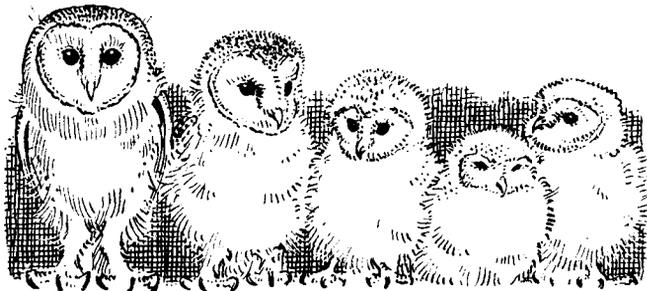


Observations on breeding Barn Owls

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This insight into the family life of the Barn Owl reveals fascinating interactions between the two adults, between the pair and their young, and between the differing-aged owlets

During 1963-72, we undertook an intensive study of the Barn Owl *Tyto alba* in northwest England. DSB studied a total of 21 nests: in a remote, young conifer forest in the West Riding of Yorkshire (now Lancashire) (18), in almost suburban surroundings in east Lancashire (two) and in limestone pasture in south Westmorland (now Cumbria) (one); and ABW observed seven nests in southwest Cumberland (now Cumbria): in lowland farmland (three), in a young spruce plantation (three) and in wasteland by the sea (one). Observations were maintained throughout the year. This paper concentrates on those facts hitherto unrecorded. The calls of the Barn Owl have already been described (Bunn 1974).

Early breeding behaviour

The first sign of breeding activity is increased screeching by the males, which begin to exhibit marked territorial behaviour in mild weather as early as February. Outside the breeding season, those in the West Riding study area, where the species was unusually common, frequently uttered a single screech as they flew from the roost at dusk, but in March and April they would utter repeated screeches as they flew to and fro in their territories in a kind of song flight. Occasionally, trespassing males were driven off with furious harsh screeches. In the other areas, the Barn Owls were not so vocal, probably because rivals were fewer. In March 1968, an unpaired male exhibited another form of self-advertisement by perching at the entrance hole to his roosting barn and uttering a loud screech every few seconds. On one occasion, a female, recognisable as such by her

different screech, was heard first to fly to this male and then to be attracted away to another screeching loudly from his territory about 1 km away.

Many Barn Owls remain paired throughout the winter, though it may be the territory that keeps them together. Our observations showed that mild courtship, mainly mutual preening, is indulged in at the roost during winter and that the two owls frequently rest side by side. It was difficult to be sure whether other individuals vacated their territories after the breeding season, because mortality could have accounted for their absence.

Throughout the year, the male Barn Owl greets the female with a combined squeak and chirrup whenever he looks in her direction; she usually squeaks in reply. In March, however, the female becomes sexually active, starting to 'snore' regularly in the male's presence and to greet him by snoring. This is essentially a juvenile call and appears to function as a stimulant to the male, who responds by bringing her prey items. The earliest record of food presentation was on 28th February 1971, in the West Riding study area.

Food presentation is always followed by copulation, during which the female, still holding the prey in the bill, snores loudly and the male utters a staccato squeak. Sometimes, on the male's arrival with prey, the female flies into the future nest site or a dark crevice and calls him to her with a high-pitched purring note; the male may utter the chatter which the female uses when feeding small young. As the presentation is largely ritualised, prey items at times accumulate and may exceed the female's requirements.

56. Female and young Barn Owls *Tyto alba*, Norfolk, June 1953. Although the chick is old enough not to need brooding, the female stays at the nest until the owlets are large enough to be left on their own. This female appears to have recently had a bathe. Note the cache of three dead short-tailed voles *Microtus agrestis* (K. J. Carlson)



On two occasions, ABW witnessed a display in which the male flew to the female and hovered momentarily in front of her; during this brief 'moth flight', two soft wing claps were heard, the second quieter than the first. Derick Scott, however, has told us (*in litt.*) that on four occasions he observed a similar display accompanied by a much louder wing clap audible at 50 m. From the paucity of records, it seems likely that this display is rather rare. A remarkable display was described by Hosking and Smith (1943): the male stretched his head upwards until his neck was fully extended, puffed out his neck and throat feathers and then, with his bill wide open, and head thrown backwards, swayed and rolled his head in snake-like motions, while the female swayed in sympathy and snored. This must be rare, for we never observed it.

Mutual preening, often preceded by bill-fencing and cheek-rubbing, was much more common. In this, first one and then the other owl lowers its head and nuzzles against its mate to solicit preening; the head, the back and, particularly, the underparts are meticulously groomed to the accompaniment of encouraging twitters from the passive bird, which, in the case of the pair most closely observed, was usually the male.

Sexual chases also take place, the male pursuing the female, sometimes at high speed, around the nesting area. At such times, both sexes utter the most bizarre screeches and wails, but silent chases have also been observed. Frequently, the male suddenly swoops into the nesting barn, whence his screeching attracts the female. This behaviour seems to be particularly important in pair formation and is comparable with the 'in-and-out flights' of some hole-nesting passerines.

From the onset of breeding activity until the eggs are laid, the male frequently searches the roosting barn for suitable nesting sites and, having found a dark corner or crevice, crouches and begins purring, revolving around, poking about with his bill and stamping or scraping with his feet to form a nest hollow. This invariably attracts the female and the two crouch down together, with lowered wings, the female snoring and tongue-clicking in excitement. This behaviour nearly always culminates in copulation, which is extraordinarily frequent: from early March until the first egg is laid, it occurs every few minutes during the evenings. Often, it immediately follows food presentation; at other times, the female simply begins to snore more rapidly and quietly and lowers her body, whereupon the male mounts, balancing with widely spread wings and by holding her nape feathers in his bill. On occasions, he screeches loudly after the act. Sometimes, the male mounts without invitation, but his attentions are always accepted. During the incubation and brooding periods, copulation takes place whenever the male visits the nest; in one case, this ceased only when the oldest owlet was eight days old and, in another, when the oldest was 29 days. It begins again, however, if there is a second courtship period just before the owlets fledge. After the start of courtship feeding, in March, the female becomes much less inclined to leave the roost and then begins to spend much of her time in the future nest, which as a result becomes littered with pellet remains.

Both sexes breed in their first year. One female, the second oldest of



57. Adult Barn Owl *Tyto alba* with owlet aged about four weeks. Norfolk, June 1953. The owlet needs little attention and can feed itself on the store of food deposited at the nest by its parents (K. J. Carlson)

a 1971 brood, laid a total of 16 eggs in 1972, in three unsuccessful nests in a well 25½ km from her birthplace.

Incubation

A Lancashire pair, observed very closely by DSB between September 1971 and September 1972, provided much detailed information on early breeding behaviour. After the laying of the first egg, the female seldom left the nest (never more than once during an evening's vigil), but, when she did, she evacuated an enormous quantity of faeces and then dashed around the barn, exercising herself, before preening for a short time and then returning to the nest. Her longest period of absence was ten minutes. The impressions of the eggs can sometimes be seen clearly on the underparts of an incubating female when she is off the nest.

The incubation period proved to be 30-31 days, whenever accurate checks could be made (at a number of nests), and was, therefore, at variance with the 32-34 days given by Witherby *et al.* (1940). Although only the female is known to incubate, on one occasion DSB witnessed a remarkable incident in which, during the female's absence, the male flew to the nest and began to nuzzle the single egg with his beak or with the feathers down the centre of his facial disc. He then carefully pushed it underneath him, as if to settle down to incubate. Unfortunately, at this moment the female came down beside him and, before he could lower his body farther, sat on the egg. ABW has known a captive male to incubate on several occasions during the first ten days, both sexes sitting side by side, each of them on eggs, but much of the behaviour of captive Barn Owls has proved to be abnormal.

Hatching usually takes place in the small hours of the morning, the first hole appearing during the previous evening. The female can hear the young calling from inside the egg at least 24 hours before hatching,



58. Adult Barn Owl *Tyto alba* with four owlets, the eldest aged about six weeks, West Sussex, June 1972 (A. N. H. Peach)

because at this time she begins to utter the chattering call which she uses to communicate with them until they are able to feed themselves. They respond with a querulous chittering note.

Bühler (1970), observing captives of the subspecies *guttata*, noted that the female actively assisted the young to hatch. His photographs show the female nibbling away the fragments of shell and removing shreds of the membranes. Bühler's owls swallowed the smaller fragments and either left the larger pieces at the edge of the nest or, holding them in one talon, broke them up and ate them piecemeal. Unfortunately, neither of us has witnessed hatching, but circumstantial evidence indicates that eggshell disposal by wild individuals of the race *alba* is essentially the same as that observed by Bühler. Normally, shells are merely pushed into the corner of the nest cavity or to the periphery of the nest hollow. Once, however, ABW saw a male Barn Owl leave the nest with what appeared to be a piece of shell in his bill; and Trollope (1971) recorded a captive male removing eggshells and broken eggs. At one nest that we studied, the

shells were simply dropped from the nest entrance and were littered almost immediately beneath the nest itself, conspicuously advertising its presence. At a nest in a metal trunk, studied by DSB, shells were removed or eaten. Infertile eggs usually remain in the nest until they are broken by the movements of the young or buried in the accumulating debris; in three cases, an unhatched egg was found intact in the nest after the owlets had flown.

Post-hatching behaviour

Appendix 1 summarises the progress of the developing young and the behaviour of young and adults. The young hatch at two- or, less commonly, three-day intervals, according to when the eggs were laid. They are about 5 cm long, markedly pot-bellied and large-headed, the closed eyes making bulbous lumps on the sides of the head; the bill is ivory with a pinkish suffusion at the base; the upperparts are covered with short greyish-white down, the belly is sparsely covered, and the sides of the neck have bare patches. Especially when left by the female, the owlets chitter; they also snore faintly. It appears that the ability of the unhatched chicks to call from the egg has a survival value for the first hatched, for ABW observed that, when two owlets, one and three days old, were accidentally knocked from the nest by the departing female, they were able to find their way back, albeit laboriously, apparently by homing in on the calls from one of the eggs, in answer to their chittering, from a distance of about 23 cm.

After the young have hatched, the female becomes very attentive, continually using the fast, chattering note to stimulate the young to beg. They do not gape, but take food readily from her when she dangles strips of meat that touch the bristles around the base of their bills. When feeding small young, the female raises herself slightly from the brooding position and straddles them. Feeding sessions can be very long: one female took 70 minutes to dispose of a single common shrew *Sorex araneus*. It may be significant that one female stopped her incessant snoring after the owlets had hatched, calling only as the male approached, possibly because the calls of the young are adequate to stimulate the male to bring in food.

During the first fortnight, the female eats any faeces in the immediate nest area, but after this, when brooding ceases, the owlets back out of the nest until either they reach the outer rim of the nest hollow or their rear ends touch an obstruction; they then wave their tails in the air and defecate. When they are too young to move to the edge of the nest, they waggle their tail stumps before defecating; this alerts the female, who then cleans up the droppings.

The 16th day marks an important stage in the life of a young Barn Owl. At about this time, it develops its long, dense second down (mesoptile plumage), so that it no longer relies on the female for warmth. This down is pure white, not creamy-buff as stated by Witherby *et al.* (1940) and Fisher (1951). The owlet can also now swallow whole the common prey species such as short-tailed voles *Microtus agrestis* and common shrews. Consequently, when the youngest has reached this age, the female is able

to leave all the owlets to themselves. Interestingly, one male Barn Owl which brought in a large prey item (a juvenile Starling *Sturnus vulgaris*) made no attempt to dismember it for the young; they were unable to do this themselves and had to await the next visit of the female before they could feed, although one, aged 22 days, vainly tried to swallow it whole. Males probably lack the instinct to dismember prey for the young, although they will decapitate and partially pluck birds.

The female's brooding drive wanes over a period of a few days. During half an hour's vigil at one nest, when the oldest of the five owlets was 17 days and the youngest five days, the female stood over them most of the time. Five days later, on returning, she stood near the nest watching the young for about five minutes, then attempted to brood by walking backwards on to them. Two or three of the family, however, were much too big and she eventually crouched down by the side of them, so that the younger ones could have crept beneath her if they needed warmth; the two largest owlets were standing upright on either side of her. In addition, she left the nest at the slightest suspicious sound. When the oldest and youngest were 25 and 13 days old, the female simply stood by them, feathers fluffed up and wings drooping a little. Four days later, she visited the young only to feed them. The factor controlling the female's brooding drive may be the age of the youngest owlet rather than that of the oldest: she tends to remain at the nest until the youngest is at least ten days old.

The extent to which the now liberated female helps the male to feed the young varies individually, but all females, and to a lesser degree males, develop a tendency to roost away from the nest in a different part of the territory when the owlets near fledging age. This may be to escape harassment by the young, since the parents clearly dislike being approached by begging owlets and fly away at high speed, the male often screeching loudly. Before this stage, when the parents are bringing food to the young in the nest, it is possible to recognise the sexes by the fact that the male approaches with twittering chirrups, whereas the female snores or approaches silently.

A conspicuous feature of the behaviour of young Barn Owls is their noisy greeting ceremonies. The stationary bird behaves as if it is about to be fed, crouching with upturned facial disc, while the approaching owlet extends its beak towards that of the other, as if passing food. The action then develops into bill-fencing and cheek-rubbing, similar to that of adults in courtship. ABW believes that these displays represent a form of ritualised feeding which serves as an appeasement gesture and helps to reduce aggression between members of the brood. Rarely, the older owlets will actually feed the younger ones. In 1971, a 58-day-old chick, the second oldest of a brood of four, was seen to feed the youngest, aged 52 days, after receiving a vole from the female; and in the same year E. Soothill and G. Yates (*in litt.*) observed a family of five in which the youngest, a runt which was not old enough to leave the nest, was fed regularly, first by the two oldest owlets, when they received food from their parents nearby, and then, when these owlets began to spend more time away from the building, by the other two members of the brood.

It is not uncommon for owlets to fall out of the nest when wing-flapping or clamouring for food, but they are remarkably skilful at climbing back, guided by the calls of the rest of the family, by using the sharp claws, the beak and the wings. If they fail, they are ignored by the adults and die of starvation.

The fledged young are positively sociable, although squabbles do occur from time to time during feeds, particularly if the young are extremely hungry. An owlet with prey, if approached by another, will immediately mantle the food with its wings. During the later stages, many adults become hesitant to pass food to the young because of the rough reception they receive: DSB once saw four owlets and the male parent tumble to the ground in a heap when the latter attempted to hand over food in the window where the young were waiting. When several owlets are lined up in this way, the sight of an adult returning with prey causes tremendous excitement. First, the owlet crouches down and stretches out its wings horizontally, turning its facial disc upwards and weaving it from side to side; then, just before the arrival of the adult, it vibrates its wings. Significantly, in this display the wings are supinated to show the white undersides (plate 59), whereas in a somewhat similar threat display they are pronated to show the upperside and are held rigid.

The main call of the young after the first few days is the snore, which has a variety of functions. The owlets apparently become accustomed to the main hunting times of their parents, for snoring as a food call starts just before the beginning of the evening activity and becomes desultory throughout the quieter periods. Nevertheless, the snoring does not have a strong, short-term, stimulative effect on the adult, which would cause it to fly off to hunt whenever it was uttered, but it exerts a weaker stimulus, without immediate effect, which maintains the parents' drive to forage

59. Begging-display of two ten-week-old Barn Owls *Tyto alba* as they see the male approaching with prey, Yorkshire (now Lancashire), September 1965 (*W. Palfrey*)



for the young: the male sometimes starts to hunt before snoring begins, and may finish while the owlets are still calling lustily. It is comparatively rare for all the owlets to snore loudly at the same time; usually one, or perhaps two, make most of the noise. When the older young first venture from the nest, they inevitably lose themselves, but always manage to find their way back, apparently by homing in on the snores of the young still in the nest. When they start to explore away from the nest site, the snore is then employed as a contact call as they follow each other about. The youngest member of the brood is usually slow to reach independence and to leave the vicinity of the nest; its persistent snoring very probably serves to allay the latent aggression of the adults: at a barn where the female had become intolerant of them, owlets were seen to avert an attack on a number of occasions by begging and snoring loudly.

If the food supply is particularly abundant, Barn Owls often lay again. This is preceded by a bout of energetic courtship. We found three instances in which second clutches were produced just after the fledging of the first brood, in two cases in the same nest. The second brood is, therefore, fledged very late in the year, when the chances of survival of the owlets are likely to be slender. More usually, although many pairs seem to indulge in this revival of courtship behaviour about the seventh week after the hatching of the first egg, it subsides again without a second clutch being produced. Many so-called second broods are probably only replacement clutches, for the female will frequently lay again later in the summer if the first nest fails.

The younger owlets, although slower to reach independence, tend to be enticed from the nest at a slightly earlier age by the activities of the older ones. After fledging, at between seven and eight weeks, the owlets gradually teach themselves to catch prey while still being supported by their parents. After approximately three weeks, they either leave the territory of their own accord or are tolerated for a further week or two before being driven away by one of the adults. At this stage, owlets have been noted to become overtly nervous in their parents' presence. Once the adults have ceased to feed the young, they go into heavy moult and the female stops snoring. Until the following March, she greets the male mainly with squeaking notes, although she will take part in territorial screeching duets at dusk.

The asynchronous hatching of the eggs of most birds of prey is generally regarded as being of survival value, since the food supply is likely to be uncertain: in the event of shortage the stronger members of the brood will survive at the expense of the weaker. We noted, however, that, in several cases, one of the oldest succumbed while the youngest and weakest survived. In one instance, when the owlets were virtually equal in size and almost fully grown, a 50-day-old chick was killed and eaten by its two nest-mates, aged 56 and 54 days.

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and corresponded with us, but we wish to acknowledge in particular the help given to us by Derick Scott, who has allowed us to draw freely from his voluminous notes on the species. Valuable help in the field was given by the late H. Clarke and R. D. S. Wilson.

Summary

Between 1963 and 1972, a study of the Barn Owl *Tyto alba* was undertaken in northwest England, involving a total of 28 nests. Both sexes breed in their first year. Breeding behaviour starts in early March and involves more frequent screeching; snoring; food presentation; copulation; mutual preening; 'in-and-out flights'; the visiting of likely future nest sites; and, rarely, a hovering display with wing-clapping. The incubation period lasts for 30-31 days, during which time the female seldom leaves the nest; the male probably takes no part in incubation. Before hatching, chicks call from the egg; this may have a survival value for those already hatched. The progress of the young, and the behaviour of young and adults, are described. One case of cannibalism is recorded.

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Appendix 1. Development of a young Barn Owl

This brief, week-by-week summary describes the oldest, and normally the most precocious, of the brood. It is biased towards fast development, taking the earliest recorded age for the acquirement of each characteristic, and is, therefore, accurate for those broods which are well supplied with food.

Week 1 Chittering is main call, but snores lustily when hungry by 5th day. Huddles against eggs or other owlets. Cannot lift head for long and grows fairly slowly.

Week 2 Voice strengthens. Will hiss when disturbed, giving feeble tongue-clicks. Can hold up head indefinitely. Eyes opened for short periods; pupils have blue, blind-looking appearance. Sheds egg-tooth. Second down begins to show. Moves freely around nest.

Week 3 Stands upright. Can swallow small voles whole. Second down covers all body except stomach. Eyes fully open when awake. Facial disc begins to show. Primary quills about 2.5 cm long. Snatches food from adult and will give weak defensive display.

Week 4 Facial disc more pronounced. Eyes turning brown. Primary quills and tail feathers start to unfurl. Claws begin to lengthen. One attempt at warning or mobbing scream recorded.

Week 5 Comes to edge of nest to look around. Flaps wings when receiving prey, which it eats immediately; can pull prey to pieces. Peers about with exaggerated head movements; stretches and flaps wings. Facial disc well developed, body feathers growing rapidly, primaries about 7.5 cm long. May leave nest between feeds and wander about, running and jumping. When examined, will roll over, striking with feet. Female no longer stays at nest.

Week 6 Feathers appear on back of head; primaries unfurled for almost full length, secondaries for half length; last 12 mm of tail feathers unfurled; feathers appear on back of tarsus. Facial disc more rounded. May run from nest when examined. Snores often and for long periods. Sometimes tongue-clicks when fed.

Week 7 Primaries about 12.5 cm long. Facial disc white and rounded. Tail extends beyond primaries. When

examined, may give defensive display with loud sustained hisses, roll on back and strike effectively with talons. First mutual preening.

Week 8 Mutual preening increases. First 'play' pounce recorded and first short flight. Starts to roost away from nest, but remains in nest area. May leave building for first time.

Week 9 Still traces of down on lower body, but much resembles adult. 'Plays', pouncing and rushing at inanimate objects. Leaves building at dusk to explore, and sometimes flies towards incoming adults for food. Flies perfectly (63rd day). Adults, particularly female, much inclined to roost away from nest building.

Week 10 First serious pounce recorded.

Roams farther afield. May chase adults for food. Spends long periods alone, away from nest site. Female parent may lay again.

Week 11 First capture recorded. Still roosts near nest, but is often ignored by adult bringing food. May leave parental territory.

Week 12 When hunting or exploring, does not snore often, so more likely to make capture. May roost away from building.

Week 13 Aggression increases. Now independent and no longer receives much food from adult.

Week 14 Last feed by adults recorded.

Week 15 Aggression by adults finally drives off any owlets still in area. Almost perfect screech recorded from young.

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