A winter roost of Grey Herons

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INTRODUCTION

Gatherings of Grey Herons *Ardea cinerea* at traditional standing-grounds during the breeding season have been noted by several authors (Beetham 1910, Huxley 1924, Lowe 1954, Milstein *et al.* 1970), and the behaviour of the birds at these standing-grounds has been investigated (Birkhead 1973). Gatherings of herons outside the breeding season seem to have attracted less attention (see pages 162-163 in Huxley 1924, and Southern 1939), but this may be because they occur less frequently at those times. I consider, however, that groups of herons not associated with heronries are less conspicuous and are easily overlooked.

The present paper describes observations at a winter day-time communal roost in Yorkshire. Data collected are compared with the results of similar work carried out during the breeding season (Birkhead 1973). The roost has been in existence since at least 1966 (personal observation) and probably for considerably longer; B. King (verbally) has recorded a field in Somerset being used by Grey Herons as a roost site for 35 years.

ROOST SITE AND OBSERVATIONS

The roost site is situated in an area of low-lying arable land in north-west Yorkshire. From September to March, usually each day, herons congregated on the same field, though occasionally either of two adjacent fields was used. The field in which the herons most

Fig. 1. Map of the study area, showing the main field used for roosting and the surrounding vegetation
frequently gathered is 2.63 ha (6.5 acres) in area and slopes gently downwards to the north-west. At the western edge is about 0.6 ha (1.5 acres) of rough grass, mostly tussocks of cocksfoot *Dactylis glomerata*; virtually the entire periphery of the field supports further areas of cocksfoot and a few large trees, mostly oaks *Quercus* (fig. 1). The field was ploughed and sown during the winter months and throughout this period the soil remained bare. During the late spring and summer it was covered by a cereal crop.

During February and March 1970, from September 1970 to March 1971, and from September 1971 to March 1972, I made over 100 visits to the roost site and recorded various aspects of the herons' behaviour. Observations were made for a total of 50 hours, without disturbing the birds, from a point about 100 metres to the east of the roost site (fig. 1), in periods of 20 to 300 minutes.

**EVENTS RECORDED**

*Attendance at the roost* Throughout the study periods the total number of herons and the numbers of adults and yearlings (see Milstein *et al.* 1970 for age classes) present at the roost were recorded.

*Arrivals and departures* On 38 visits made to the roost during the winter of 1970/71, the arrivals and departures of all the herons were recorded.

*Behaviour on arrival* When herons arrived at their roost during the breeding season, a display referred to as the 'arch-neck display' was frequently seen (Birkhead 1973). In the present study, behaviour on alighting was observed and recorded.

*General activities* On each visit made to the roost it was possible to allocate a number to each heron for the duration of the observations. Behaviour was recorded at five-minute intervals, when it was placed in one of the following categories: standing, asleep, lying, hunting, twig-fiddling, preening or sunning (see Birkhead 1973 for descriptions and diagrams of postures assumed).

*Vocalisations* Any distinctive sound uttered by a heron at the roost was noted.

*Intraspecific interactions* Interactions between herons at the roost were recorded.

*Interspecific interactions* Relations with other species of birds and with mammals were also recorded.

**RESULTS**

*Attendance at the roost* No herons were seen at the roost before the beginning of September or after the first week of April. Changes in the number present around midday from September 1970 to March 1971 and from Sep-
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Fig. 2. Total number of Grey Herons Ardea cinerea at the roost between 11.00 and 15.00 hours during the winters of 1970/71 and 1971/72

September 1971 to March 1972 are shown in fig. 2. I noted that during July and August in both 1970 and 1971 immature herons predominated at near-by feeding areas, but at the roost site between September and March in both winters adults were in greater abundance than yearlings (table 1). Two explanations are suggested: first, yearling herons may be less sedentary and more widely dis-

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Table 1. Mean monthly ratios of adults to yearlings at winter day-time roost of Grey Herons Ardea cinerea, Yorkshire, October 1970 to February 1972

The age-classes are defined in Milstein et al. (1970)

<table>
<thead>
<tr>
<th>Month</th>
<th>1970/71</th>
<th>1971/72</th>
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<tbody>
<tr>
<td>October</td>
<td>1.8:1</td>
<td>—</td>
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<tr>
<td>November</td>
<td>2.0:1</td>
<td>3.1:1</td>
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<td>December</td>
<td>3.0:1</td>
<td>3.5:1</td>
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<tr>
<td>January</td>
<td>2.7:1</td>
<td>3.0:1</td>
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<td>February</td>
<td>3.0:1</td>
<td>6.0:1</td>
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<tr>
<td>March</td>
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persed than adults during the winter; second, yearlings may need to spend more time away from the roost site in feeding areas. In a study of the Little Blue Heron *Florida caerulea*, Recher and Recher (1969) found that juveniles up to at least nine months old fed less efficiently than adults.

Fluctuations in numbers at the roost in relation to weather were noted. Reduced attendances and later arrivals were recorded during periods of snow or mist. For example, there were ten herons on 9th January 1971 during mild and fine weather, but only three on 13th when misty conditions prevailed. By 29th January weather conditions had improved and 14 birds were at the roost. This suggests that during bad weather herons had difficulty finding food and so spent more time in feeding areas. It should be noted that both the 1970/71 and 1971/72 winters were relatively mild.

**Arrivals and departures**

On each of the visits I made to the roost, herons began to arrive, usually singly, about one hour after dawn and mostly between 09.00 and 10.00 hours (fig. 3). They continued to arrive at a slower rate throughout the day until 16.00-17.00 hours. Some started to leave

![Graph showing arrivals and departures of Grey Herons](image-url)

**Fig. 3.** Average number of Grey Herons *Ardea cinerea* arriving at the roost (filled circles), and departing from it (open circles), each hour during the entire study
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the roost between 15.00 and 16.00, but the greatest number left approximately one hour before dark in the evening, and all had left by the time it was dark. The herons generally went singly or in small groups of two or three. On some occasions it was possible to follow them through binoculars or by car to feeding areas.

In contrast with the situation during the breeding season (Birkhead 1973), once herons had arrived at the roost they remained there until dusk. The mean length of time spent at the roost was probably considerably longer in winter than during the breeding season, notwithstanding the shorter day-length; the lack of breeding commitments probably accounts for this difference. The data suggest that the herons were feeding to a large extent at dawn and dusk, and possibly nocturnally.

**Behaviour on arrival**

The arch-neck display seen at the roost during the breeding season (Birkhead 1973) appears to be confined to that period and was not observed during the present study. A display which involved only raising of the dorsal body plumes (fig. 4) was, however, recorded in 132 (55%) of the arrival sequences observed. In the remaining 108 (45%) no display occurred. Erection of the dorsal body plumes constitutes part of the arch-neck display, but also occurs in other displays at the nest (see Milstein et al. 1970). It is possible that this plume-raising on arrival at winter roosts is simply a subdued form of the arch-neck display.

![Fig. 4. Grey Heron *Ardea cinerea* with erect dorsal plumes, an alighting display seen in 55% of all arrival sequences](image)

**General activities**

The herons spent 76.8% of their time at the roost standing and awake, 5.9% asleep, 0.6% hunting and 16.6% preening. These results are broadly similar to those obtained during the breeding season (Birkhead 1973). Lying, sunning and twig-fiddling were not
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recorded; only when herons were standing in areas of cocksfoot would they have had the opportunity to twig-fiddle, since there was neither vegetation nor twigs in the centre of the field, and it seems likely that this activity is closely related to nest-building. Once in August 1971, however, I observed a fledgling heron, by a lake edge, playing with a stick for several minutes (see page 239 in Milstein et al. 1970).

It was not clear what prey species was involved in the hunting activities, which occupied only a very small proportion of the time. Once at another standing-ground in June 1971 I watched a yearling heron stalking and eating flies on standing barley.

Vocalisations

On several occasions a low-amplitude, low-frequency, 'muttering' sound was uttered by a heron immediately after alighting at the roost among other herons. At other times, herons departing singly from the roost at dusk gave loud and harsh 'fraank' calls. Weather conditions were not always suitable for hearing calls and as a result there is insufficient information to form any conclusions.

Intraspecific interactions

Mention has already been made of the display which sometimes occurred when herons arrived at the roost. Once there, however, there was very little activity except preening, and interactions of any sort were infrequent. Only two agonistic incidents were recorded, both within 35 minutes of each other during the same observation period. Ten herons were standing in long grass at the southern edge of the field. Two of the birds, both adults, suddenly jumped out on to the field with wings open and necks extended, one chasing the other. The remaining eight became alert and apparently watched the other two for about three minutes. The attacked bird remained on the field for 30 minutes after the other had returned to its original position in the grass. The attacked bird then defaecated and walked across the field in a westerly direction towards a yearling heron. As the yearling walked in front of the adult, the latter’s dorsal plumes became erect. The adult lunged at the younger bird which rapidly moved out of the way. After the incident the adult’s dorsal plumes remained erect for about a minute, and then both birds adopted hunched postures.

Interspecific interactions

It is well known that herons in flight are likely to be mobbed by other birds. Birkhead (1972) described incidents in which herons on the ground were mobbed by individual and small groups of Carrion Crows Corvus corone corone. This mobbing behaviour was
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unusual in involving actual contact, the crows pulling the herons' feathers; Cramb (1972) observed a similar incident.

To the north of the roost site are several large reservoirs, some of which are used during the winter months by gulls *Larus spp* as nocturnal roosts. Gulls flying over standing herons on their way to the reservoirs in the late afternoon frequently swooped down and flew directly over them, but never lower than about ten metres; the herons reacted only by turning their heads, sometimes virtually upside-down, apparently watching the gulls.

No interactions with mammals were observed. Brown Hares *Lepus capensis* occasionally crossed the field in which the herons were standing, but both species ignored each other. Lowe (1954) could find no evidence of mammalian predators taking adult herons, although B. King (verbally) has observed a Fox *Vulpes vulpes* stalking a group of roosting herons: it was able to approach to only about 50 metres before the birds took flight.

DISCUSSION

A variety of terms has been coined to describe the sites used by gatherings of herons, for example ‘standing-grounds’ (Lowe 1954), ‘gathering-grounds’ (Baerends and van der Cingel 1962) and ‘dancing-grounds’ (Meyerriecks 1960). These gatherings are similar in some respects to the ‘clubs’ of certain seabirds and to the loafing areas of wildfowl, and both Beetham (1910) and Milstein *et al.* (1970) referred to ‘loafing’ herons. Kramer (1950) defined a roost simply as a place where a bird rests during a long inactive period. Since I have shown that the day-time gatherings of herons during the breeding season (Birkhead 1973) and throughout the winter months are characterised generally by periods of inactivity, I suggest that they should be referred to as roosts, and the areas in which they occur as roost sites.

In addition to breeding season and winter roosts, herons may also roost communally at other times of the year. I have noted post-breeding season roosts, as did Southern (1939) and Lowe (1962), and, although no detailed study of these has been made, my observations confirm Southern’s in that most birds are generally standing, sleeping or preening.

Several authors have suggested possible functions of communal roosting in birds. Lack (1968) regarded the main purpose, in all birds, as protection from predators. Since roosting herons spend a large proportion of their time sleeping and preening, a predator such as a Fox is more likely to be noticed by a group than by a solitary heron engaged in these activities. If ground predators were a serious threat to roosting herons, however, it seems reasonable to suppose that they would roost in trees.
Ward (1965) has put forward the hypothesis in relation to *Quelea* that communal roosts have evolved primarily for the exploitation of unevenly distributed food sources by acting as ‘information centres’. This hypothesis has been extended and amplified by Ward and Zahavi (1973), who suggest that ‘information’ is transferred by birds following each other from roosting to feeding areas, and that for birds which roost communally but tend to hunt solitarily, such as herons and harriers *Circus spp* (Gurr 1968, Watson and Dickson 1972), this information relates to the position of food in relation to the roost, though not to its precise location. They also consider predation pressure to be the most important factor influencing the selection of safe roosting sites (see also Zahavi 1971). Herons roost on the ground and in the open perhaps because this behaviour enables others in flight to locate those already standing at the roost and conversely provides the latter with all-round vision, giving them a clear view of birds arriving and departing and of any approaching predators.

As far as herons are concerned, I regard the ‘information centre’ hypothesis of Ward and Zahavi as more likely than Lack’s. Supporting evidence is, however, largely circumstantial. On a few occasions I noted that one or two herons followed another as it left the roost in the evening, although I did not realise the possible significance of this at the time. In this respect, the calls uttered by herons leaving the roost may also be important.

Lowe (1954) has shown from ringing recoveries that most herons die between December and February, and it is well known that hard winters greatly reduce their numbers (Alexander 1945), indicating that food may be most difficult to find at this time of year. My observations on weather effects and attendance at the roost suggest that bad weather might extend the feeding time, though it is not clear whether this is because food is harder to find or because herons need more food during bad weather. Much more needs to be known about the winter food and feeding techniques of herons and the effects of sudden changes in weather conditions. Lack (1949) showed that mortality of herons in their first year remains very similar from fledging until the following April, with no winter peak of recoveries. It therefore seems unlikely that the changes in adult-yearling ratios observed (table 1) were due to changes in yearling mortality through the winter. It is interesting that in the 1970/71 winter there was a tendency for low numbers of yearlings when total numbers were high, particularly between December and February. If yearling herons have to spend more time feeding than adults, they may experience their greatest difficulty in finding food when the days are shortest, which would account for their relative scarcity at the roost site between December and February.
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Breeding season and post-breeding season roosts might also serve as 'information centres', since it could be argued that efficient food-finding is particularly important at such times. First, during the breeding season herons must be able to find sufficient extra food for their chicks; and second, newly fledged herons must rapidly learn good feeding areas in order to survive. Owen (1959) and A. A. Bell (verbally) have observed immature herons following adults during the breeding season, and Owen provided evidence that immatures could thus learn the location of feeding places. This does not preclude the possibility that roosts during the breeding season fulfil some reproductive function as well.

If the sort of mechanism which Ward and Zahavi (1973) suggest is operating in the transfer of information, in theory herons need attend the roost only in the afternoon. The fact that, in the present study, most arrived between 09.00 and 10.00 indicates that it is important for them to spend much of the day resting and preening.

Large groups of herons have been recorded taking advantage of a temporary, local abundance of food (Lowe 1954, Ward and Zahavi 1973). Although this is very circumstantial evidence to support the 'information centre' hypothesis, it would be possible to create an experimental situation at a regular feeding site (at different times of the year) by suddenly providing a superabundance of food. If the birds were colour-marked, it would be possible to discover to what extent the roost operates in information exchange. Siegfried (1971) has made a detailed study of communal roosting in the Cattle Egret Bubulcus ibis, using dye-marked birds to determine movements from specific roosts. The use of colour-marked herons, or at best telemetry, might give an indication of the extent to which herons feed nocturnally and the distance they travel to feeding areas in relation to weather conditions. In addition, careful study of roost departure behaviour should be made to determine, for example, the possible function of calls given by departing birds; and the behaviour of young in following adult herons should be examined in more detail, in particular to investigate whether it is more frequent during bad weather.

ACKNOWLEDGEMENTS

Grateful thanks are due to B. King and A. A. Bell for allowing me to use their unpublished material, and also to Dr P. Ward, Dr C. M. Perrins, Dr S. M. Evans and Dr E. K. Dunn for their helpful comments on the manuscript. Particular thanks are due to M. E. Birkhead whose help in the field was indispensable.

SUMMARY

Observations were carried out at a winter day-time roost of Grey Herons Ardea cinerea in Yorkshire. A regular pattern of arrivals and departures was recorded, most birds arriving within two hours after dawn and not leaving until dusk. Mist
and snow resulted in reduced attendance and later arrival at the roost. A display observed in 55% of the arrival sequences may serve a similar function to the arch-neck display which occurs during the breeding season. General activities were broadly similar to those recorded at breeding season roosts, 76.8% of the total time being spent standing, 16.6% preening and smaller amounts sleeping and hunting. Inter- and intraspecific interactions are described. The possibility that heron roosts serve as 'information centres' for food-finding is discussed, and lines of further study are suggested.

REFERENCES


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