; 'just the man for the job - it was made for Joe', but Civil Service

regulations blocked the appointment. A Scientific Officer had to be a scientist and 'Dr Eggeling is not a scientist but a forester'. The late Sir Arthur Duncan, then Chairman of the Nature Conservancy (and first Chairman of the SOC in 1937) was determined to have him on board and swept away the objections by the inspired expedient of inventing a new type of post to which a forester *could* be appointed: Conservation Officer. Thus Joe Eggeling was launched on his distinguished conservation career in Scotland.

The Nature Conservancy in the 1950s and 60s was a much smaller organisation than its modern counterpart but in a pioneering way it grappled with major issues like the setting up of the first National Nature Reserves in the Cairngorms, in Torridon and Rhum, designating the first Sites of Special Scientific Interest and generally bringing a more orderly approach to the welfare of wildlife. Joe Eggeling relished the challenge which this presented both in terms of directing practical conservation work on the ground and also the more humdrum and long drawn-out bureaucratic processes which lay behind it.

In all this he could be quite firm with everyone concerned; he possessed the formidable armoury of toughness combined with a sense of humour. One landowner who telephoned the Nature Conservancy with a complaint and who scathingly said that its staff knew nothing of ecology compared to his own experience of Africa found himself being addressed by Joe Eggeling in trenchant Swahili. He succeeded Dr Berry at Director in Scotland in 1968 until his retirement from the Conservancy in 1970. He was made CBE in 1971.

He also applied his energy to the SOC, being elected to Council in 1955 and serving as Vice President in the years 1963-66 and as

President in 1966-69. During this long service he played a prominent part in all the Club's decisions including, for example, the founding of *Scottish Birds* in 1958. In the late 1950s *The Scottish Naturalist*, in which the Club published material, was down to a circulation of 250 with only 90 Club members subscribing. It took a steady nerve to start a new journal from that base. Accommodation was another problem and Joe Eggeling served on the committee which, thanks to the generosity of a donor's gift of £3000, was able to oversee the purchase of 21 Regent Terrace as the Scottish Centre of Ornithology and Bird Protection.

He also chaired the committee which, for nerve, was the biggest Club undertaking of those years: the Bird Islands Cruise of 1966. This entailed chartering the passenger liner *Devonia* and setting up the whole organisation for a tour for 420 foreign delegate to the International Ornithological Congress, plus resident members, on a journey round the top of Scotland to islands not always blessed with fine weather.

On this occasion they were. Warm sunshine and calm seas contributed to the outstanding success of the trip and at the end of the first day Joe Eggeling was able to put some months of anxiety behind him with a beaming grin and the words 'it will be all right now'. Members who were on the cruise will remember his genial presiding presence and his excellent commentaries from the bridge as the ship sidled past island birds cliffs.

Of all these islands it was the May which was closest to his heart. Familiar with its shape on the horizon since childhood, it was a haven for him for many years. On 25 October 1952 he wrote in the Bird Observatory log: 'I would like to record the extreme pleasure I have

obtained from my visits to the island this summer and autumn. I have laid up many lovely memories to bring out of store and linger over in Africa. That country is too large, as even are its component parts, for one to get to know any piece of it intimately, and that is one of the great attractions of the May. You can get to know every blade of grass, every stone, and every nest'.

Never one to stay on the side-lines he soon found himself elected as Honorary Secretary of the Bird Observatory on his return to Scotland. He threw himself into running it, keeping the most meticulous records in tiny handwriting famously at odds with his bulky frame, and completely re-organising the records system. In his professional role he was instrumental in bringing about the National Nature Reserve on the May through negotiations with the Northern Lighthouse Board, and also with the Bird Observatory which was entrusted as managed of the reserve on the Nature Conservancy's behalf.

Not that it was all book work. A good deal of physical effort was required to keep the Observatory building, the Low Light, and all the traps in good order. In the 1950s one hazard was the lightkeepers goats which made a habit of climbing onto the roofs of the Heligoland traps to nibble emerging tree tops, and crashing through the wire netting.

Often accompanied by his wife Jessie and their children he was a frequent resident of the Low Light, refurbishing it, repairing goat and gale damage elsewhere, trapping and ringing, botanising, but above all enjoying the place with its migrant excitements and its teeming sea-birds in summer. He took a particular interest in the small Fulmar population; one long-resident pair was dubbed Joe and Jessie.

But some of the work was a slog, a fact not always appreciated by others who benefited from it. On a lone visit in March 1958, he wrote in the log: 'It has been a day of toil and my fingers are so chapped and hacked and wire torn that I can scarcely hold the pen'. Three days later the situation had not improved. 'Already I am six days overdue and the emergency shelf now houses only one tin of sardines, curry powder, mixed herbs and white pepper'. It was to be yet another six days before the weather calmed down enough for a boat to take him off; he had been kept going by the lightkeepers hospitality and a plentiful supply of rabbits.

1960 saw the publication of his book *The Isle of May* in which he chronicled the whole story of the island with its lighthouses and its wildlife and the Bird Observatory. This was just prior to the dramatic changes in the sea-bird populations. In a log entry in July 1949 he had written: 'The morning was spent looking for Puffins. Two pairs were seen to enter cracks in the Mill Door'. By 1960 they were breeding

'in small numbers' before taking off to the present population of over 40,000. Herring Gulls increased from about 6000 in 1960 to 30,000 ten years later, leading to the culls carried out in the 1970s by the NCC at the request of the Observatory committee.

Following retirement Joe Eggeling suffered a stroke in 1973 but continued his active interest in conservation as a Commissioner of the Countryside Commission for Scotland and a Vice President of the Scottish Wildlife Trust. On his last visit to the May in 1989 he had the pleasure of seeing the ownership of the island being formally handed over to the NCC, securing its conservation for the future. He himself had played a major part in advancing that conservation, not only on the May but throughout the whole of Scotland. He will be remembered with respect for that achievement, but he will also be remembered with affection for his generosity of spirit, his thoughtfulness towards others and for his good company. He was not just a big man; he was a towering presence.

**John Arnott**

## 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 October 1993 to February 1994. The librarian 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 per order for postage and packing.

### Scientific papers.

Bones, M. 1993. The garefowl or Great Auk *Pinguinis impennis*. *Hebridean Nat.* 11: 15-24.

Bryant, D.M. 1993. Bird communities in oak and Norway spruce woodlands on Loch Lomondside: a long-term study. *Forth Nat. & Hist.* 16: 59-70.

Buckland, S.T. & Elston, D.A. 1993. Empirical models for the spatial distribution of wildlife. *J. appl. Ecol.* 30: 478-495. Includes case studies of the Redstart and the Green Woodpecker in Scotland.

Cadbury, J. 1993. Grazing and other management of upland vegetation for birds in the United Kingdom. *RSPB Conserv. Rev.* 7: 12-21.

Canham, M. 1992. Nestboxes for Kestrels. *Forestry Comm. Res. Inf. Note* 215.

Craib, J. 1994. Why do Common Cuckoos resemble raptors? *Brit. Birds* 87: 78-79. A study in northern Scotland.

Cresswell, W. 1993. Escape response by Redshanks *Tringa totanus* on attack by avian predators. *Anim. Behav.* 46: 609-611.

Crockford, N.J. 1993. Action for Merlins. *RSPB Conserv. Rev.* 7: 22-26.

Delany, S. 1993. Introduced and escaped

geese in Britain in summer 1991. *Brit. Birds* 86: 591-599.

Dougall, T.W. 1993. Post-juvenile moult and dispersal in the Meadow Pipit *Anthus pratensis*. *Ringling and Migration* 14: 137-142. A study in southern Scotland.

Duncan, K. & Marquiss, M. 1993. The sex/age ratio, diving behaviour and habitat use of Goldeneye *Bucephala clangula* wintering in north-east Scotland. *Wildfowl* 44: 111-120.

Elliott, M.M. 1993. Greylag Goose counts in the Uists from 1986 to 1991. *Hebridean Nat.* 11: 56-60.

Ellis, P. & Dawson, J. 1994. Ageing and sexing of King Eiders. *Brit. Birds* 87:36-40. Based on observations in Shetland and in captivity.

Fairlamb, D. 1993. The year of the flood. *Perth & Kinross Bird Report* for 1992: 42-44. Describes the creation of an artificial wetland at Vane Farm RSPB Reserve.

Furness, R.M. 1994. The impact of the BRAER oil spill on Shetland's breeding seabirds. *Seabird Group Newsletter* 67: 3-6.

Gibson, J.A. 1992. The 1988 census of Gannets on Ailsa Craig. *Scot. Nat.* 104: 115-121.

Gitay, H., Fox, A.D. & Boyd, H. 1990. Analysis of historical Pink-footed Goose ringing recovery data. *Ring* 13: 103-112. A study covering Ireland, England and Scotland (only recently received).

Graves, J., Ortega Ruano J. & Slater, P.J.B. 1993. Sex ratio of chicks in the Shag *Phalacrocorax aristotelis* determined by a female-specific band in DNA fingerprinting. *Ibis* 135: 470-472.

Green, R.E. & Stowe, T.J. 1993. The decline of the Corncrake *Crex crex* in Britain and Ireland in relation to habitat change. *J. appl. Ecol.* 30: 689-695.

Harrison, N. & Sears, J. 1993. Towards a marine conservation programme. *RSPB Conserv. Rev.* 7: 35-41. Concerned with

seabirds, pollution and overfishing.

Hartley, I.R., Shepherd, M., Robson, T. & Burke, T. 1993. Reproductive success of polygynous male Corn Buntings as confirmed by DNA fingerprinting. *Behav. Ecol.* 4: 310-317.

Hill, D., Rushton, S.P., Clark, N., Green, P. & Prys-Jones, R. 1993. Shorebird communities on British estuaries: factors affecting community composition. *J. appl. Ecol.* 30: 220-234.

Hirst, P. 1993. RAFOS Expedition to St Kilda 28 May - 15 June 1988. *Royal Air Force Orn. Soc. J.* 22: 1-18.

Hume, R.A. 1993. Brown Shrike *Lanius cristatus* in Shetland: new to Britain and Ireland. *Brit. Birds* 86: 600-604.

Johnston, R.D. 1993. The effect of direct feeding of nestlings on weight loss in female Great Tits *Parus major*. *Ibis* 135: 311-314. A study near Stirling.

Kenney, D. 1993. Common Buzzard taking Common Teal in flight. *Brit. Birds* 86: 625.

McCracken, D.I., Foster, G.N., Bignal, E.M. & Bignal, S. 1992. An assessment of Chough *Pyrhacorax pyrrhacorax* diet using multivariate analysis techniques. *Avocetta* 16: 19-29.

Mitchell, J. 1993. The Herony at Gartcairn Wood, Loch Lomondside: an update. *Forth Nat. & Hist.* 16: 58.

Moss, R., Watson, A., Parr, R.A., Trenholm, I.B. & Marquiss, M. 1993. Growth rate, condition and survival of Red Grouse chicks. *Orn. Scand.* 24: 303-310.

Newton, I. 1993. Age and site fidelity in female Sparrowhawks *Accipiter nisus*. *Anim. Behav.* 46: 161-168.

Peach, W.J., Thompson, P.S. & Coulson, J.C. 1994. Annual and long-term variation in the survival rates of British Lapwings. *J. Anim. Ecol.* 63: 60-70.

Percival, S.M. 1993. The effects of reseeded, fertiliser application and disturbance on the

use of grasslands by Barnacle Geese, and the implications for refuge management. *J. appl. Ecol.* 30: 437-443. A study on Islay.

Redfern, C. 1993. Song Thrushes feeding on Periwinkles. *Brit. Birds* 86: 630. An occurrence in the Outer Hebrides.

Riddiford, N. & Potts, P. 1993. Exceptional claw-wear of Great Reed Warbler. *Brit. Birds* 86: 572. Found in a vagrant on Fair Isle.

Sankey, S. 1993. Our birds: a conservationist's view. *Forth Nat. & Hist.* 16: 53-57.

Watson, A., Moss, R., Parr, R., Mountford, M.D. & Rothery, P. 1994. Kin landownership, differential aggression between kin and non-kin, and population fluctuations in Red Grouse *Lagopus l. scoticus*. *J. Anim. Ecol.* 63: 39-50.

Watson, J., Leitch, A.F. & Rae, S.R. 1993. The diet of Golden Eagles *Aquila chrysaetos* in Scotland. *Ibis* 135: 387-393.

Williams, G. & Green, R. 1993. Towards an upland habitat action plan. *RSPB Conserv. Rev.* 7: 5-11.

Young, S.C. 1993. The Shetland oil disaster. *Envir. Politics* 2: 333-339.

Zonfrillo, B. & Brockie, K. 1993. Daurian Redstart in Scotland. *Brit. Birds* 86: 629. Vagrant on the Isle of May.

## Bird Reports

*Argyll Bird Report for 1992.* J.C.A. Craik (ed.) 1993. 56pp. \*£3.50

*Colonsay and Oronsay, Natural History of., for 1993.* J. Clarke & P.M. Clarke (eds) 11pp. This series is now in its 12th year under the same editors.

*Dumfries & Galloway Bird Report for 1992.* Paul Collin & Ken Bruce (eds) 1993. \*£2.20

*Forth Area Bird Report for 1992.* C.J. Henty (ed.) 1993. In *Forth Nat. & Hist.* 16: 25-52. Covers the Districts of Falkirk, Clackmannan and those parts of Stirling District that drain into the River Forth.



*Highland Bird Report for 1991.* Colin Crooke (ed.) 1993. 31pp \*£2.50

*Lothian Bird Report for 1992.* Paul Speak (ed.) 1993. 122pp. \*£3.95. Includes ten short articles on special surveys, rarity reports, atlas work and ringing, plus a 67-page systematic list.

*North Sea Bird Club Annual Report for 1992.* 84pp. Includes a 43-page systematic list and a checklist of birds seen at offshore oil installations and vessels from 1979-92.

*North-East Scotland Bird Report for 1992.* Andy Webb (ed.) 1993. 76pp. \*£3.50. Includes articles on wintering waterfowl at the Loch of Skene, on Skua movements off Peterhead, and on Quail in north-east Scotland.

*Perth & Kinross Bird Report for 1992.* Wendy Mattingley (ed.) 1993. 48pp. \*£3.50. Includes a 38-page systematic list, a short report on ringing, and an article on the Vane Farm RSPB reserve (see Fairlamb above).

***W.G. Harper.***

---

## European Journals in the Waterston Library

The following selection of articles appeared in the European journals received in the Waterston Library between September 1993 and February 1994 inclusive, thus following on the list published in Vol 17 No 2. 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 its year of publication. Journals quoted are as follows :

Belgium: *Mergus*

Netherlands: *Dutch Birding, Limosa, Ardea*

France: *Alauda, Le Passer*

Switzerland: *Der Ornithologische Beobachter*

Germany: *Limicola, Vogelwelt, Corax, Die Vogelwarte, Seevögel*

Poland: *The Ring*

Spain: *Ardeola*

Ireland: *Irish Birds*

Denmark: *Ornis Scandinavica* (with effect from 1994 renamed 'Journal of Avian Biology'), *Dansk Ornitologisk Forenings Tidsskrift*

Norway: *Vår Fuglefauna*, Stavanger

Museum occasional publications

Sweden: *Vår Fågelvärld, Ornis Svecica*

Finland: *Linnut, Ornis Fennica*

### General:

Helmich, J. [The impact of pesticides on birds; a case study on Great Bustard]. *Ardeola* 2/92 (This is a special issue of *Ardeola*. It contains seminar papers on conservation in Spain

which are too numerous to enumerate here, but cover a wide field of subjects on this overall theme).

### Divers to Ducks:

Wink, M. *et al.* Genetic evidence for speciation of Manx Shearwater and Mediterranean Shearwater. *Vogelwelt* 6/93.

Ullman, M. [Field identification of Storm Petrels]. *Vår Fågelvärld* 7/93.

Anfinnsen, M.T. [The Great Crested Grebe at Jæren in the 1950's] (includes a brief history of Great Crested Grebe in Norway since 1774). Stavanger Museum occasional publication 1992.

Rösner, H-U. [Monitoring of Barnacle and Brent Geese in Schleswig Holstein Wadden Sea 1991-2]. *Corax* 3/93.

Clausen, P. & Fischer, K. [Identification of age and race of Brent Geese]. *Dansk Orn. For. Tidsskr.* 1/94.

Gélinaud, G. *et al.* [Wintering of Shelduck in France]. *Alauda* 4/92.

Schricke, V. [Mont St Michel Bay, the major moulting area in France for Common Scoter]. *Alauda* 1/93.

Durinck, J. *et al.* Diet of Common and Velvet Scoters wintering in the North Sea. *Ornis Fenn.* 4/93.

### Birds of Prey:

Solonen, T. Spacing of raptor territories in southern Finland. *Ornis Fenn.* 3/93.

Kjellén, N. [Raptor migration at Falsterbo]. *Vår Fågelvärld* 5/93.

Wirdheim, A. [The Honey Buzzard]. *Vår Fågelvärld* 5/93.

Solonen, T. *et al.* [Where do Buzzards nest? a review of nest sites in Finland]. *Linnut* 4/93.

Fernandez, C. [Selection of breeding site cliffs by Golden Eagle]. *Alauda* 2/93.

Fernandez, C. & Azkona, P. [Influence of breeding success on reuse of nests by Golden Eagle]. *Ardeola* 1/93.

Forsman, D. [Ageing of Golden Eagle]. *Linnut* 6/93.

Selås, V. [How does illegal shooting of Goshawks affect the breeding population?]. *Vår Fuglefauna* 3/93.

Steen, O.F. [Status of Peregrine Falcon in SE Norway 1993]. *Vår Fuglefauna* 4/93.

#### Grouse to Cranes:

Martin, K. & Horn, A.G. Clutch defence by male and female Ptarmigan. *Ornis Scand.* 4/93.

#### Waders to Auks:

Mahéo, R. [International importance of French coasts for wintering waders]. *Alauda* 4/92.

De Putter, G. *et al.* [Numbers and distribution of waders on Flemish coast July 1989 - June 1990]. *Mergus* 1/93.

Ens, B.J. *et al.* [Distribution of overwintering waders in the Dutch Wadden Sea]. *Limosa* 4/93.

Berg, A. Habitat selection by monogamous and polygamous Lapwings on farmland - the importance of foraging habitats and suitable nest sites. *Ardea* 2/93.

Boschert, M. & Rupp, J. [Breeding biology of Curlew at a site in the southern Upper Rhine valley]. *Vogelwelt* 5/93.

Hülsmann, H. [The Redshank in Schleswig-Holstein] *Seevögel* 4/93.

Leuzinger, H. & Jenni, L. [Migration of Wood Sandpipers at Ägelsee, Switzerland]. *Orn. Beob.* 3/93.

Le Maréchal, P. [Development of gull (*Larus* and *Rissa*) populations in Ile-de-France 1976-92]. *Le Passer* 1-2/93.

Kompanje, J.O. & Post, J.N.J. [Russian race

of Common Gull in Netherlands]. *Dutch Birding* 6/93.

Bartel, P. & Königstedt, D.G.W. [Identification of Slender-billed Gull]. *Limicola* 4/93.

#### Pigeons to Woodpeckers:

Fredriksson, R. [Identification of juvenile owls after leaving nest]. *Limicola* 6/93.

Giraudoux, P. & Michelat, D. [Prey-predator-habitat relationship of Barn Owl during breeding season]. *Alauda* 2/93.

Stegen, C. [Prey composition of Barn Owl in an area of Schleswig-Holstein]. *Seevögel* 3/93.

Lind, H. Differing ecology of male and female wintering Snowy Owls. *Ornis Svec.* 3-4/93.

#### Passerines:

Sjöberg, K. *et al.* Differences in bird habitat quality between plantations of Scots and Lodgepole Pine measured in terms of Pied Flycatcher breeding success. *Ornis. Svec.* 2/93.

Mild, K. [Identification of European black-and-white flycatchers]. *Limicola* 5/93.

Busse, P. Migratory behaviour of Blackcaps wintering in Britain and Ireland: contradictory hypotheses. *The Ring* 1-2/92.

Fransson, T. & Stolt, B.-O. Is there an autumn migration of continental Blackcaps into Northern Europe? *Vogelwarte* 2/93.

Hogstad, O. & Kroglund, R.T. The throat badge as a status signal in juvenile male Willow Tits *Jour. für Orn.* 4/93.

Berrow, S.D. *et al.* 2nd International Cough Survey in Ireland 1992. *Irish Birds* 1/93.

Olsen, K.M. [Field identification of Crossbill species]. *Vår Fågelvärld* 8/93.

**M.H. Murphy**

## 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 italics should follow the first text reference to each species and should follow Voous 'List of Recent Holarctic Bird Species' as given in the *The British Birds' List of Birds of the Western Palearctic* (1984). Only single quotation marks should be used throughout and numbers one to ten should be written out whereas 11 and above should be written as numerals. Dates should be written:.....on 5 August 1991.....but on the 5th (if the name of the month does not follow). Please note that papers shorter than 700 words will be treated as Short Notes where all references should be incorporated into the text, and not listed at the end, as in full articles.

Tables, maps and diagrams should be designed to fit either a single column or the full page width. Tables should be self-explanatory and headings should be kept as simple as possible, with footnotes used to provide extra details where necessary. Each table should be on a separate sheet. Maps and diagrams should be in Indian ink and be camera ready, but drawn so as to permit reduction to half their original size.

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

### Errata

*Scott. Birds* 17(2) Colour plates. The caption to the winning photograph in the SOC 1993 Photographic competition should read 'Sooty Shearwater' *Puffinus griseus* and not Manx Shearwater. The plate opposite should read 'Verditer Flycatcher', not 'Verditors'. Apologies to the photographers.

*Scott. Birds* 17: 104. Paragraph 3. line 3 should read '61 attacks' not '91'. Apologies to the author.

# Introducing...

## Bird Conservation International

*Published for the International Council for Bird Preservation by Cambridge University Press*

### A major new journal of international conservation

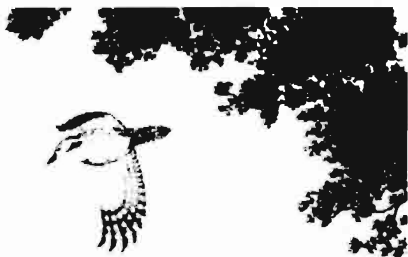
**Bird Conservation International** is a new quarterly journal focusing on the major conservation issues affecting birds – especially globally threatened species – and their habitats. Founded by the International Council for Bird Preservation, the journal provides a stimulating, international and up-to-date coverage of bird conservation topics critically important in today's world.

### Why you should read Bird Conservation International

With original papers and reviews, **Bird Conservation International** will keep you informed about endangered bird species, habitat destruction, wildlife trade and recent scientific research findings. In addition, much of the journal's published material has its origins in ICBP's *Red Data Research Programme* (used by governments and environmental decision makers world-wide) and its *Conservation Programme of Field Projects*.

### Essential reading for anyone interested in:

- species conservation
- preservation of habitats
- environmental issues
- ornithology



### Subscription

**Bird Conservation International** is published quarterly in March, June, September and December. Volume 3 in 1993. £64 for institutions; £32 for individuals; £26 for members of the World Bird Club; airmail £13 per year extra. ISSN 0959-2709.

51356

### Invitation to subscribe

Please enter my subscription to **Bird Conservation International**, Volume 3, 1993, ISSN 0959-2709

- £64 for institutions; £32 for individuals;  
 £26 for members of the World Bird Club;  
 Please send by airmail @ £13 per year extra

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Postcode \_\_\_\_\_

I enclose a Cheque (payable to Cambridge University Press and drawn against a UK bank)

Please send me an invoice

Please send me a sample copy

Send to: Journals Marketing Department, Cambridge University Press, FREEPOST\* The Edinburgh Building, Cambridge, CB2 1BR, UK. (\*No stamp necessary if posted in UK)

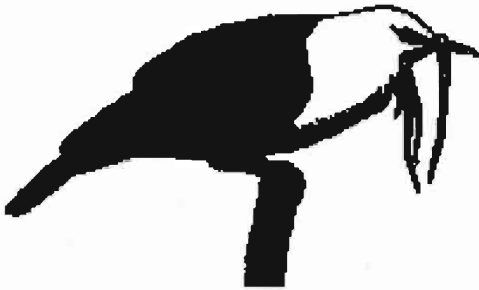
In USA, Canada & Mexico write to: Cambridge University Press 20 West 40th Street, New York, NY 10011-4211, USA



**CAMBRIDGE**  
**UNIVERSITY PRESS**

---

---



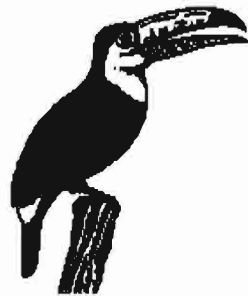
## NEOTROPICAL BIRD CLUB

### Neotropical bird club launched

A club has been launched to promote the study and conservation of the birds of the Neotropics (South America, Central America and the Caribbean). It is currently seeking founder members to help reach the launch budget of £2000, which is required to get the club running and to publish the two first issues of its intended journal 'Continga'. Founder members will be asked to pay a minimum of £25, and will be formally acknowledged in the first issue of 'Continga', planned for January 1994. 'Continga' will provide a colourful and much needed forum for exchange of information on the avifauna of this extremely rich and diverse area, and will contain papers and features on the birds and their conservation as well as news of recent observations and discoveries (at present, new species are still being discovered at the rate of more than two a year). It is hoped that in due course the club will be able to provide direct funding and support for practical conservation programmes.

*For further details and membership forms,  
please contact:*

**Rob Williams,  
Publicity Officer,  
Neotropical Bird Club,  
c/o The Lodge,  
Sandy,  
Bedfordshire SG19 2DL**



# Scottish Birds

Volume 17      Part 3      June 1994

## Contents

### Research Progress Reports

- The density and species diversity of songbird populations in northern upland spruce plantations. *I.J. Patterson & J.G. Ollason* 125  
Research on Capercaillie and their habitat. *R. Moss* 127

### Main articles

- Prey remains at Osprey nests in Tayside and Grampian, 1987-1993. *D.N. Carss & K. Brockie* 132  
Scottish List. *R.W. Forrester* 146

### Short Notes

- Mating times of Merlin. *R.C. Dickson* 160  
Merlin chick killed by adder. *G. Shaw* 162  
Site fidelity of Jack Snipe on migration? *D.G. Andrew* 163  
First breeding records of the Mandarin in Argyll. *S.J. Petty & D.I.K. Anderson* 164  
Discovery of the first British clutch of Slavonian Grebe eggs in a museum collection. *H.A. McGhie* 167  
Rook flight-line across Firth of Forth. *H.E.M. Dott* 168  
The diet of nestling Corn Buntings on North Uist – insects not grains. *I.R. Hartley & D.L.J. Quicke* 169

### Correspondence

- Pink and polluted Peregrines. *W.R.P. Bourne* 171  
Spring passage of Skuas in the Outer Hebrides. *D.G. Andrew* 172

### Rare Migrants

- Semi-palmated Sandpiper on Stronsay. *J. Holloway* 173  
Pallid Harrier in Shetland; second Scottish Record. *H. Harrop* 174  
Cetti's Warbler in Edinburgh: a new bird for Scotland. *I.J. Andrews* 177

### Obituary

- Dr W.J. Eggeling CBE FRSE. *J. Arnott* 178  
Items of Scottish Interest. *W.G. Harper* 181  
European Journals in the Waterston Library. *M. Murphy* 184  
Advice to Contributors 186  
Errata 186

Published by the Scottish Ornithologists' Club,  
21 Regent Terrace, Edinburgh EH7 5BT. © 1992

Printed by Milne, Tannahill and Methven Ltd., Perth