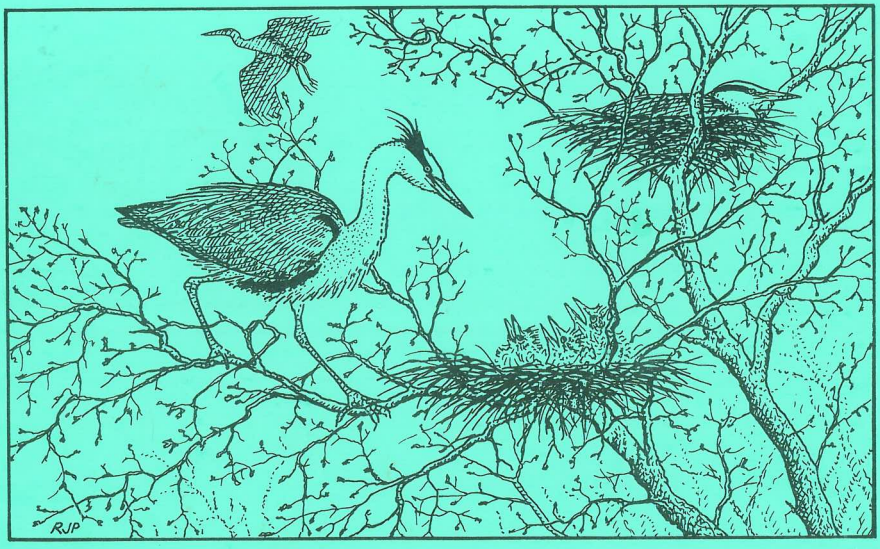
BRISTOL ORNITHOLOGY

THE JOURNAL OF THE BRISTOL ORNITHOLOGICAL CLUB



NUMBER 23, 1996

The Heronry at Cleeve

Communal Roosting in the Breeding Season

Status of the Willow Warbler in Saltford

Winter Sun-Basking by Garden Passerines

BRISTOL ORNITHOLOGY

THE JOURNAL OF THE BRISTOL ORNITHOLOGICAL CLUB

NUMBER 23, 1996

CONTENTS

Preface

Every year the British Trust for Ornithology organises a nationwide census of heronries across the UK, as part of a monitoring programme for this species, one which is vulnerable to pollution and hard winters, among other potential threats. Robin Prytherch has counted the nests at the Cleeve heronry for over 25 years and in this issue of *Bristol Ornithology* he documents the colony's long-term history, placing it within both a regional and the national context.

Also close to home, Will Duckworth presents an account of his study of Willow Warblers in the Saltford area since the early 80s. As with so many of our commoner species, it is only by undertaking careful studies on one's 'local patch' that fluctuations in numbers can be reliably compared year-on-year. On a nation-wide basis, or even on a county-wide one, it is difficult to say much more than that the species is 'widespread, locally abundant'.

Behavioural studies seem to be currently rather unfashionable, but there is much of interest to be discovered about even our commoner birds. Communal roosting is often assumed to be very much a winter activity for most species, but Jeffery Boswall shows that for many species this habit also occurs while nesting activities are under way. His studies range from Topsham to Tokyo, whereas Ken Simmons, although no stranger to foreign travel (e.g. his long-term work on Ascension Island), shows that fresh insights can be achieved even from one's living-room window. In this issue he expands on his observations of sun-basking behaviour by passerines, in this case in winter.

Jane Cumming, Ken Hall & Robin Prytherch
Bristol Ornithology Editorial Committee

The Heronry at Cleeve
A History of its First 34 Years

Robin Prytherch

The Grey Heron *Ardea cinerea* is a colonial breeder nesting, usually, in trees, but more rarely in low bushes, reed beds, on cliffs or bare ground (Cramp & Simmons, 1977). In recent years there have been at least 10 colonies, or heronries, in Avon, all in trees. Cleeve heronry, along with other heronries in Avon, has been counted annually as a contribution to the British Trust for Ornithology (BTO) national heronry census. The national census was first organised in 1928 by E.M. Nicholson for *British Birds* magazine and has been repeated annually since then, although in most years only a sample of heronries is counted (Hickling, 1983). On its formation in 1933 the BTO took over responsibility for organising the census. At a local level the census is organised (usually by county) by a member of the BTO but counts of nests at individual heronries are undertaken by anyone who is interested enough to do it.

I was introduced to Cleeve heronry by John Burton in 1968 when I accompanied him in order to count the nests. At that time I had no notion that from the next year I was to check the heronry in all years (but two) to the present (1995).

In this paper I document the history of the heronry from first colonisation with

- a brief description of the physical and biological features,
- the annual counts,
- comparisons with other heronries within 10 km of Cleeve and the national results and
- an analysis of the use of trees, including the distribution of trees within the heronry, choice of tree species and proportion of single and multiple nest trees.

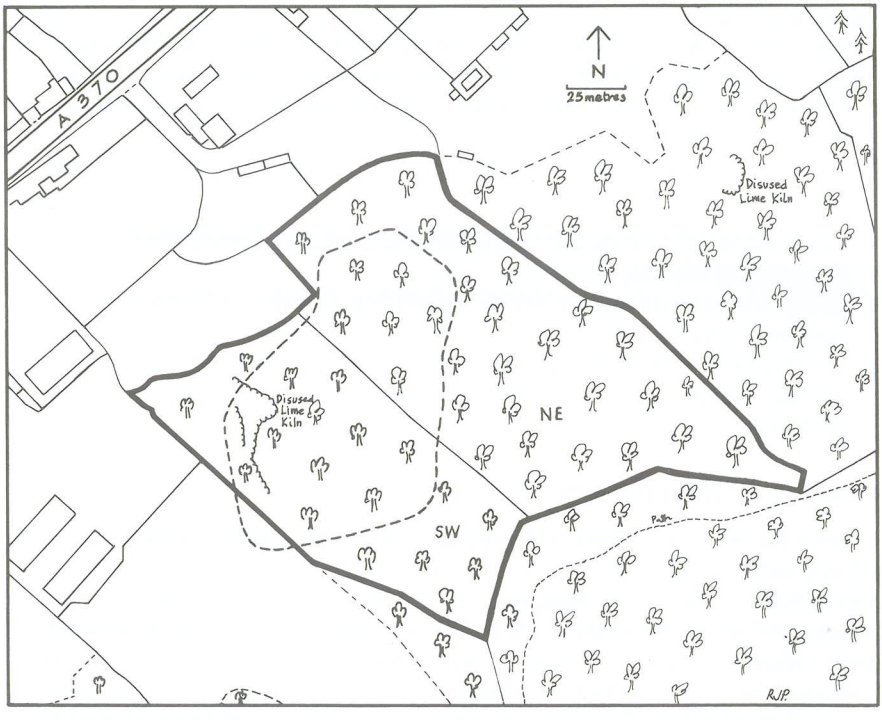
Formation of the Heronry

Cleeve heronry was formed because trees were felled (harvested) in the long established heronry at Brockley (described as 'Ancient' by Rutter (1829) in Palmer & Ballance, 1968). Brockley held up to 48 nests between 1902 and 1962 (Palmer & Ballance, 1968) and still held five nests in 1964 (after felling had commenced) before becoming 'extinct' in the following year. The birds had already moved the short distance, less than one km to the south-west, to Cleeve in 1962 when breeding was first recorded, but in this year and the following one, no counts were made. In 1964 sixteen nests were counted, but there was no count in

1965 when the heronry was fully established. From 1966, when 23 nests were counted, the heronry rapidly rose to 56 nests by 1971 and then slowly declined to 18 nests in 1989, thereafter recovering to 43 in 1995 (see below and Fig. 1 for further details). The heronry is located approximately 400m ENE of Cleeve church, on the lower edge of Cleeve Hill Woods (centred on grid reference ST 464663). The 2.5 hectares (6 acres) of woodland used by the herons became a reserve of the Somerset Trust for Nature Conservation in 1974 and was handed over to the Avon Wildlife Trust (AWT) on its formation in 1980 (Teverson, 1983). The south-west part of the reserve is owned by AWT; the other part by Alan Down, Cleeve Nursery. The reserve is closed to general access.

Physical and Biological Features

Most of the following account has been extracted from Teverson (1983). The heronry is on the lower north-west facing slope of Cleeve Hill, ranging in altitude from 45m on the NW edge to 70m at the southern corner (see Map 1). The underlying rock is carboniferous limestone and this is covered by a thin layer, rarely more than 6cm, of



Map 1 *Cleeve Heronry Reserve, Avon, shown in relation to adjacent woodland, buildings and the A370. The area of woodland actually used by the Grey Herons is enclosed within the broken line. The bold line indicates the limits of the reserve with the thin line separating the SW and NE parts of the reserve.*

soil. The woodland is mostly secondary with many mature or over-mature trees. The dominant species are English Oak *Quercus robur* and Ash *Fraxinus excelsior* with Lime *Tilia* sp. and Yew *Taxus baccata* sub-dominant, plus a few each of Field Maple *Acer campestre*, Sycamore *A. pseudoplatanus*, Cherry *Prunus avium*, Beech *Fagus sylvatica*, Hornbeam *Carpinus betulus*, Turkey Oak *Q. cerris* and Silver Birch *Betula pendula*. The highest area used to contain many English Elm *Ulmus procera* and the gaps created as they fell (due to 'Dutch Elm Disease') have been invaded by Sycamore. The storms of the 1989–90 winter blew over many trees, particularly in the area then being used by the herons. During that winter there were gales in October 1989, and in late January and early February 1990, but most trees fell in the hurricane force winds on 25th January. Ash, Lime and Cherry were the main victims, with a few Oaks. Since then one or two trees have fallen each winter, eliminating all Cherry trees large enough for use by herons (a species they like, see below). Many sapling trees have been planted to replace those that have fallen.

The shrub layer is generally quite well developed, but absent in some areas, comprising Hawthorn *Crataegus monogyna*, Spindle *Euonymus europaeus*, Dogwood *Cornus* sp., Holly *Ilex aquifolium* and some Hazel *Corylus avellana*. The ground flora is dominated by Ivy *Hedera helix* and Bramble *Rubus fruticosus* with, in spring, a reasonable spread of Bluebell *Hyacinthoides non-scripta*, Dog's Mercury *Mercurialis perennis* and Wood Anemone *Anemone nemorosa*. There is an active Badger *Meles meles* sett near the lower edge of the wood and most other locally common mammals probably use the wood and woodland edges. Apart from Grey Herons, the wood is populated by a selection of typical woodland birds, both resident and migrant although, to my knowledge, no survey has ever been carried out.

The Heronry Counts

I usually made my count of nests in the heronry between the middle of April and the end of the first week of May, after which foliage cover makes counting very difficult. Grey Herons breed early and by the third week of April many nests contain medium to large chicks, but even then, some late nesters are only laying; their pale blue eggs just visible through the twigs of the still flimsy nests. Counts up to 1991 classified nests on a scale from A: definitely in use, through B, C, D to E: definitely not in use. From 1992 a simpler and better two class system has been in use in which nests actually counted are noted under A, with B being a best estimate of the real total (to allow for any nests which may be hidden or difficult to be certain of). Large heronries can be exceptionally difficult to count and it is easy both to miss nests and to count them twice. By numbering (from 1979) and mapping the trees I could guarantee an accurate count. In the counts listed below I have included all

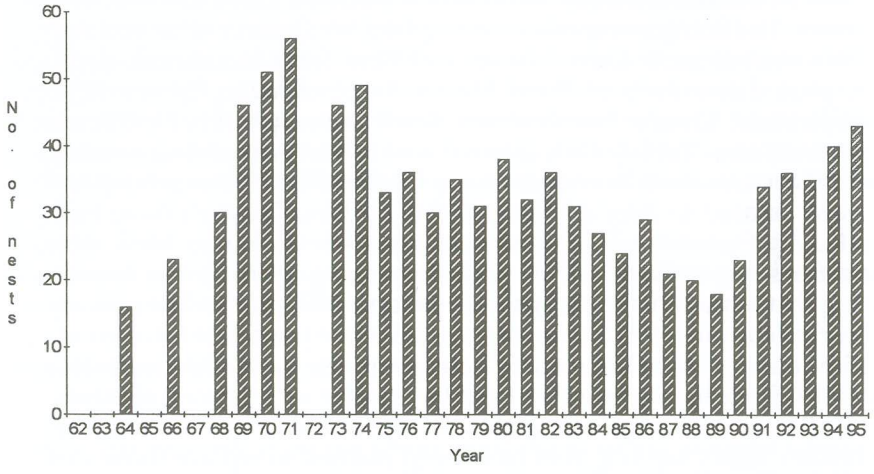


Fig. 1 Annual counts of Grey Heron nests at Cleeve heronry from its formation in 1962 to 1995. All counts made by the author except those for 1964, 66, 68 and 73. The actual figures for the counts are given in Table 1.

nests in categories A and B (definitely in use and probably in use) up to 1991 and in category A only from 1992. The counts for Cleeve (and West Hill, see below) are mine except for 1964, 66, 68 and 73. In some years for Cleeve they are at slight variance (for reasons which are not clear to me) from those held at the BTO. The BTO may, for their own purposes, include an allowance for extra nests that were possibly but not certainly occupied. For other heronries (see below) I have used counts provided by the BTO backed up with counts listed in the appropriate *Avon Bird Reports*.

Fig. 1 charts the counts at Cleeve Heronry from the earliest known in 1964 to the present, 1995. The first nests in 1962 and 63 were not counted unfortunately, but this may have been due to the very severe winters prior to those two seasons when potential observers may have been distracted by the consequences of the bad weather. It would have been especially interesting to have had these figures, in the circumstances. Counts were not made in 1965, 67 and 75 but for the purposes of calculating an average and for the long-term trend (see below) I have assumed the 1975 count as mid-way between the 1974 and 1976 counts.

As can be seen in Fig. 1 the heronry increased in size very quickly, rising to 56 (the highest number ever) in 10 years. Thereafter there was a steep decline over four years to just over 30 nests and it remained at between 30 and 38 nests for the next eight years (to 1983). Numbers then declined again to 18 nests in 1989, but in the most recent six years numbers have bounced back in a rapid increase to 43 nests in 1995. The average since 1969 has been 35 nests.

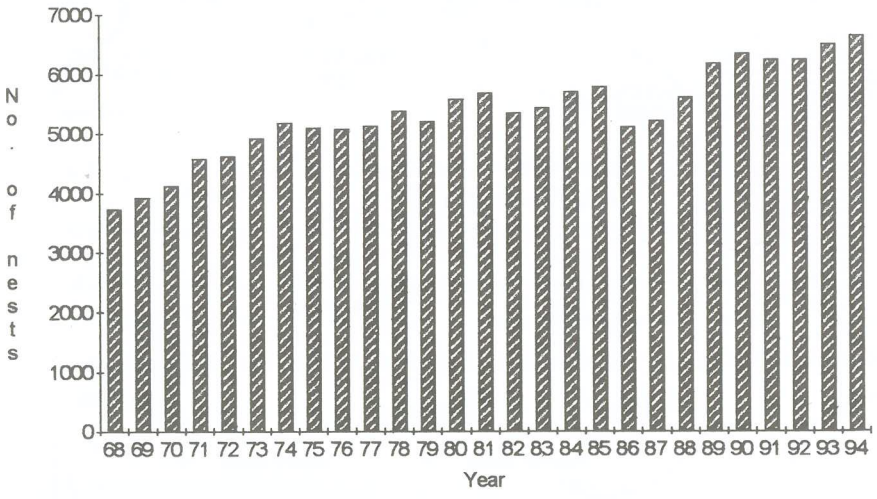


Fig. 2 Annual counts of Grey Heron nests recorded for England and Wales in the national census for 1968 to 1994.

Over the same period, comparison with the national census results (for England and Wales only) show parallel increases after the cold winters of 1961/62 and 1962/63. These winters were exceptionally severe and the census results showed a fall from about 4500 pairs to just over 2000. The population bounced back rapidly to approximately 5500 pairs in 1974 and continued to rise slightly but with some brief declines, especially between 1985 and 1990. The counts for 1968 to 1994 are shown in Fig. 2. The census stood at over 6000 pairs in the early 90s but, bearing in mind that the annual census is based on only a sample of all heronries, the actual figure must be higher. It was estimated that the total population in all Britain then was just over 10000 pairs (Gibbons *et al.*, 1993). At Cleeve, after reaching its peak in 1971, the pattern of declines between a stable period and final increase is contrary to the national trend described above. Indeed, the trend in the south-west has shown a greater increase than most other areas of Britain (Marchant *et al.*, 1990; Carter, 1993) which emphasises that Cleeve Heronry was, perhaps, in some trouble. Why were there these differences from the national and regional trends and, particularly, what caused the trough between 1983 and 1991 at Cleeve?

I decided to check on the history of other heronries within 10km of Cleeve and compare the counts. I chose the 10km limit as I knew it would just include the most distant of three other heronries in use during the period (see Map 2). All were first occupied after Cleeve was formed and have become extinct recently. The heronry at Bulling's Wood, Portbury, was occupied from 1971 to 1986, when the trees were felled. West Wood, Clevedon, was first used in 1984 and vacated in 1990 after a period of very

Map 2 *The location of Cleeve heronry and the three other heronries within 10km (indicated by the circle) relative to the main towns, rivers and coast of south Avon. The dashed line shows the approximate extent of the coastal levels — the presumed main feeding area of the Grey Herons.*

strong winds. Elwell Stream, Barrow Gurney, was occupied from 1983 to 1991 and may have been vacated due to the felling of nearby trees, although this is doubtful. (Two other small heronries have formed recently just outside my 10 km limit. Since the mid-1980s Denny Island at Chew Valley Lake (13 km from Cleeve) has held a few nests (three to five) each year until 1994 and 95 when seven and 11 nests respectively were recorded. Paradise Bottom near Abbots Leigh has held about four each year since 1990 but has never been counted accurately. These, and any single isolated nests away from the heronries within 10 km of Cleeve, are not considered here.) The nearest large and 'permanent' heronries are to the south at Tadham Moor and Swell Wood, both in Somerset. The former is 21km from Cleeve and holds *c.* 15 nests; the latter 43km and *c.* 80 nests (the largest in Avon, Gloucestershire, Somerset and Wiltshire) (Somerset Ornithological Society, 1988).

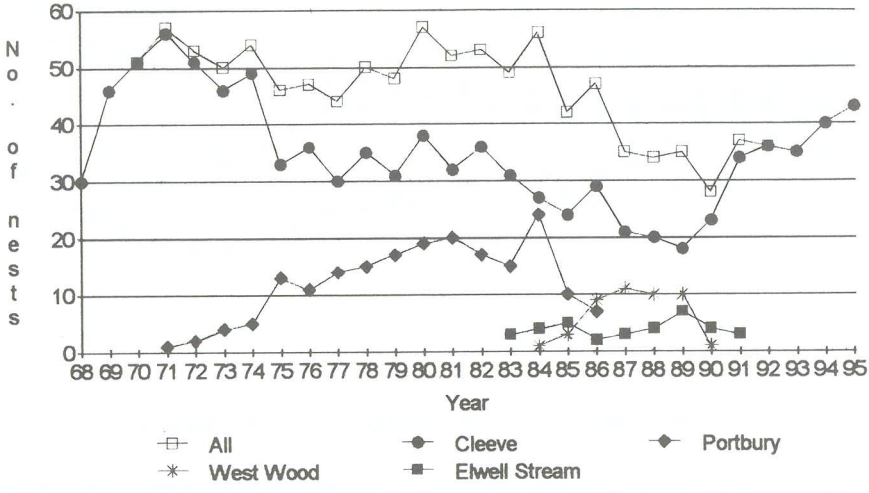


Fig. 3 Annual counts of Grey Heron nests at Cleeve heronry, 1969–1995, with other heronries within 10km of Cleeve: Bulling's Wood, 1971–86; Elwell Stream, 1983–91; West Wood, 1984–90 and all four combined. The figure for 1972 (not counted) is assumed at 51 (an average of 1971 and 1973) for this Fig. and for the calculation of running averages in Fig. 4.

During the initial growth of Bulling's Wood, Cleeve declined rapidly (see Fig. 3). Over the next seven years Bulling's Wood continued to increase while Cleeve levelled out. After two declining years Bulling's Wood rose to its peak of 24 nests before its demise two years later. During this time (1982–86) both Elwell Stream and West Wood were established. There appears to be a clear link between the decline of Bulling's Wood and the rise of West Wood. Both locations are in the Gordano Valley and it seems that the birds simply shifted from one end of it to the other. West Wood was deserted just as the birds were beginning to nest. One pair did lay eggs; some of the others may well have moved to re-nest at Cleeve. Elwell Stream was occupied only during the main slump in numbers at Cleeve, being first occupied during the decline at Cleeve in the early 1980s and abandoned when numbers there rose again. Up to 1984 the combined numbers of nests in all four heronries remained roughly stable, but from the next year there was a rapid decline in overall numbers until 1990. During this period there was a genuine loss of birds from the area. But then, as the Bulling's Wood, West Wood and Elwell Stream heronries declined and disappeared so Cleeve heronry started to attract new pairs. The final upsurge at Cleeve started after the violent storms of the autumn and winter of 1989/90, when many trees were blown over. The birds were forced to move to other trees in the wood (see below). Whether this change had some effect on the cohesiveness of the colony (i.e., making it more 'attractive' to prospecting pairs), or was pure coincidence, will

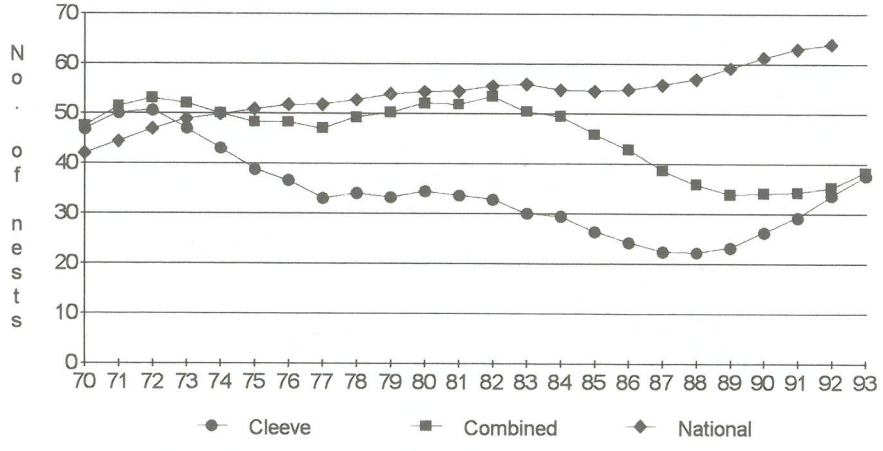


Fig. 4 Five-year running averages of counts of Grey Heron nests at Cleeve heronry, and Cleeve combined with heronries at Bulling's Wood, Elwell Stream and West Wood from 1968–72 to 1991–95, together with five-year running averages for the national census (England and Wales) from 1968–72 to 1990–94. For the latter, vertical scale should be multiplied by 100. Averages are plotted against the middle year of each period.

forever remain a mystery. At present, 1995, there are no other heronries within 10 km of Cleeve.

In Fig. 3 I show the counts from 1968 to 1995 for Cleeve, Bulling's Wood, West Wood and Elwell Stream and all four counts combined. (For ease of comparison these are drawn as line graphs when strictly they should be drawn as histograms.) This shows clearly that the combined counts indicated relatively stable numbers until the decline which started in 1985. To give a better indications of the trends I have calculated five-year running averages for Cleeve and for all four heronries combined. These are shown in Fig. 4. The decline, trough and final rise are clearly indicated for Cleeve. The trend line for the combined counts again indicates a fairly steady picture until the final trough, although it also shows that the early peak is followed by a shallow trough before a second peak (1980–84) which precedes the main trough and final upward trend.

The equivalent trend line for the national census is also shown in Fig. 4. Apart from the two declines the similarity of the trends is remarkable, particularly between the national census and my combined results during the periods 1973–77 to 1982–86 and 1987–91 to 1990–94. Since the downward trend at Cleeve and the other three heronries in the 1980s was against the trends of both the south-west regional counts of the national census and the national census overall, I can only assume that local conditions must have been unfavourable to some degree. The fluctuating fortunes of all four heronries during that period perhaps indicate that that was so.

Use of Trees

As mentioned above, in 1979 I started to number and identify the species of tree used by the herons. This not only aided accurate counting, but also enabled me to log the history of the usage of each tree. The trees were numbered as they were found; any attempt to number systematically, say, from east to west, or in some other logical way would fail (as new trees are used in subsequent years) unless *all* trees were numbered. The trees were mapped rather crudely at first, then in 1992 I made an accurate map (using tape measure and compass) of the trees in use that year. I was then able to retrospectively plot more accurately fallen trees in use earlier. I could also plot new trees used by herons in future years.

Table 1 shows the identification number and species of each tree with the number of nests used in each year from 1979 to 1995. My identification numbers were carved with a penknife on the trunk at head height; they were intentionally small to avoid vandalism by unauthorised visitors to the wood. This meant that, rarely, I could not find the number because it had either weathered over or become disfigured in some way. Tree 5 was an Ash which I could not relocate (it probably fell) so the number was given to an Oak. (I now always give a new number to a new tree.) Trees 5 Oak, 25 Ash, 36 Lime, 41 Yew and 52 Oak never held a nest which was used by herons; they are omitted from the table.

The most striking feature of Table 1 is the remarkable change that took place after the storms of 1989/90 blew over the majority of the trees then being used by the herons. A man-made event of this magnitude may well have caused the herons to desert the wood, but they took this natural catastrophe in their stride. They moved into the SW part of the wood, which was less damaged; back into the area where I remember most nests being when I first counted the heronry in 1969. Over the years the birds had slowly moved into the NE part of the wood although a few remained in the SW part in 1979.

I will refer to these different periods before and after the storms as 'early' (1979–89, 11 years) and 'late' (1990–95, 6 years). Only five trees (17 Lime, 21 Ash, 28 Oak, 37 Oak and 38 Oak) were used in both periods and only one tree (6 Oak) which was in use before the storms and did not fall, was not used subsequently. Many apparently suitable trees were still standing in the NE part of the wood (particularly on the lower slope) but the storm had cut a swathe through exactly that part of the wood used by most of the birds. Map 3 shows the location of all nest trees used from 1979 to 1995 (17 years) listed in Table 1 (except tree 5 Ash and 36 Lime). Maps 4 and 5 show the location of nest trees in the 'early' and 'late' periods respectively.

Table 2 shows how each species of tree was used in the (a) 'early' and (b) 'late' periods and (c) in all years. It plots tree species against the number of trees, number of nests, 'tree years' (the sum of all years in

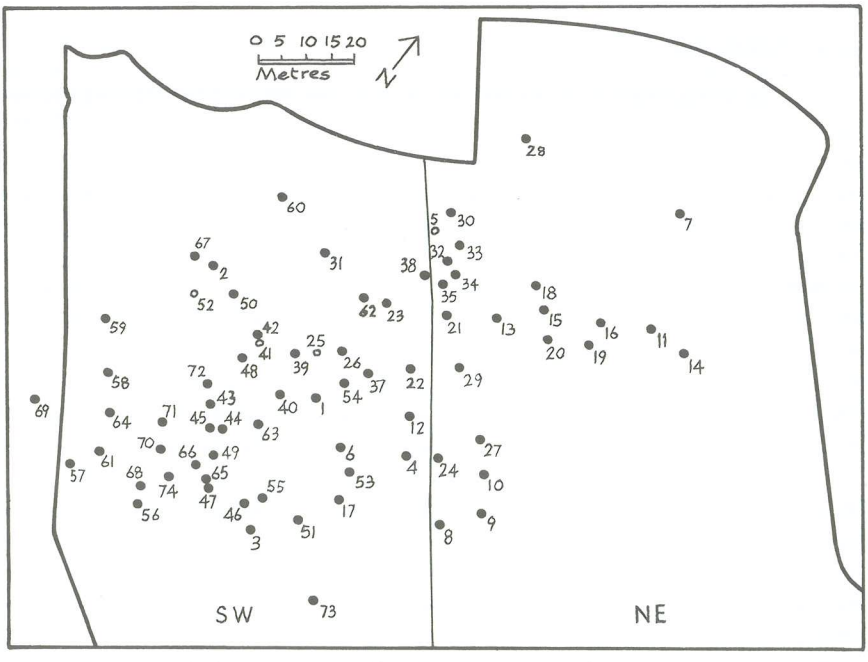
Table 1 *List of trees at Cleeve heronry and number of Grey Heron nests in each tree annually from 1979 to 1995. Trees 5 Oak, 25 Ash, 36 Lime, 41 Yew and 52 Oak never held a nest and are therefore not shown. F indicates the year in which a tree fell; most during the 'storm' winter of 1989/90.*

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Total
1 Lime	1											F						1
2 Oak												1	1	1	1	1	1	6
3 Ash	1	2	1	F														4
4 Oak			1															1
5 Ash		1																1
6 Oak		1				1	1	1		2	1							7
7 Oak	1	1	1	2	2	3	2		1									13
8 Ash	2	2	2	2	2	1	1	1	1			F						14
9 Ash	3	2	1	2								F						8
10 Ash	3	3	2	2	1	1	1	2	1			F						16
11 Oak	2	2	2	2	2	1	2	2	1	1		F						17
12 Oak	2		1	1				1				F						5
13 Ash			2	1	1	1	1	1				F						7
14 Oak	2	2	1	2	2	2	1	2	2	2	2	F						20
15 Cherry	1	1			F													2
16 Lime	1	2	2	2	2	1	1	1	1	1	1	F						15
17 Oak						1	1	1	1			1	2	2	2	1	2	14
18 Ash	1	1	1	1		F												4
19 Ash							1						F					1
20 Lime	1	1		1	1								F					4
21 Ash	1	1		2	2	1	1	1	1	1	1		1	1				14
22 Oak	1	1	1	2	2	1	1	1	1	1	1	F						13
23 Beech														1	1	1		3
24 Ash	1	1	1	1	1	1	1					F						7
26 Lime	1	2	1	1	1	1	1	1	1	1	1	F						12
27 Oak		2	2	2	2	1	1	3	2	2	2	F						19
28 Oak			1	1	1	1	1	1	1	2	2	2	1	1	1			16
29 Oak		1											F					1
30 Cherry			1			1		1				F						3
31 Oak	4	4	4	5	6	5	4	4	4	4	4	F						48
32 Cherry	1	1	1	1	1	1	1	2	1	1	1	F						12
33 Cherry		1	1	1	1			1				F						5
34 Cherry	1	1	1	1	1	1	1	1	1	1	1	F						11
35 Cherry		2	1	1								F						4
37 Oak									1	1		1	F					3
38 Oak											1	1	1	1	1			5
39 Oak												2	2	3	3	2	2	14
40 Oak												3	3	4	4	6	4	24
42 Oak												1	1	1	1	1	1	6

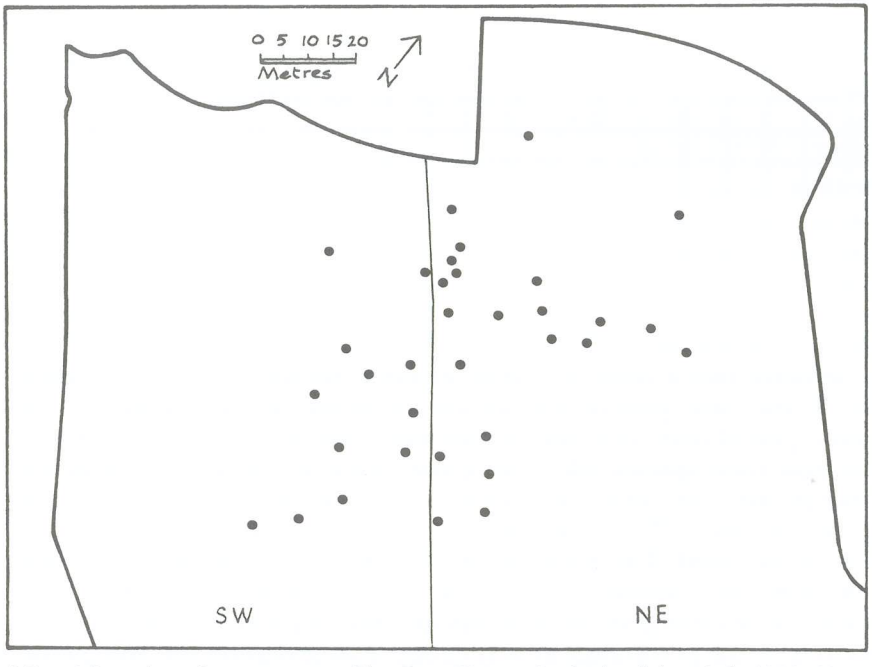
Table 1 (*continued*)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Total
43 Lime												1	1	1	1	1	1	6
44 Oak												4	4	4	3	3	4	22
45 Oak												1	1	1	1			4
46 Oak												1	1	1	2	3	4	12
47 Lime													1	1				2
48 Field Maple												1	1	1	1	1	1	6
49 Oak												1	1	1	2	2	4	11
50 Ash												1	1	1				3
51 Ash						1		1										2
53 Lime													1					1
54 Oak													1	1	1	1		4
55 Cherry													1			F		1
56 Oak													1	1	1	1	2	6
57 Ash													1					1
58 Oak													3	3	5	4	2	17
59 Oak														1	1	1	1	4
60 Beech												1	3	1		1	1	7
61 Cherry														1	1	F		2
62 Oak														1				1
63 Oak														1	1	1	2	5
64 Oak															1	1	1	3
65 Oak																1	1	2
66 Oak																1	2	3
67 Oak																1		1
68 Oak																1	1	2
69 Oak																1	1	2
70 Field Maple																1	1	2
71 Oak																1	1	2
72 Oak																1	1	2
73 Oak																	1	1
74 Oak																	1	1
Totals	31	38	32	36	31	27	24	29	21	20	18	23	34	36	35	40	43	

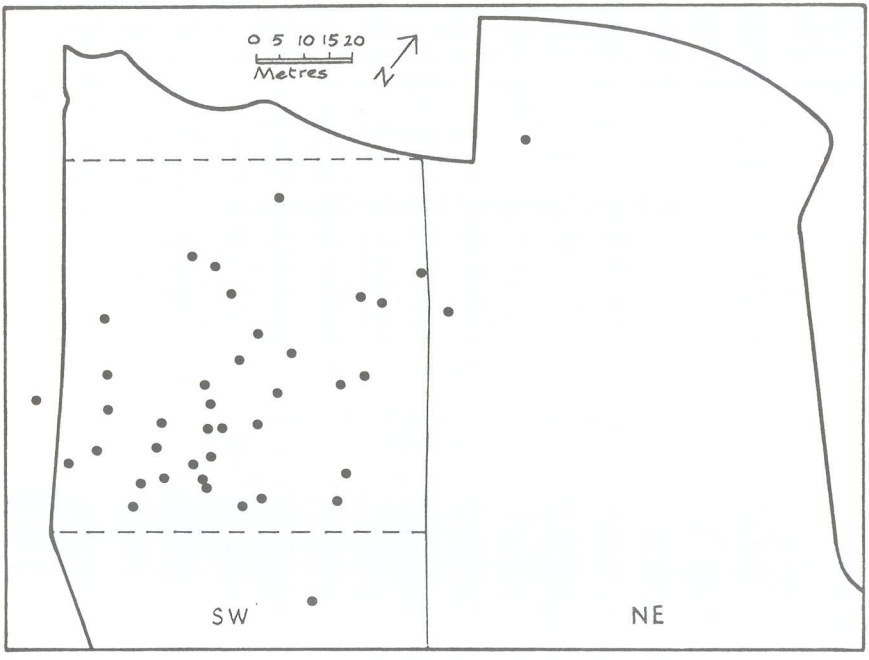
which each tree is used) and average nests per tree. By comparing the 'early' and 'late' periods we can see the extent of the changes. In the 'early' period only four tree species were used and although Oak was the most used species, the other three combined made up 60% of the total. In the 'late' period six tree species were used but Oak was now more dominant (70%), the other five species combined making only 30% of the total. The importance of Oaks is emphasised when one compares the 'tree years' and number of nests. In each case the percentage of use of Oaks goes up, whereas for the other species — and in both periods — the percentage mostly drops (rising slightly for 'tree years'



Map 3 Location of all nest trees used by Grey Herons in Cleeve heronry listed in Table 1 for all years, 1979–95. The numbers match those in Table 1. There is no location for trees 5 Ash and 36 Lime. Trees numbered but not used are indicated by an open circle.



Map 4 Location of nest trees used by Grey Herons in the 'early' period, 1979–89, 11 years, at Cleeve heronry. There is no location for tree 5 Ash.



Map 5 Location of nest trees used by Grey Herons in the 'late' period, 1990–95, six years, at Cleeve heronry. The dashed lines in the SW part of the reserve enclose the area (approx. 5600 sq. metres) used to compare trees used by the birds with all available trees (see text).

in three instances). In the 'late' period Lime, Ash, Beech, Field Maple and Cherry contributed just 25% of the 'tree years' and a little over 17% of the nests.

The average nests per tree remained fairly similar between periods, with a slight increase overall, caused by the greater bias towards Oaks (many of which, compared to the other species, held more than one nest) in the 'late' period. For individual species though, the average nests per tree reduced in the 'late' period, especially for Ash and Lime.

This apparent difference in use of trees between the two periods looks striking, but it is deceptive. The bar charts in Fig. 5 show the yearly use in percentage of (a) tree species and (b) number of nests per species of tree from 1979 to 1995. These clearly show how the Oak was gaining in dominance steadily over the whole period. The use of Oaks increased from 30% in 1979 (the one year when more Ash (35%) were used than Oaks) to 84% in 1995. Nests in Oaks increased from 39% to 91% over the same period. Ash were not used after 1993 and Limes (never a favoured species) have just retained a foothold with one nest in each of the last three years. Most nests in Cherries were in a small stand which blew down in the 1989/90 storms. Since then there has been only three

Table 2 *Use of trees by Grey Herons at Cleeve heronry. Overall number of trees used, nests used, and 'tree years' for (a) the 'early' period, 1979–89, (b) the 'late' period, 1990–95 and (c) all years, 1979–95. 'Tree years' are calculated thus — if a tree is used in all years it scores 17, in one year only 1, and pro rata.*

Tree species	No. of trees (%)	Tree years (%)	No. of nests (%)	Nests /tree
a) 'Early' period, 1979-89 (11years)				
Oak	14 (40.0)	89 (43.0)	162 (52.8)	1.82
Ash	11 (31.4)	56 (27.1)	76 (24.8)	1.36
Cherry	6 (17.2)	35 (16.9)	37 (12.0)	1.06
Lime	4 (11.4)	27 (13.0)	32 (10.4)	1.19
Totals	35 (100)	207 (100)	307 (100)	1.48
b) 'Late' period, 1990-95 (6 years)				
Oak	28 (70.0)	102 (75.0)	175 (82.9)	1.72
Lime	3 (7.5)	9 (6.6)	9 (4.3)	1.00
Ash	3 (7.5)	6 (4.4)	6 (2.8)	1.00
Beech	2 (5.0)	8 (5.9)	10 (4.7)	1.25
Field Maple	2 (5.0)	8 (5.9)	8 (3.8)	1.00
Cherry	2 (5.0)	3 (2.2)	3 (1.4)	1.00
Totals	40 (100)	136 (100)	211 (100)	1.55
c) All years, 1979-95 (17 years)				
Oak	38 (54.3)	191 (55.7)	337 (65.1)	1.76
Ash	13 (18.5)	62 (18.1)	82 (15.8)	1.32
Cherry	8 (11.4)	38 (11.1)	40 (7.8)	1.05
Lime	7 (10.0)	36 (10.5)	41 (7.9)	1.14
Beech	2 (2.9)	8 (2.3)	10 (1.9)	1.25
Field Maple	2 (2.9)	8 (2.3)	8 (1.5)	1.00
Totals	70 (100)	343 (100)	518 (100)	1.51

nests in two trees. Finally, Beech and Field Maple have retained their foothold, with one or two trees and up to three and two nests respectively during the 'late' period.

Single and Multiple Nest Trees

The other feature that is readily revealed by Table 1 is the few trees which have more than one nest (multiple nest trees). 40 of the 70 trees used since 1979 have held only one nest in any one year. 30 have held two or more nests and of these 11 have held three or more nests, six held four or more nests and three held five or six nests. Map 6 shows the location of single and multiple nest trees. The multiple nest trees are scattered throughout the heronry, with no marked clumping, although the majority of the well used trees are in the SW part of the wood. Tree

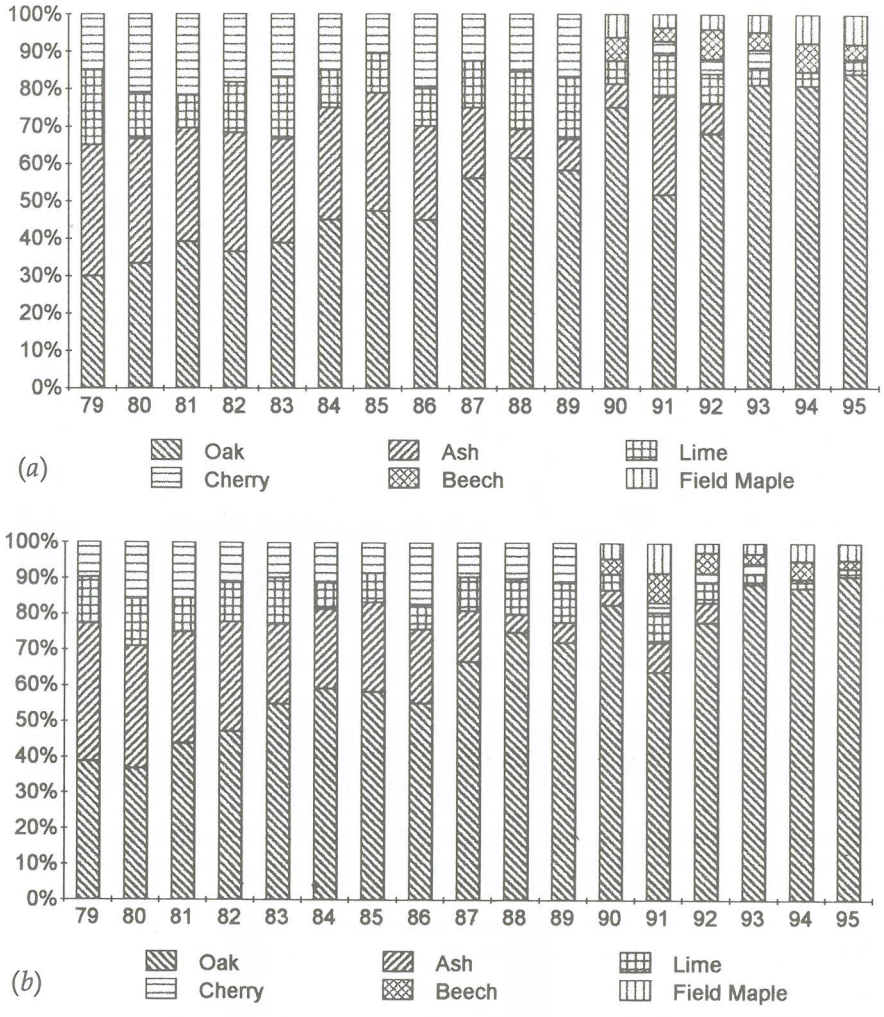
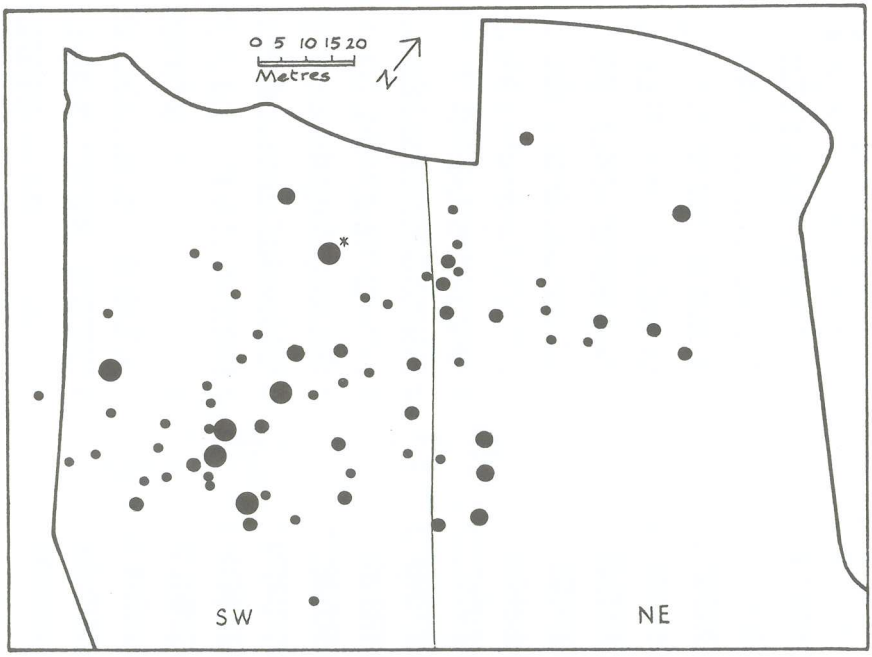


Fig. 5 Annual use by Grey Herons at Cleeve heronry of (a) different tree species and (b) nests per tree species, both by percentage, 1979–95. The 'storm' winter was 1989/90.

31, in this area, was the only tree to hold four, five or six nests in any year during the 'early' period.

All the trees which held four or more nests were Oaks and the majority of other multiple nest trees were also Oaks. The proportions of single, double and triple nest trees are shown in Fig. 6. Oak is clearly selected by the birds; of the 107 multiple nest trees, 82 were Oaks.

Table 3 shows the totals of single and multiple nest trees split between the 'early' and 'late' periods. This reveals the striking fact that only one tree other than Oaks held more than one nest during the 'late' period (a Beech held three nests for one year, 1991). Furthermore,



*Map 6 Location of all nest trees used by Grey Herons in Cleeve heronry showing those which held in any one year between 1979 and 1995 one (•), two (●), three (●) and four, five or six nests (●). * Indicates tree 31 Oak, the only tree to hold six nests in the 'early' period (see text). There is no location for tree 5 Ash, which held one nest.*

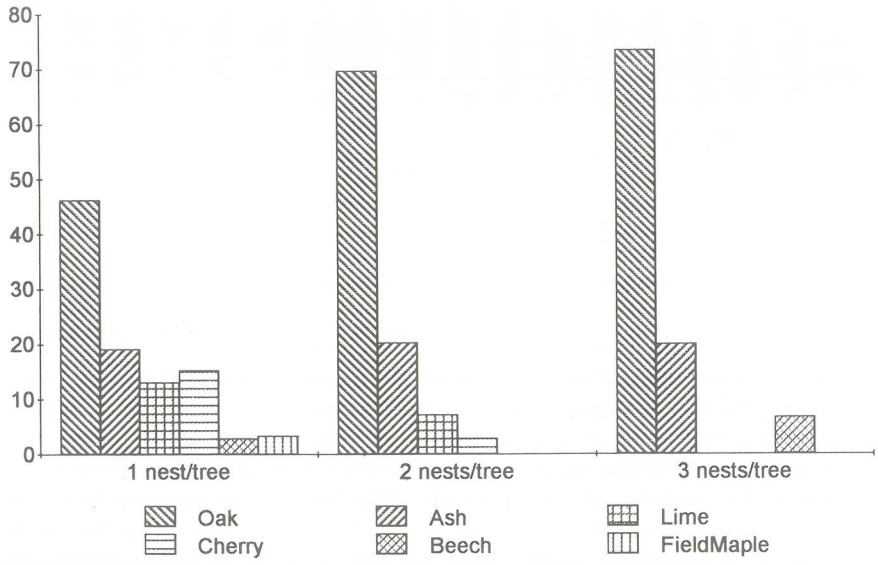


Fig. 6 Proportions of Grey Heron nests at Cleeve heronry in single and multiple nest trees in different tree species, by percentage, 1979–95. Four, five and six nest trees were all Oaks.

Table 3 *Grey Heron nests at Cleeve heronry in single and multiple nest trees split between the 'early' period (1979–89) and 'late' period (1990–95). The figures in brackets show the percentage of nests in nests/tree category.*

	'Early'					
	Nests per tree					
Species	1	2	3	4	5	6
Oak	44 (31.9)	32 (60.4)	2 (40)	8 (100)	2 (100)	1 (100)
Ash	39 (28.3)	14(26.4)	3 (60)	0	0	0
Lime	22 (15.9)	5 (9.4)	0	0	0	0
Cherry	33 (23.9)	2 (3.8)	0	0	0	0
Beech	0	0	0	0	0	0
Field Maple	0	0	0	0	0	0
	'Late'					
	Nests per tree					
	1	2	3	4	5	6
Oak	65 (66.3)	16 (100)	9 (90)	10 (100)	1 (100)	1 (100)
Ash	6 (6.1)	0	0	0	0	0
Lime	9 (9.2)	0	0	0	0	0
Cherry	3 (3.1)	0	0	0	0	0
Beech	7 (7.1)	0	1 (10)	0	0	0
Field Maple	8 (8.2)	0	0	0	0	0

during the 'late' period the proportion of single nest trees of Ash, Lime and Cherry reduced, and Beech and Field Maple were used for the first time.

Are the herons choosing Oaks because they prefer them or because it is the dominating species in the wood? Fortunately, we know a good deal about the structure of the wood. In 1976 Richard Bland, with pupils from Clifton College, carried out a survey of the trees in the reserve (Bland, 1976). The information for the SW part of the wood which was used by the herons mainly in the late 1960s and early 70s and from 1990 to 1995 — my 'late' period — is the most detailed, so it is possible to compare the total number of trees available with those actually selected by the herons. Although 15 years separate the survey of the trees from the start of the 'late' period, my personal observations suggest that the structure of this part of the wood has not changed a great deal. Several trees have fallen over the years, including five (three Oaks and two limes which held nests) which fell in the storms of 1989/90. The latter were mostly adjacent to the border with the NE part of the wood. I have excluded these from Bland's totals to make the comparison more valid. The area, a rectangular block covering the SW quarter of the reserve, is approximately 5600 sq. metres and is shown on Map 5. Almost all the trees are well grown to mature.

Table 4 *Comparison of trees available in approx. 5600 sq. metres in the SW part of Cleeve heronry (see Map 5) in 1976 with those used by the Grey Herons in the 'late' period, 1990–95. *Others included Yew (34, 14.3%), Holly (6, 2.5%), Hornbeam (3, 1.3%), Sycamore and Birch (2, 0.8% each). 12 Elms present in 1976 have been excluded from the calculations.*

Tree species	Trees available, 1976 (% of total)	Trees used by herons, 1990-95 (% use of species or total)
Oak	93 (37.2)	25 (26.9)
Ash	49 (19.6)	2 (4.1)
Lime	23 (9.2)	3 (13.0)
Field Maple	18 (7.2)	2 (11.1)
Beech	3 (1.2)	2 (66.7)
Cherry	5 (2.0)	2 (40.0)
Others*	47 (19.7)	0
Total	238 (100)	36 (15.1)

Table 4 shows the composition of the tree species within the area (from Bland, 1976) and the proportion of those trees used by the herons during the 'late' period, 1990 to 1995. Over a third of the available trees are Oaks and a fifth are Ash; these two species accounting for 57% of the trees. The herons used 27% of the available Oaks, but only 4% of the Ash; clear evidence that the birds prefer Oaks. The herons also have a liking for Beech and Cherry (although the sample is too small to draw any conclusions). Two out of the three Beeches were used. One was a very large tree and once held three nests, the other was dying when used. Two of the five available Cherries have been used; one was mature and the other was a rather flimsy tree, but both have fallen during the period. All of the available Cherries in the NE part of the wood were used in the 'early' period. Beech and Cherry seem to be highly attractive as a nest trees for herons, although it is clear that if these two least numerous tree species are excluded the overall preference is for Oak.

How and why the herons make these choices is unknown, but one could speculate that the tight twig structure of Oaks and to a lesser extent of Cherries, probably gives greater support to the nests, which can be very flimsy. A greater success rate in these nests (an aspect not studied by me) would probably lead to increased selection of similar nests by future generations. A disadvantage in selecting Oaks to nest in could be that access to the nest may be more difficult for such a large bird. Ash, on the other hand, have a very loose twig structure, which may give fewer opportunities for nest sites, but easy access for the herons. In these respects, Lime, Beech and Field Maple are between the

extremes of Oak and Ash. Although Field Maple is closest to Oak in twig structure, it is a small tree even when mature and its crown is usually somewhat below the surrounding canopy.

Summary with Concluding Comments

During its 34 years of existence Cleeve Heronry has become the most important in Avon. The average occupancy has been 35 nests, with a maximum of 56 in 1971 and minimum of 18 in 1989. The count for 1995 was 43 nests. Annual monitoring at Cleeve and nearby heronries indicated that there was probably a movement of birds between them. If birds did actually relocate during the 1970s from Cleeve to Bulling's Wood, as seems likely, it is difficult to find a reason why. Circumstances at Cleeve did not appear to change, i.e. the structure of the wood then remained the same and no disturbance was recorded. After the apparent fragmentation of the heronry during the 1970s and 80s the violent storms of the winter of 1989/90, which ravaged part of the wood, seem to have had a stabilising effect. Other heronries within 10km of Cleeve became extinct and numbers at Cleeve are increasing again.

A detailed study of the trees used by the herons at Cleeve has shown a change in choice of species over 17 years from 1979 to 1995. Up to the 'storm' winter of 1989/90 the birds nests were spread between four tree species — Oak, Ash, Cherry and Lime with just over half in Oaks. During this 'early' period there was a trend towards Oaks which continued into the 'late' period, after the storms. This was despite a wider choice of tree species, Beech and Field Maple also being used. Most trees held only one nest, but some held two or more (up to six) nests. The majority of these multiple nest trees were Oaks which emphasised the preference the herons showed for Oaks. They showed a declining interest in Ash and Lime, but used the few Cherry and Beech if they were accessible.

Acknowledgements

I am grateful to both the STNC and AWT for allowing me to count the herons. AWT also gave me access to their Cleeve Hill file and a copy of Rosemary Teverson's Cleeve Heronry Management Plan (1983). I would especially like to thank Tom and Lee O'Brien of the Old Post Office and Alan and Felicity Down of Cleeve Nursery who kindly allowed me to cross their land to gain access to the heronry . The BTO provided details of the counts of all the Avon heronries and the national census. Keith Fox (the local census organiser) also provided me with some counts of local heronries and David Warden gave me the most recent counts for the heronry on Denny Island at Chew Valley Lake. Finally, I would like to thank Jane Cumming, Ken Hall and John Marchant who read and commented upon an earlier draft of this paper.

References

Avon Bird Reports, 1985–1993. Avon Ornithological Group.

Bland, R. (1976) [*A Survey of the Trees in the Cleeve Heronry Reserve.*] Internal report to the Avon Wildlife Trust, Bristol.

Carter, S. (1993) The world's longest running bird census. *BTO News* 187: 1.

Cramp, S. and Simmons, K.E.L. (eds.) (1977) *The Birds of the Western Palearctic*, Vol.1. Oxford: Oxford University Press.

Gibbons, D.W., Reid, J.B. and Chapman, R.A. (1993) *The New Atlas of Breeding Birds in Britain and Ireland: 1988–1991*. London: T. & A.D. Poyser.

Hickling, R. (1983) *Enjoying Ornithology*. Calton: T. & A.D. Poyser.

Marchant, J.H., Hudson, R., Carter, S.P. and Whittington, P. (1990) *Population Trends in British Breeding Birds*. Tring: BTO.

Palmer, E.M. and Ballance, D.K. (1968) *The Birds of Somerset*. London: Longmans.

Rutter, J. (1829) *Delineations of the North-Western Division of the County of Somerset*. London.

Somerset Ornithological Society (1988) *Birds of Somerset*. Gloucester: Alan Sutton.

Teverson, R. (1983) *Cleeve Heronry Management Plan*. Internal report to Avon Wildlife Trust, Bristol.

Robin Prytherch
23 Caledonia Place, Clifton, Bristol, BS8 4DL

Communal Roosting in the Breeding Season by Breeding Birds of Non-Colonial Species

Jeffery Boswall

Introduction

Wynne-Edwards (1962) as part of a discussion of possible functions of communal roosting gives as one of four essential features of the behaviour that it 'is typical of a way of life that comes into its own after the breeding season is over and is only suspended again when the breeding season approaches once more'.

In this paper I give details of some non-colonial bird species whose breeding individuals roost communally during the breeding season as well. By doing so I hope to show that communal roosting is more than a non-breeding season phenomenon. Identifiable (e.g. colour-ringed) individuals can demonstrate this beyond doubt (see Pied Wagtail below). So can close observation of individual birds such as that of Kuroda (1990) on Jungle Crows (*Corvus machroryhnchos*) in Tokyo.

Otherwise any assembly of individuals of a solitary-nesting species could beg our question. Could the birds be non-breeders (too young? too old?). To give an isolated example of this last: a spring roost of non-breeding Ravens *Corvus corax*, about 60 strong, was in use till mid-April in Virginia, USA (Harlow *et al.*, 1975). These birds are likely to have been sub-adult, since breeding Ravens lay as early as February or March. Or could the birds be failed breeders? Could they be migrant birds occupying a staging roost? If the concerned species is sexable and all are males (of a species in which the female does the overnight nest duty) and if it *is* the breeding season, then a high degree of likelihood of relevance presents itself.

There is still however a need for caution. Breeding seasons vary intraspecifically with latitude. In analysing Pied Wagtail *Motacilla alba yarrellii* data I came upon a record of a large flock roosting on the coarse herbage at the mouth of the Whiteadder in Northumberland (Bolam, 1912). The date was 11th May (1887). Safe enough one might think. But the northern UK populations of this species are much more migratory than the southern ones (Davis, 1966). This is also very clear from a comparison of the BTO summer atlas distribution and the winter one. Suppose Bolam had said all the birds were cocks? Then if, as many migrant passerines do, the cocks migrate some days ahead of the hens, and if the birds occupy staging roosts *en route* (which they surely must) again there could be an element of doubt. However, in this particular

case, the return movement north is in late March and early April! (The passage migration of the closely related White Wagtail, a race of *Motacilla alba* (*alba* not *yarrellii*) through Britain to, for example, Iceland, would be later, but the Continental form is in any case so distinctive in spring that risk of confusion must be negligible.)

Species Accounts

Rock Dove

Cramp (1985) quoting E.-M. Reinke, found off-duty male Rock Doves *Columba livia* in Hamburg using communal roosts during incubation.

Common and Lesser Nighthawks

From their nesting season field experiences in Idaho with the Common Nighthawk *Chordeiles minor* Selander & Preece (1951) suggest that 'gregarious roosting assemblages of males are of common occurrence and that such behaviour may be normal for breeding as well as nonbreeding individuals'. The species is a summer resident from early June to early September. An assembly of *c.* 100 birds composed almost entirely of adult males was found on 1st August. Sixteen were obtained and were proved to be males in breeding condition. The same applied to six out of *c.* 50 at another roost on 31st July. Cock roosts at nesting time are known also from the Lesser Nighthawk *Chordeiles acutipennis*, but the precise relationship of the cocks with breeding hens has not been determined.

Chimney Swift

Audubon (1840) quoted by Bent (1964) found in July, among a sample of 115 roosting Chimney Swifts *Chaetura pelagica* (out of 9000), 87 adult males, 6 females and 22 recent fledglings, '... young of that year's first brood'. The balance of the females were no doubt on their nests? On 2nd August he found many more females and young than males.

Purple Martin

Similarly, female Purple Martins *Progne subis* were held by Cater (1944) to be incubating or brooding while males congregated *en masse* to roost in cottonwood trees in Tucson, southern Arizona. Throughout the summer months, the number at the roost, an estimated 3000 martins, did not change noticeably except during the period of egg-laying and egg-incubation from late June to late July (fledging is in August). During nesting the males at the roost greatly outnumbered the females, the total being reduced by the females remaining on the nests. The birds were believed to nest in an area of some 375 square miles, one flight line starting at least 19 miles away.

Swallow

When the female Swallow *Hirundo rustica* has eggs or young nestlings, she usually covers them at night. The male roosts nearby, often on wires or perhaps in trees. When a pair has a second brood the male sometimes leaves his partner to roost communally (Turner, 1994).

Pied Wagtail

The work on Pied Wagtails at the Reading sewage farm roost showed that the numbers dropped in the summer. This was partly because many of the birds were only winter visitors to the area. Seven recoveries of birds ringed in winter were made in the breeding season at least 100 kms away. However, three colour-ringed males recorded at the roost were known to be breeding nearby, one as far as two miles away. There was also circumstantial evidence that many and probably most of the birds in the roost in summer were breeding locally (Sales, 1972; Broom, *et al.* 1976).

A roost of seven cock Pied Wagtails was seen at Topsham Bridge on the Devonshire Avon on 26th April (*Devon Bird-watching and Preservation Society Report*, 1962). Glegg (1935) reports that 'forty to sixty adult males are present all summer in Osterley Park [Middlesex], roosting in reed beds'. At Kingsley in Hampshire (*South Eastern Bird Report* for 1936), 'During the nesting season there were about seventy males each night'. R.D. English estimated 25 birds, all males, on 9th May in reeds and young willow growths at Leybourne, Kent (BTO Roost Record Card).

A very urban Pied Wagtail roost in Barnet High Street, London was visited by Frederick Metcalf twenty-seven times in May and June 1965. From 43 birds on 4th May the number of wagtails, all of which appeared to be males, slowly and consistently declined but there were still six on 20th June. There were none on three immediately subsequent dates. Observations started again on 31st December 1965. From then until 8th April up to only eleven birds appeared (16 visits). Usually there were both immatures and adults. From 15th April (35 adults, presumably cocks) onwards, eleven counts showed a similar pattern to the previous year: a steady lessening of numbers. On 24th June three cocks turned up, and there were none seven, 14 or 21 days later (BTO Roost Record Card). Chandler's (1979) more detailed study of a roost in Kent that was occupied throughout the year for three years revealed that from mid May to early June males outnumbered females by nearly three to one.

A congregation of Pied Wagtails found by Meiklejohn (1937) in Wales on 28th June numbered about 60 birds of which two-thirds were birds of the year and a majority of the rest males, presumably the mates of birds in the valley 'which appeared to have still either eggs or young'. A May roost seen by Hopkins (1937), composed of approximately 50

Pied Wagtails all of which were adult (but unsexed by the observer), was seen on 16th of the month. By 30th May several birds of the year were also in attendance.

Although the birds were not sexed by the observers it is worth adding the following records. 'About thirty birds — presumably non-nesters — roosted in marshes [near Cambridge] from April to mid-June' (*Cambridge Bird Club Report*, 1937); and that on 25th June 1936 near Galashiels in Roxburgh between 20 and 30 Pied Wagtails assembled, most of which were adult with one or two juveniles among them (Clancey, 1936).

A few hundred Pied Wagtails slept on the glass roof of a building in Leicester in the winters of 1933/34 and 1934/35. From a figure of 400–600 in February 1935 the number went down to over 200 by 1st May. The site was still occupied on 8th May but deserted by 25th May (Mayes, 1935).

On 11th May 1887 a large flock roosted on the coarse herbage at the mouth of the Whiteadder in Northumberland (Bolam, 1912).

On 2nd June 1950 K.G. Spencer counted 15 birds in cotton grass and rushes on moorland south of Burnley, Lancashire (BTO Roost Record Card).

In birches and gorse on Hayes Common, Middlesex, up to 40 birds roosted regularly from April to the end of 1949 including the breeding season. In 1950 the use of this site continued all year with a maximum of about 60 birds in April. In 1951 'the roost continued in use all the year; maximum *c.* 60 in April' (*London Bird Reports* for 1949, 1950 and 1951).

M.J. Barrett (BTO Roost Record Card) made 33 counts between 17th November 1967 (no birds) and 8th June 1968 at a power station in Hoddesdon, Hertfordshire, where the birds used roof ventilators as a dormitory. From 24th November to 13th April the numbers varied between 214 (on 24th February) and 94 on 13th April. Six precisie breeding season counts, the last on 8th June gave 57, 49, 41, 55, 47 and 49 birds. During the rest of June *c.* 25 birds were present and at the beginning of July, 6–8 birds.

Blackbird

Of the Blackbird *Turdus merula* B.W. Tucker (in Witherby, 1938) wrote 'Some males may continue to occupy winter roosts during breeding season' a phenomenon confirmed in a four-year study of seasonal variations in the occupancy of suburban Blackbird roosts in Aberdeen by Swann (1975). From October to March the percentage of males remained constant at around 56%, but it then increased to 80–90% by June. By August it had dropped to around 54%. Actively breeding Blackbirds of both sexes used one roost in the breeding season: the females prior to laying and after the young had fledged; males throughout.

American Robin

Brewster (1906), a long-term student of American Robin *Turdus migratorius* roosts, telling of one particular site, in his Massachusetts garden, wrote (quoted by Bent, 1949), 'At first there were not more than twenty or thirty birds, but their numbers rapidly increased until by the close of summer we often counted as many as four or five hundred... During the whole of May the roost was frequented nightly by fifty or more birds, all apparently old males. By the middle of June these were joined by the first broods of young, and a month or so later by the old females with their second broods. Thus the number of Robins steadily increased until early in August, when it probably reached its maximum and when we sometimes noted upwards of seven hundred birds in the course of a single evening.' Directly comparable observations were made by Howell (1940), abstracted by Allen & Young (1982), at a communal roost of 200–300 Robins, from April to July 1937 in New York. Prior to egg-laying, both males and females roosted at the site; once eggs were laid almost all females remained at nests, but males continued to use the roost. Juvenile Robins began using the roost at about three weeks of age.

Jackdaw

B.W. Tucker (in Witherby, 1938) states that Jackdaw *Corvus monedula* roosting sites, away from those at breeding sites, may continue to be used by male Jackdaws during the nesting time. But Coombs (1978) states only that nonbreeders 'often go to the communal roost even in May and June'. Without knowing their sex or breeding status, Griffiths (1955) found that a Jackdaw roost site in Wales was occupied from January 1953 at least until June. He wrote 'Taking the breeding-season to occur from April onwards I have records of flocks of a minimum of 2000 Jackdaws flying to the roost on 6th April, 24th May and 3rd June, apart from numerous instances when I estimated between 1000 and 1500.' These too could have been non-breeders. Brownsey & Peakall (1955) found that a Jackdaw roost in Surrey, England, first used in mid April by about 100 birds increased in numbers to *c.* 300 by the end of the month and slightly more during May and June. There was then a sharp rise in July to *c.* 1000 birds who continued to patronise the site till October. Most British Jackdaws lay in the last week of April and fledge their young in the third week of June (Coombs, 1978).

Cramp & Perrins (1994) say that the incidence of communal roosting in the breeding season varies, but quote A Röell's Groningen colony where females roosted on the nest during incubation and brooding while males continued to use communal roosts, often switching to the vicinity of the nest after hatching occurred.

Azure-winged Magpie

In a paper devoted to the roosting behaviour in Japan of the Azure-winged Magpie *Cyanopica cyana*, Hosono (1967) gives five categories of 'flock roosting' arranged in seasonal order: male roost (during incubation period), family roost, compound family roost, small area roost (autumn to winter) and large area roost (winter).

Jungle Crow

Male Jungle Crows *Corvus macrorhynchos* also leave their mates each evening to assemble for the night. The roosting and other behaviour of Tokyo's inner city population was studied in detail by Nagahisa Kuroda, particularly from 1969 to 1977 and his series of seventeen papers in Japanese has been summarised in English (Kuroda, 1990). The breeding pairs each maintain a territory throughout the year. In summer there is a congregational roost at one location and in winter a separate one elsewhere. During the egg and chick stages the male crows gather at the summer site. Does this find a parallel in breeding male Rooks *Corvus frugilegus* which, according to W.D. Campbell (B.W. Tucker in Witherby, 1938), may roost either near their own nests or collectively in separate trees in the rookery?

Starling

Writing of the roosting behaviour of the Starling *Sturnus vulgaris*, Witherby (1938) says 'Non-breeding birds may also continue to occupy roosts in breeding-season, and such roosts may also include a large proportion of breeding males'. This statement must be based at least partly on E.V. Savage having shot 33 Starlings in Cumberland between 12th April and 23rd May 1923. Of these 22 (67%) were in breeding condition, 20 males and two females; and eleven (33%) were in non-breeding condition, seven males and four females (Witherby, 1930). Bogucki (1972), abstracted by Allen & Young (1982), found that during a study of a Starling breeding colony conducted near Poznan in Poland, in 1960–63 and in 1966, the birds roosted communally in a reed bed 1 km away until incubation began. While females incubated at night, males continued to roost outside the colony. In Canada, Johnson & Cowan (1974), abstracted by Allen & Young (1982), found that Starlings roosted communally away from nests until incubation began. Then, some males continued to do so while the females incubated at night, while other males roosted singly near the nest. A study over two or three years of a small Starling roost on a building in Detroit, by Thompson & Coutlee (1963), abstracted by Allen & Young (1982), revealed that the sex ratio overall was skewed in favour of males, the percentage of females declining sharply during the breeding season.

Streaked Weaver

Cramp & Perrins (1994) quote V.C. Ambedkar who reported that in Uttar Pradesh while females were incubating or brooding male Streaked Weavers *Ploceus manyar* roosted communally away from the colony.

Linnet

Cramp & Perrins (1994) quote T. Meineke who found males assembling 500 metres from a Linnet breeding area. Males apparently continued using the communal roost during incubation.

Common Grackle

In a round-the-year study of an assembly by the Common Grackle *Quiscalus quiscula*, Peck (1905) found a roost in Philadelphia occupied by 20–25,000 birds in March. Then as birds built nests in April the number declined but in May the number seemed never to fall below 2–3,000, 'birds which have not mated as yet or else males which have nests nearby, probably both'. June was like May 'except that very few females visit the roost and towards the end of the month young birds begin to come in in company with the males'.

Discussion

In tackling the question of breeding-season assemblies of breeding birds it is important to know whether or not the individuals assembling are actively engaged in reproduction. Clearly, birds of some larger species do not breed until they are two or more years old. To take an obvious example at random, I have observed assemblies of immature Yellow-legged Herring Gulls *Larus cachinnans* on estuaries in Portugal and on the same day seen breeding adults of the same species on nearby sea cliffs. This was at the very end of March, 1994.

Wynne-Edwards (1962) thought that May-roosting adult Pied Wagtails may have been nonbreeders (but not May-roosting male American Robins, for some reason). Ward & Zahavi (1973) recognise that even among solitary nesters the communal roost may persist through the breeding season and that in some cases, but not invariably, the occupants may be non-breeders. But they claim that breeding individuals of only three species gather for the night: the Starling (Bogucki, 1972), the American Robin (Brewster, 1890) and the White Wagtail (Zahavi, 1971a, 1971b). The inclusion by them of the last species is puzzling since neither of the papers cited makes reference to the gathering of breeding birds! However, that the British *Motacilla alba* records in the first paper (1971a) are relevant is evident from Zahavi's joint authorship with Broom *et al.* of another paper (1976), the field work having started at

Reading in October 1969. The second paper (1971b) uses observations only from Israel where the species winters but does not breed!

What may be becoming clear from the examples I have given is that with a number of bird species (and no doubt a more thorough search of the literature could produce many more) a communal roost is not always something resorted to only outside the breeding season (though this must remain true of many species), but may be something that has to be 'broken away from' in order to breed. This may well, however, not be true of every individual Blackbird, or Pied Wagtail, or whatever. Further, to repeat myself, it must be continually borne in mind that it is obviously not true of all species. To pick an isolated example at random again: in his detailed study of Long-eared Owl *Asio otus* Denver Holt (pers. comm., 1994) showed that in Montana the winter roosts (of up to twenty-odd birds) break up entirely each March when the birds pair up and start nesting. The off-duty owl, i.e. the one neither incubating nor brooding, roosts near the nest. This pattern is true of many, many bird species.

My purpose here is to point up the extent to which individuals actually engaged in breeding continue to assemble communally for roosting. Workers with the Reading Pied Wagtails and Aberdeen Blackbirds proved this conclusively with colour-ringed birds. In the cases where only (or mainly) males occupied sites during the peak of breeding activity, it seems most unlikely that these were merely non-breeders; the more so in cases where males were joined firstly by juveniles and then later by females with second broods of young. This applies readily to the Rock Dove, Common Nighthawk, Chimney Swift, Purple Martin, Barn Swallow, Pied Wagtail, Blackbird, American Robin, Azure-winged Magpie, Jackdaw, Jungle Crow, Common Grackle, Starling, and Streaked Weaver. It may, but may not, apply to the Lesser Nighthawk.

Summary

This paper draws added and specific attention to the fact that in some solitary-nesting bird species individuals engaged in breeding do roost communally. Usually it is the breeding males that do this, since in a majority of bird species the females incubate at night. Birds of at least 15 species in eleven families and three orders do this. A thorough search of the literature would undoubtedly reveal a good many more.

Neither Wynne-Edwards (1962) nor Ward & Zahavi (1973) appreciated at all fully the reproductive season involvement in social sleeping among solitary nesters. A more thorough assembly of comparative data is being attempted by this author in the hope that it may make a contribution to unravelling the adaptive significance of avian communal roosting. This preliminary paper is intended to draw attention to an opportunity for further field study.

Acknowledgements

I am grateful to Mrs D. Pearce for patient and accurate word processing; to Linda Birch, the Alexander Librarian at Oxford; to D. V.-Chip-Weseloh, M.G. Wilson, R.J. Prytherch, George B. Reynard, Nagahisa Kuroda, T. Hosono and others for reprints or photocopies; and to the British Trust for Ornithology (H. Mayer-Gross) for permission to use data from Roost Record Cards, not forgetting the observers who filled them in. V.C. Wynne-Edwards' book, *Animal Dispersion in Relation to Social Behaviour* has long been an inspiration and remains so.

References

Allen, H.L. and Young, L.S. (1982) *An Annotated Bibliography of Avian Communal Roosting*. Washington Dept of Game.

Audubon, J.J.L. (1840) *The Birds of America*, Volume 1.

Bent, A.C. (1949) *Life Histories of North American Thrushes, Kinglets and Their Allies*. Smithsonian Institution Bulletin 196.

Bent, A.C. (1964) *Life Histories of North American Cuckoos, Goatsuckers, Hummingbirds and their Allies*. Smithsonian Institution Bulletin 176.

Bogucki, Z. (1972) Studies on the activity of Starlings *Sturnus vulgaris* (Linn. 1758) in the breeding season. *Acta Zool. Cracov*, 17, 97–121 [in Polish].

Bolam, G. (1912) *Birds of Northumberland and the Eastern Borders*. Hunter Blair, Alnwick.

Brewster, William (1890) Summer Robin roosts. *Auk*, 7, 360–373.

Brewster, William (1906) The birds of the Cambridge region of Massachusetts. *Mem. Nuttall Orn. Cl.*, no. 4.

Broom, D.M. *et al.* (1976) Pied Wagtail roosting and feeding behaviour. *Bird Study*, 23 (4), 267–272.

Brownsey, B.W. and Peakall, D.B. (1955) Jackdaw roost continuing throughout breeding season. *Brit. Birds*, 48, 371.

Cater, M.V. (1944) Roosting habits of Martins at Tucson, Arizona. *Condor*, 46, 15–18.

Chandler, R.J. (1979) Two urban Pied Wagtail roosts. *Brit. Birds*, 72, 299–313.

Clancey, P.A. (1936) Pied Wagtails using roost in June. *Brit. Birds*, 30, 82.

Coombs, F. (1978) *The Crows*. Batsford, London.

Cramp, S. (ed.) (1985) *Birds of the Western Palearctic*. Vol. IV. Oxford University Press.

Cramp, S. and Perrins, C.M. (eds) (1994) *Birds of the Western Palearctic*. Vol. VIII. Oxford University Press.

Davis, P. (1966) The movements of Pied Wagtails as shown by ringing. *Bird Study*, 13, 147–162.

Glegg, W.E. (1935) *A History of the Birds of Middlesex*. Witherby, London.

Griffiths, J. (1955) Jackdaw roost continuing throughout the breeding season. *Brit. Birds*, 48, 139.

Harlow, R.F. *et al.* (1975) Some winter and nesting season foods of the Common Raven in Virginia. *Auk*, 92, 298–306.
Hosono, T. (1967) A study of the life-history of the Blue Magpie: 2: Roosting behaviour. *Misc. Rep. Yamashina Inst.*, 5 (1), 34–47 (in Japanese).
Hopkins, J. (1937) Adult Pied Wagtails using roost in June. *Brit. Birds*, 31, 124–125.
Howell, J.C. (1940) Spring roosts of the Robin. *Wilson Bull.*, 52, 19–23.
Johnson, S.R. and Cowan, I.M. (1974) Thermal adaptation as a factor affecting colonization success of introduced Sturnidae (Aves) in North America. *Can. J. Zool.*, 52, 1559–1576.
Kuroda, W. (1990) *The Jungle Crows of Tokyo.* Yamashina Institute, Tokyo.
Mayes, W.E. (1935) Pied Wagtail roost on a Leicester building. *Brit. Birds*, 29, 56–57.
Meiklejohn, M.F.M. (1937) Adult Pied Wagtails using a roost in June. *Brit. Birds*, 31, 85.
Peck, C.J. (1905) The Overbrook Grackle roost. *Cassinia*, 9, 36–39.
Sales, D. (1972) Sleeping on a clinker bed. *BTO News*, 55, 5–6.
Selander, R.K. and Preece, S.J. (1951) Cock roosts of Nighthawks. *Condor*, 53, 302–303.
Swann, R.L. (1975) Seasonal variation in suburban Blackbird roosts in Aberdeen. *Ringing and Migration*, 1, 37–42.
Turner, Angela K. (1994) *The Swallow.* Hamlyn, London.
Ward, P. and Zahavi, A. (1973) The importance of certain assemblages of birds as 'information centres' for food finding. *Ibis*, 115, 517–534.
Witherby, H.F. (1930) Breeding Starlings resorting to a roost. *Brit. Birds*, 23, 187–188.
Witherby, H.F. (ed.) (1938) *Handbook of British Birds.* Vols 1 & 2, Witherby.
Wynne-Edwards, V. (1962) *Animal Dispersion in Relation to Social Behaviour.* Oliver & Boyd.
Zahavi, A. (1971a) The function of pre-roost gatherings and communal roosts. *Ibis*, 113, 106–109.
Zahavi, A. (1971b) The social behaviour of the White Wagtail *Motacilla alba alba* wintering in Israel. *Ibis*, 113, 203–211.

Jeffery Boswall
Biological Imaging, Derby University, Green Lane, Derby DE1 1RX, UK

The Status of the Willow Warbler in Saltford

William Duckworth

In contrast to many British breeding passerines, especially trans-Saharan migrants, the Willow Warbler *Phylloscopus trochilus* population has remained rather stable, with relatively few dramatic changes in abundance between breeding seasons since monitoring began in the early 1960s (Marchant *et al.*, 1990). Recently this long-term pattern has been replaced by a steady decline in both farmlands and woodlands. For the three seasons from 1989 the national breeding population showed statistically significant declines, more steeply so in the south than the north of Britain, for which no cause is apparent (Marchant & Balmer, 1993). No clear trend was detected in 1993 (Marchant & Balmer, 1994). Such a population shift in a species showing little change over many years may indicate that it is suffering new and potent problems and is certainly more alarming than a similar change shown by a species prone to wide fluctuations in abundance.

The Willow Warbler breeds throughout Britain and Ireland, and every 10 km square in Avon is occupied, although densities in the county seem to be rather lower than average for England (Da Prato, 1993). It was present during the breeding season in 89% of Avon tetrads during 1985–1991 (Bland & Tully, 1992). It is Britain's most abundant summer migrant (Marchant *et al.*, 1990); despite, or rather because of, this, most county bird reports give it scant consideration. The description of the bird in Somerset as 'common, locally abundant' (Palmer & Ballance, 1968) does not allow meaningful comparison at a later date unless a major change in status has occurred, so here I consider the species's status in one small area in detail.

Study Area

Saltford (Fig. 1) is an area of farmland in the Avon valley, which retains many hedges (kept under various cutting regimes) and ponds. There is a modern sewage farm (c.o. ST 691683) and a few small woods. Since the mid 1980s the area has been predominantly under arable cultivation, with substantial areas grazed by horses. Prior to this, many fields were grass leys used for cattle and sheep grazing. Of the area covered by Fig. 1, most observations relate to the land north of the abandoned withy beds (ST 689668), west of the River Avon downstream to its confluence with the River Boyd (ST 681688), and east of a line from there to Saltford tunnel (ST 684673). Willow Warblers are common

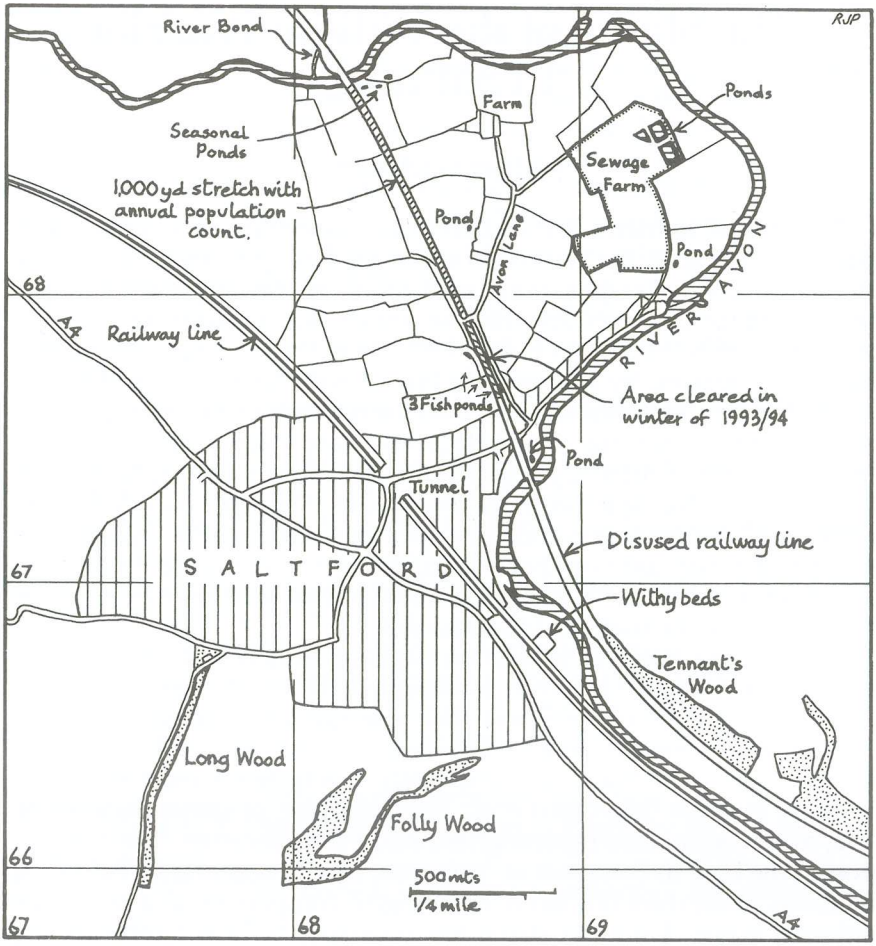


Fig. 1 Saltford, with locations mentioned in the text. Hedges are shown only in main area: some are now so degraded that they are basically fences with rough vegetation

summer visitors to the area; the first arrive in early April and stragglers remain into September.

Spring Arrival

The earliest birds usually arrive in the first few days of April. For 10 years with dates accurate to three days between 1980 and 1994, the mean first date was 3 April, from a range of 29 March to 11 April. Numbers build up rapidly, such that many are usually present within a few days (mean of six years, 8 April; range 30 March to 14 April). By contrast, Chiffchaffs *Phylloscopus collybita* arrive markedly earlier, having arrived in numbers before the end of March (mean of nine years, 25 March;

Table 1 *Willow Warbler counts in Saltford, April 1986*

Date	16	18	21	23	24
River Avon	9(4)	17(4)	4(0)	13(2)	17(6)
Sewage farm	5(2)	7(2)	0	5(1)	4(2)
Railway line	0	0	0	1(0)	9(8)
Other areas	1	0	0	1(1)	0

The figure refers to all birds in that area; the number singing is in parentheses. Birds breed commonly along the disused railway line, but not along the river or in the sewage farm.

range 15 March to 7 April; first dates are difficult to calculate because of the presence of wintering birds). Palmer & Ballance (1968) considered that Willow Warblers were not usually common in Somerset until mid April; this is rather on the late side for Saltford in the 1980s. This may suggest that a change has occurred, or that Saltford provides especially suitable habitat for early arrivals.

Early arriving Willow Warblers are almost invariably in waterside habitats: in scrub on the bank of the River Avon or in bushes close to pools in the sewage farm. Neither of these areas is used for breeding and it may be some time before any birds are seen in breeding areas. Table 1 gives a breakdown of arrival in a typical spring, although this was rather a late season; in early years, many birds may be on territory within the first week of April. Singing is more frequent by birds on territory than from waterside migrants, as would be expected.

The most important question that this raises is whether individual local breeders arrive first in waterside areas and then move to breeding territories, or whether the waterside birds are composed entirely of passage migrants. The first seems more likely. Newly arrived male warblers of many species tend to move rapidly and jerkily through areas whose size corresponds to several breeding territories, feeding intensively but singing only intermittently. This is observable in species which on a local scale arrive straight into breeding areas, for example Reed Warblers *Acrocephalus scirpaceus* and Lesser Whitethroats *Sylvia curruca*. Similar behaviour is shown by freshly arrived Willow Warblers beside the river and in the sewage farm, but not by those along the disused railway line, the major breeding area. Even when a bird along the railway line is known to have arrived very recently, an observer cannot deduce this from its time budget or from the area within which it forages. This suggests very strongly that, although the bird is new to the immediate area, it has been in the surroundings for at least a day or so. This arrival pattern may be so in some but not all other areas: May (1947) noted in Surrey that males 'almost immediately' settled in; Brock (1910), however, considered that they 'soon settle down into regular beats', a pattern sounding subjectively more like that of birds moving onto breeding areas immediately on arrival in the region; while Lawn

(1994) found that territories were established shortly after the males' arrival, in contrast to the immediate establishment in Saltford, if, as implied, his 'arrival' means to the breeding site.

Willow Warblers in Surrey were found to have annual survival rates around 30–40% (which corresponded well with previous estimates from other single-site studies: Tiainen, 1983; Pratt & Peach, 1991; Peach, 1993) and a site fidelity of almost 50% in high quality habitats (Lawn, 1994). Together, these figures, if applying to birds in Saltford, suggest that it is unlikely that birds establish territories slowly while taking time to familiarise themselves with the area. Birds are relatively infrequent in waterside areas once several singing birds have settled in breeding areas. This suggests that fresh arrivals, which are certainly still occurring, move straight in to their breeding areas. Thus it seems likely that the earliest birds in fact arrive too soon to find sufficient food in the areas where they will later breed, and have to go elsewhere for a short period. It is surprising that early arrivals appear not to spend any time at all establishing a territory.

The Breeding Season

The many breeding pairs of Willow Warblers in Saltford are concentrated in several sites. The disused railway line provides ideal habitat, with about 15 pairs between its two crossings of the Avon (ST 688673 and ST 682688) in the 1980s. To the south, probably half as many pairs bred around Tennant's Wood (c.o. ST 694665) and on the adjacent railway line. The woods around the golf course (Folly Wood, c.o. ST 681660, and Long Wood, c.o. ST 676664) support a similar population. The interiors of these three woods do not support many pairs of Willow Warblers and tend to be filled with Chiffchaffs; the former species is less typical of mature woodland than the latter (Cramp, 1992). Sporadic pairs may occur wherever there are a few tall trees, although territories based solely along hedgerows are exceptional, despite hedges being frequently listed as breeding habitat (Cramp, 1992, Marchant *et al.*, 1990); presumably there are not enough trees in most Saltford hedges. In general, rank undergrowth (for nest sites) and tall bushes or trees (for songposts) are needed, as found by May (1947).

Male Willow Warblers sing conspicuously both before and after pairing. This makes it much easier to estimate breeding numbers than in species where song levels collapse after pairing, such as Sedge Warblers *Acrocephalus schoenobaenus* and Lesser Whitethroats. In the 1980s, the population in the area shown in Fig.1 was probably 30–40 pairs, though it must be stressed that only the population in the north part of the area was carefully surveyed (by BTO Common Bird Census). This overall density is of course very much lower than that found in blocks of suitable habitat by Brock (1910: 22 pairs in 26

***Table 2** Breeding counts along 1000 yards of disused railway line*

Year	Wllow Warblers	Chiffchaffs
1981	12	8
1982	8	3
1983	9	4
1984	10	-
1985	9	-
1986	-	4
1987	11	4
1988	12	4
1989	10	5
1990	7	8
1991	7	6
1992	8	7
1993	-	-
1994	6	7

Figures are given for estimated numbers of pairs breeding. This is deduced from counts of singing males. Common Bird Census results including the area from 1981 to 1983 showed that late April singing male count is a fair predictor of the number of territories. No Willow Warbler count was posslble in 1986 because the birds settled too late. Data for Chiffchaffs were recorded within adequate precision in 1984 and 1985. No observations were made in 1993.

acres), May (1947: 33 territories in 11.5 acres) and Lawn (1994: 34–36 pairs per sq. km).

Table 2 gives the estimated breeding population along the 1000 yard section of the disused railway line between the northern crossing of the River Avon and the bridge from Avon Lane (ST 686679). Birds' territories do not spill over from the railway banks into hedges across the adjacent fields. The populations in Table 2 thus use an area of approximately 4 acres, and live at densities comparable to May's.

There is a strong suggestion, probably real, that since 1988, numbers of Willow Warblers have rather declined and Chiffchaffs have increased. This is probably because of maturation of the bankside scrub (which grew largely unchecked since the early 1970s), the taller areas being more suitable for Chiffchaffs than for Willow Warblers; the latter is known as a species of young woods and scrub (Da Prato, 1993). Heavy clearance of the railway line around the mediaeval fishponds in winter 1993–1994 created ideal conditions, with four birds holding territory in 200 yds of railway line in 1994 (in most recent years two pairs settled); this was a much higher density than in the largely uncleared stretch to the north. As this long-term decline is a local effect it precludes any relation to the change occurring nationally.

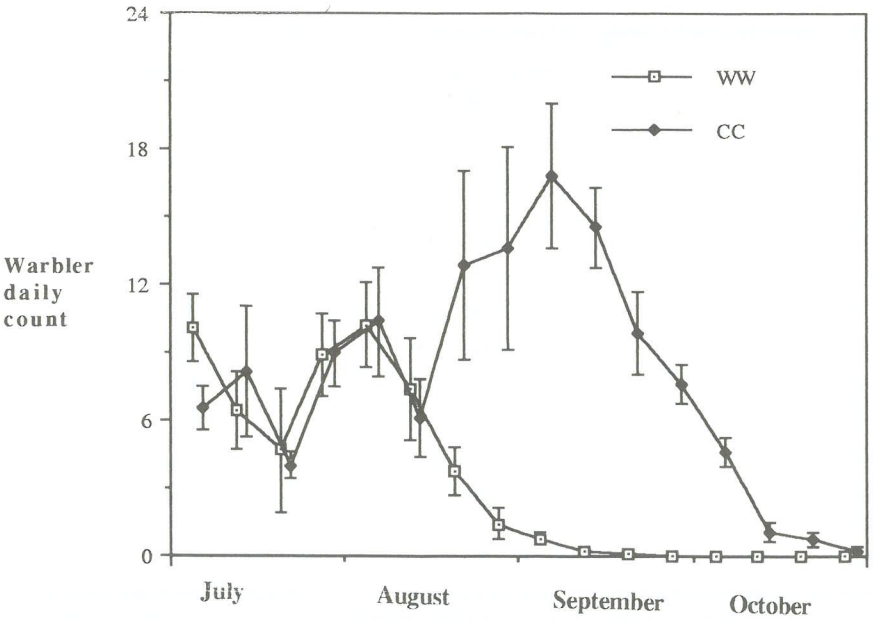


Fig.2 Autumn passage of Willow Warblers and Chiffchaffs through Saltford

The points plotted represent the mean number of birds located per day in the field, with standard error bars. These bars are calculated by taking all records for each year as one data point. The sample size, for the purposes of these calculations, is thus the number of years in which observations were made. They are (July) 7, 5, 3, 7, (August) 6, 6, 4, 5, (September) 8, 9, 9, 10, (October) 9, 5, 5, 5. Months are split into four at the following dates: 7/8, 15/16 and 23/34. Daily counts during July fluctuate widely due to large amounts of time spent observing insects rather than birds: while this should not affect the ratio of the two species, it may obscure true population patterns. In particular, the rise in counts of both species between July and August may be largely due to more time being spent per day counting birds. The patterns from August to October are much less affected by this error. Figures for Chiffchaff are plotted slightly offset for clarity.

Autumn Departure

Willow Warbler numbers decline throughout August and by the month end they are no longer continuously present (Fig. 2). Nationally, most have left by this time. Cramp (1992) and Lawn (1994) found that most breeders at a site in Surrey had departed by mid to late August. Although records are not unexpected in the first third of September, I have only six sightings after the tenth. The month's total of 22 bird days compares with well over 1000 Chiffchaffs from 1980 to 1992. The latest record is of one on 1 October. This is much the earliest departure among the warblers in the area: Blackcap *Sylvia atricapilla* and Chiffchaff both remain into October in numbers, Sedge Warbler and Lesser Whitethroat almost to the end of September and Whitethroat *Sylvia communis* into

the final half of September. The main fall in Chiffchaff numbers is fully five weeks later than for Willow Warblers (Fig. 2).

Though this early departure of the Willow Warbler may reflect the tendency of many birds of the year to commence migration well before the completion of post-juvenile moult (Norman, 1994), this phenomenon also occurs in the two whitethroat species (Boddy, 1983, Ellegren & Fransson, 1992, Norman, 1992) and furthermore birds from Surrey did not emigrate until after moult completion (Lawn 1984); Norman's population, in Cleveland, had a later breeding season than did Lawn's. The extent of this phenomenon in Saltford, a southern site like Surrey, is not known. The post-breeding period sees Willow Warblers at their most catholic with respect to habitat choice. Birds may be encountered anywhere: breeding areas such as the disused railway line continue to support large numbers, while at the same time many are in waterside areas. It is the only season during which birds are commonly found in actively managed farmland hedges and in town gardens, as also in Scotland (Brock, 1910). However, when large numbers are still present, it is difficult to assess which habitats are preferred by the birds: competitive effects or, less aggressively, an ideal free distribution, mean that many birds are foraging in suboptimal areas (Ellegren, 1991, Duckworth, 1994). Once numbers have dropped, it is clear that autumn migrants are very selective in their habitat: 15 of 18 September/October records with precise localities were close to small ponds or streams and the birds were in mature unmanaged hedgerows, verdant riparian bushes or withy beds. Two of these areas are by the River Avon and two a couple of hundred yards distant. One of the latter is a complex of abandoned mediaeval fishponds (c.o. ST 687676), adjacent to the disused railway line; surprisingly, despite this area's pre-eminence of September records (five) it is not specially patronised by birds in spring, and is colonised no earlier than the remainder of the disused railway line. The other three, the sewage farm, the disused withy beds and the scrub and pond below the Rectory (ST 688674), are important in both spring and autumn. Although Cramp (1992) found that waterside areas are favoured for breeding, the strong choice by passage migrants for these habitats is not there presented.

References

Bland, R.L. and Tully, J. (1992) *Atlas of Breeding Birds in Avon 1988–1991*. Privately published report.

Boddy, M. (1983) Factors influencing timing of autumn dispersal or migration in first-year Dunnocks and Whitethroats. *Bird Study* 30, 39-46.

Brock, S.E. (1910) The Willow-wrens of a Lothian wood. *Zoologist* 14, 401–417.

Cramp, S. (ed.) (1992) *The Birds of the Western Palaearctic* Vol VI. Oxford: Oxford University Press.

Da Prato, S.R.D. (1993) Willow Warbler. In D.W. Gibbons, J.B. Reid and R.A. Chapman (eds) *The New Atlas of Breeding Birds in Britain and Ireland: 1988–1991 (pp. 350–351).* London: T. & A.D. Poyser.

Duckworth, J.W. (1994) Habitat selection by migrant Redstarts *Phoenicurus phoenicurus* and Whinchats *Saxicola rubetra* in lowland English farmland. *Ringing and Migration* 15, 119–122.

Ellegren, H. (1991) Stopover ecology of autumn migrating Bluethroats *Luscinia s. svecica* in relation to age and sex. *Ornis Scand.* 22, 340–348.

Ellegren, H. and Fransson, T. (1992) Fat loads and estimated flight-ranges of four Sylvia species analysed during autumn migratlon at Gotland, south east Sweden. *Ringing and Migration* 13, 1–12.

Lawn, M.R. (1984) Premigratory dispersal of juvenile Willow Warblers *Phylloscopus trochilus* in southern England. *Ringing and Migration* 5, 125–131.

Lawn, M.R. (1994) Site fidelity and annual survival of territorial male Willow Warblers *Phylloscopus trochilus* at four adjacent sites in Surrey. *Ringing and Migration* 15, 1–7.

Marchant, J.H., Hudson, R., Carter, S.P. and Whittington, P.A. (1990) *Population Trends in British Breeding Birds.* Tring: BTO.

Marchant, J. and Balmer, D. (1993) Common Bird Census. 1991–1992 Index Report. *BTO News* 187, 9–12.

Marchant, J. and Balmer, D. (1994) Common Bird Census, 1992–1993 Index Report. *BTO News* 193, 11–14.

May, D.J. (1947) Observations on the territory and breeding behaviour of the Willow Warbler. *Brit. Birds* 40, 2–11.

Norman, S.C. (1992) Dispersal and site fidelity in Lesser Whitethroats *Sylvia curruca. Ringing and Migration* 13, 167–174.

Norman, S.C. (1994) Dispersal and return rates of Willow Warblers *Phylloscopus trochilus* in relation to age, sex and season. *Ringing and Migration* 15, 8–16.

Palmer, E.M. and Ballance, D.K. (1968) *The Birds of Somerset.* London: Longmans Green.

Peach, W.J. (1993) Combining mark-recapture data sets for small passerines. In J.D. Lebreton and P.M. North (eds) *Marked Individuals in the Study of Bird Populations.* Basel: Birkhauser Verlag.

Pratt, A. and Peach, W. (1991) Site tenacity and annual survival of a Willow Warbler *Phylloscopus trochilus* population in southern England. *Ringing and Migration* 12, 128–134.

Tiainen, J. (1983) Dynamics of a local populatlon of the Willow Warbler *Phylloscopus trochilus* in southern Finland. *Ornis Scand.* 14, 1–15.

J.W. Duckworth
9 Crosbie House, Northbrook Avenue, Ranelagh, Dublin 6

Winter Sun-basking by Garden Passerines

K.E.L. Simmons

In my guide to avian sunning (Simmons, 1986), I drew attention to behaviour that I termed 'sun-basking' whereby birds (especially in autumn, winter, and spring) use solar warmth to gain heat and conserve energy. As an example, I mentioned the sun-seeking tendencies of certain garden passerines, such as the House Sparrow *Passer domesticus* and Greenfinch *Chloris chloris*, which usually associate in flocks. Since then, I have found that this sun-basking habit is not confined to the middle of the day, as implied in my review.

Quite recently, on 21 December 1994, I recorded a good example of the behaviour when, at 10.40 GMT, some ten loafing House Sparrows were seen 'taking the sun' at a new site in a neighbouring garden, drastic pruning having exposed the interior of a tall bush to the rays of the morning sun. The incident reminded me of the pertinent observations I made in and near my own garden during the period December to March 1990–91 which first made me realise that sun-basking can occur throughout the day in suitable conditions. I then noted that, especially in cold sunny weather following an overnight frost, my semi-resident flock of House Sparrows, when loafing, tended to follow the sun round more or less throughout the day as it progressed, leaving those sites that became shaded for others still in the sun (especially the south-facing ones) — one or more of them serving as communal chattering places. Neither did the birds only use sheltered basking spots (as I also had implied in my review) but would also perch at times in the sun-kissed uppermost branches of some favourite trees that overlooked the feeding place where I provide a regular supply of an assortment of seeds in holders, often deliberately facing the sun to the east or south instead of facing west as they usually did (weather permitting) in order to keep the food source in view.

Similar sun-basking was also shown by members of the flock of Greenfinches that visited the garden daily, at least in so much as they kept in the sun as much as possible but perched only in the higher branches of the trees already mentioned. As these finches usually faced west to monitor the seed-holders when loafing, the sight of the whole flock (of about a dozen when at full strength) turned eastward to a bird in order to face the rising mid-morning sun was particularly striking on the few occasions it was observed.

Even more revealing was the behaviour of a series of sick Greenfinches which, that particular winter, were affected by some fatal dis-

ease or by poisoning, as was a single House Sparrow. The first of the Greenfinches (a male), seen in late December for a few days until he disappeared, was noted to be following the sun around on the ground during the day. The second (also a male) was watched more carefully on 15–16 January — both cold days of bright sunshine with frost remaining on those surfaces which lay in the shade all day — after which he too disappeared (his body and that of the earlier bird being later discovered by my wife when gardening). Although able at first to fly up into the usual trees when disturbed, and also to arrive and depart with the flock each day, this second Greenfinch later fed only on the ground under the nearest holder (which contained crushed peanuts and small sunflower seeds), upon the contents and edible debris which became dislodged by other birds working away on the feeder itself, and spent most of his day resting alone on the ground in the sun, feathers fluffed up and bill tucked away — at first near the holder, then further and further to the east of it as the shade-line (from the house) moved in the same direction during the afternoon. On both days, when I checked, the bird was either feeding or resting in the sun as near to the holder as the shade permitted. As the straight line of the shade advanced eastwards, he would bask just beyond it — this being a feature of birds that 'sun-expose' themselves in summer for purposes other than thermoregulation, adopting postures not seen from winter sun-basking birds (see Simmons, 1986, for further information and discussion). Once, when the shade line caught up with and then started to overtake the Greenfinch while he was asleep, he awoke after about two minutes, then returned to the seeds, stopping for a drink on the way; when next checked, he was back in the sun just beyond the shade as before.

For most of the time he spent on the ground, this Greenfinch would squat at a 'hot-spot', where the background (the garage wall, a large brick) provided additional reflected heat, but once he was seen about a couple of feet out in the open on the lawn. Only when the ground to the east was in the shade did he perch higher, firstly in one of the openings of a trellis and on top of two small firs behind it (both also favourite basking/loafing spots of the House Sparrows) and lastly, when all the ground was out of the sun (by about 14.00), on a jutting-out branch of a larger fir, in all cases facing south. None of the fit Greenfinches behaved in this way.

On 30 January, during a spell of cold grey weather, a third ill Greenfinch (a female) was found dead in the garden almost under the seed-holders in the passage entrance of an outhouse where she must have been sheltering from the elements, heat-conservation obviously being an important factor with these sick birds. On 6 February, a bitterly cold day, a male House Sparrow in the garden was another victim of ill-health, remaining alone on the ground below the feeders while the sun was hidden during the morning and later loafing in it when it was

out in the afternoon — sleeping in a sheltered flower border just beyond the shade line, then struggling up higher on to a nearby trellis when all the ground was in shade, but never joining the other sparrows loafing and sun-basking elsewhere even when they left the garden.

On 18 and 19 February, both sunless days after the start of a temporary thaw, a fourth sick Greenfinch (another female) was about the garden, from 07.45, well before the rest of the flock had flown in, until 17.15 long after the others had left, feeding on her own under the seeds. Next day was cold but sunny and she was seen loafing in the garden, both in and out of the sun, until 12.50; by 13.05, however, she was lying dead at her last resting place. Next day, I found another dead female Greenfinch that had been sheltering near where the third bird had died.

There was then a lull until 28 February when a sixth poorly Greenfinch (a male) had based itself in the vicinity of the feeders. He was then still strong enough to perch on one of them — a square mesh 'box', the top of which I had packed with small sunflower seeds — but, though not yet at the terminal lethargic stage of his illness, had noticeably weakened by the next day (1 March) and remained mainly on the ground, fluffed up and rather doddery, under the same and other feeders. At 11.45, he deliberately moved beyond the shadow line into the sun. By 12.20, he appeared to have left the garden with the rest of the flock but, by 13.04, was back on his own under the seed-holders again. Later, with the sun in, he rested in a sheltered place nearby, immediately edging himself into the sun when it came out again and subsequently, until it went in again, moving with the sun to a series of basking spots, some of which provided reflected heat behind him. Later, with the sun still in, he kept an eye on the box-feeder from the branches of a small laburnum-tree nearby, waiting for other birds to dislodge seeds, supplanting later-arriving Greenfinches both on the holder and the ground. His condition worsened later that afternoon, however, and he then mainly fed sluggishly under the holders or waited there inactively with wings dropped when they were unattended — conserving heat, unlike all the fit birds present, with his body feathers fluffed up into a big round ball and head retracted. He did not return next day and must have died elsewhere.

A seventh and last sick Greenfinch (a female) was present, on her own, under the feeders on 12 March, a dull but mild day. Weak and sluggish, she rested all fluffed up when not feeding even though the weather was no longer cold. After managing to flutter up on to the dividing fence, she disappeared next door and was not seen again.

Since the winter of 1990–91, there have been no further outbreaks of illness among my garden birds but recently (March 1995) I twice saw a female Blackbird *Turdus merula*, who had been blinded in one eye when fighting with another female, deliberately loaf in the sun while waiting for me to put out food for her instead of skulking away out of sight as

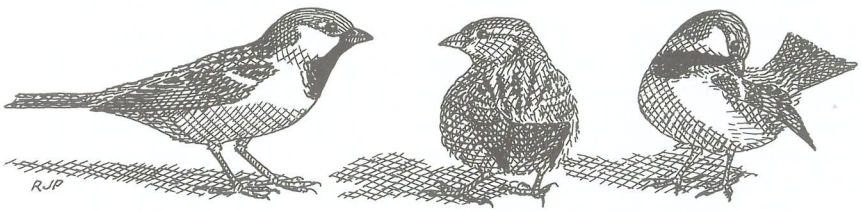
she mostly did in order to avoid harassment from the rival female and other Blackbirds.

The observations outlined here are interesting in showing how sick birds, in winter especially, try to conserve their body heat by reducing their activity, adopting heat-retaining feather postures, and, when possible, seeking the sun for heat-basking — all an exaggeration of behaviour shown by fit birds of the same species when temperatures are low.

Reference

Simmons, K.E.L. (1986) *The Sunning Behaviour of Birds: A Guide for Ornithologists.* Bristol Ornithological Club.

Dr K.E.L. Simmons
66 Romway Road, Leicester LE5 5SB



Club Activities, 1993 & 1994

At the beginning of **1993** Club membership stood at 498, but by July had risen to 500, with 526 members by the end of the year. The thirty-four field trips started with the annual visit to Slimbridge, but with heavy fog and few geese the year did not start with the usual 'bang'! There were three coach trips — to the Exe Estuary, Studland and Keyhaven; weekend visits to Suffolk in May (Red-backed Shrike and Woodlark) and Cornwall in October; a very successful Club holiday to Northern Ireland led by Robin Prytherch in February and a week on Islay (again led by RJP) in October (ten Golden Eagles in one day!) The tally hunt/summer social was well supported, but limited interest was shown in the migration watches.

As a new venture, an open evening for members was held at Taunton Leisure, where a full range of outdoor clothing and equipment was on sale at discount prices. It turned out to be a very satisfactory event both for Club members and Taunton Leisure!

The committee decided to hold a photographic competition during the year and fourteen entries were received — winners were presented with vouchers for photographic equipment. The Stanley Crick Award for best newcomer to birdwatching was presented to Paul Marshall.

Ken Hall took over from Mike Lord as the BOC representative on the Severn Estuary Conservation Group. Through this group, the Club made an official objection to the proposed Cardiff Barrage. In response to a request from the Chew Valley Ringing Station, the Club contributed towards the cost of a new computer to help them store and analyse their records.

Gordon Youdale was due to retire as Club Chairman but agreed to stand for a further year. John Tully remained Treasurer, Judy Copeland Membership Secretary and John Barber Secretary. Roger Staples and Mike Lord resigned from the committee and the vacancies were filled by Nick Ayers and Steve Hale. Trevor Silcocks continued as Honorary Auditor to the Club.

1994 started with Club membership at 526 and ended with 556 members. During the year there were thirty-one field trips with three coach outings — to the Exe Estuary, Stanpit Marsh & Hengistbury Head, and Portland; there were weekend trips to Tregaron, Anglesey and South Devon (last-minute change from Cornwall); Ken Hall led a group to Brittany in April and there was a much enjoyed Club holiday to The Gambia in November when five members joined a Cygnus tour. From November and December, mid-week meetings were started, by request, and these meetings are now regular slots in the BOC programme, largely due to the efforts of Steve Kirk and David Tombs.

For this year, instead of the photographic competition, it was decided to hold a drawing/illustration competition, hoping that winning entries could be used in the *Avon Bird Report* or *Bristol Ornithology*, but unfortunately support was minimal and the competition was closed without result. There was no presentation for the Stanley Crick Award.

During the year the BOC held preliminary discussions with the Bristol Naturalists and the Avon Ornithological Group to look into the possibility of producing a book by the year 2000 entitled *The Birds of Bristol District*. This project will need a great deal of dedication and hard work, but it is felt that a bird book covering the region is long overdue. The 1993 *Avon Bird Report* was produced as a perfect-bound publication with, for the first time, a colour illustration on the front cover.

Gordon Youdale completed a four-year stint as Chairman and John Barber resigned as Secretary, a post he had held since 1983. Roger White stood down from being a co-opted member of the committee. Nick Ayers became Chairman and Jean Lay Secretary. John Tully and Judy Copeland remained in their offices. Jane Cumming, Brian Lake and Clive Leyman were elected to the committee. Trevor Silcocks remained Honorary Auditor. Andy Middleton took over from Ken Hall as BOC representative on the Severn Estuary Conservation Group.

During 1993 the Avon Gorge Peregrines did not raise any young, but a very successful watch programme was well organised by Mike and Alix Lord. In 1994 the Peregrines successfully reared four young and Andrew Beattie undertook the demanding job of watch organiser. It was felt that this was the best year yet for the Peregrines. The Peregrines received wide media coverage and many new Club members were introduced to the BOC via the watches. The BOC is grateful for the continued support and sponsorship received from the BBC Wildlife Magazine, Bristol Water plc, ICI Fertilizers, English Nature, Rhone Poulenc Chemicals, British Telecom, Charles E. Ford Animal Feeds, Dalgety Agriculture Ltd and Spillers Milling Ltd. A great many volunteers were involved with the Peregrine watches, and also with the BTO's BBS and the CBC surveys as well as the locally organised House Martin and overwintering warbler surveys. It is good that so many people are actively involved with the work of the Club.

In both 1993 and 1994 the Club held reciprocal indoor meetings with the Bristol Naturalists Society and field meetings with Gwent Ornithological Society. Tony Jenkins from Gwent led several BOC field trips and John Grearson from the Wiltshire Ornithological Society led a BOC trip to the Cotswold Water Park. It is gratifying to report that all Club meetings were well attended, with over one hundred members at all the indoor meetings and field trips well supported — no matter what the weather — making the programme planning very worthwhile. Thanks to everyone who gave up their time to lead field meetings and to those who wrote the reports for the trips.

It was also interesting to see members' slides and to hear talks about worldwide travels during the Members' Evenings and at the AGMs. Many thanks to all those who gave their time to share their holiday experiences with Club members. Thanks also to all the members who spend time and effort to fill in and return bird recording slips each month. Please keep up the good work!

The Committee continued to invite Club members to sit in on Committee meetings and appreciated the input from all of these people.

Jean Lay, *Secretary*

Indoor Meetings

21. 1.93	Adrian del Nevo — North Atlantic Seabirds
18. 2.93	Members' Evening
4. 3.93	Beginners' Meeting
18. 3.93	David Garner — A Basketful of Owls
16. 9.93	Trevor Gunton — Wilderness Europe
21.10.93	Paul Johnson — Britain's Owls and Their Conservation
18.11.93	Andy Evans — The Cirl Bunting
16.12.93	Annual General Meeting
20. 1.94	Peter Reay — Avocets
17. 2.94	Members' Evening
3. 3.94	Beginners' Meeting
17. 3.94	Jane Sears — Shetland Oil Disaster — A Year On
22. 9.94	David Cottridge — Autumn in the Forest
20.10.94	Leslie Street — Wildlife & Management on West Sedgemoor
17.11.94	Algirdas Knystautas — The Birds of Russia
15.12.94	Annual General Meeting

ISSN 0950-2750. Published by the Bristol Ornithological Club, 1996 (c/o The Anchorage, The Chalks, Chew Magna, Bristol BS18 8SN). Printed by Severn Graphics, Clevedon.

Bristol Ornithology

Bristol Ornithology is the journal of the Bristol Ornithological Club and exists to publish the results of studies undertaken by members of the Club. Both papers and short notes are welcome — the Editors would be delighted to discuss ideas for future submissions at any time. The range of subjects covered by the journal is wide, reflecting the varied interests of Club members over the years. Many articles have reported results of studies in the Bristol region, but there is no fixed restriction limiting studies to the Club's recording area. More general behavioural studies are also welcome.

Grey Herons at a daytime roost