SWIFTS OVER HADDENHAM

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Although the sight and sound of a party of Swifts screaming overhead is one of the definitive features of an English summer, many people are hard-pressed to say what else this relatively-common summer visitor does, or even what it looks like. Because they spend most of their life on the wing, Swifts are untraceable in Africa for three-quarters of the year and unapproachable over Europe for most of the other quarter. They can only be studied scientifically from May to July when, while interrupting their flying to take shelter under our roofs, some choose to use observable artificial nest boxes. Since 1948, a long-running study of the group of artificial nest sites in the tower of the University Museum at Oxford has produced a remarkable amount of information on the breeding cycle, longevity, and nest behaviour of the European Swift (Apus apus). But because the nest is the only 'ground' that Swifts touch during the year, much less is written about their behaviour out of it.

In an attempt to understand more about their life outside the nest, the author has studied the Swift population of a single Buckinghamshire village. This resulting article notes the distribution and character of nest sites in Haddenham and considers the likely changes to their location in the parish caused by Man's activities since the Iron Age. It records the routines followed by the village's adult Swifts (which numbered about 60 breeding pairs in 2002) as they hunt and socialise in a fairly repetitive series of activities near their nests from May to early August. It also considers how this picture of regular Swift life is complicated in late June and throughout July each year by groups of 12–25 Swifts which tour the village on many days, and behave quite differently to the breeders. In the absence of published interpretation, the author suggests that these interlopers are one-, two-, or even three-year-old non-breeders, which come into the village in search of nest sites once the second- and third-year birds have paired up.

The article also records the conduct and timing of the communal evening ascents (known as vespers flights) over the village as presumed non-breeders, and possibly some adults, rise in the sky to spend the night on the wing at great height. It notes that the size of vespers flocks has a strong correlation with the size of the touring groups of assumed non-breeders and that the sighting of vespers ascents is most frequent in July when groups of assumed non-breeders are most often present in the village. The author suggests that the flying routines leading to the start of the vespers flight resemble the day-time touring of the village by presumed non-breeders.

Although this study is of the Swifts of Haddenham in Buckinghamshire, the general findings are applicable to any village or small town in which Swifts nest in the county. (Not all settlements have Swift flocks – a 1995 survey in Cheshire[1] found that roughly one-third of villages in that county did not have nesting Swifts, and a 1978 survey of Northamptonshire[2] found 47% of villages and towns without Swifts).

METHOD OF STUDY

Haddenham, the location of this study, is a large village with nearly 5,000 human inhabitants situated in the Vale of Aylesbury. Its extensive areas of post-1945 housing lie to east and west of a long, narrow conservation area which extends for a mile from north to south and represents the full extent of the village at the time of enclosure of its open fields in 1833.

The study started in 1988. Its early years were spent in noting patterns of Swift movement throughout the village, followed by a period of detailed observation of the group of Swifts flying over the small cluster of nests in Marriotts Lane/Way (indicated with an 'M' on figure 3) which could be watched from the author's garden. This led to the appreciation that, even though Swifts do not apparently recognise territories, their repetitive flight patterns of hunting and social behaviour

FIGURE 1 The European, or Common, Swift (Drawing by Diana Gulland).

during a significant part of many days are restricted to a zone of airspace roughly 200–300 metres across which is focussed over the group of nests in which they breed, and which could be labelled as 'the territory' of those nests. After a few years, the study changed to identify other nest sites across the village, and to observe from year to year which ones were occupied. This third phase included the counting of the village population in early June and again in late July each year by touring the 'territories' by bicycle in the 90 minutes before dusk to record Swifts as they congregated above their nest sites at the end of the day.

Due to the impossibility of identifying individual Swifts on the wing, the basic assumption of the study was that the repeated sighting of roughly the same number of Swifts in the same air space pursuing the same activities each day meant that the same birds were being watched.

CHARACTERISTICS OF THE EUROPEAN SWIFT (*Apus apus*)

With much of their day spent hunting silently and individually above us for airborne food, Swifts tend to be unnoticed by many people for most of the time. However they suddenly 'appear' when they come together to engage in a series of high-speed chases that demonstrate their impressive flying skills. Such chases are often accompanied by the quintessential summery sound of their shrill chorus of high-pitched, single-note 'swee-ree' screaming and are mainly focussed over the larger colonies of Swifts' nests.

Physical appearance and lifestyle

The European (or Common) Swift (of Order Apodiformes) is often confused by casual observers with the unrelated House Martin and Swallow (of Order Passeriformes) but the Swift's nearest relatives are actually Humming Birds. Unlike the latter, which are restricted to the Americas, the 96 species of Swift spread out to reach most parts of the world's land mass (excluding the arctic and antarctic regions) in the course of the year. However, although stray Pallid and Alpine Swifts reach the southern and eastern shores of Britain in very small numbers during migration, the European Swift *(Apus apus)* is overwhelmingly the dominant species seen in Britain and is the subject of this article. Male and female European Swifts look alike and, at a first glance, their appearance (figure 1) is dominated by crescent shaped wings with their 16" span. In contrast to the smaller House Martins (11" wingspan) and Swallows (13" wingspan), Swifts look heavier and darker, and move faster. Although, when seen at speed against the sky, Swifts look all-black, they are actually coloured black-brown with an almost white chin and throat.

The European Swift can reach 60 mph in level flight, but much of the time its apparent speed is due to great aerial mastery which enables sudden changes of direction and altitude when hunting or socialising. It spends most of its life on the wing, hence its highly modified wings and relatively tiny legs. It cannot perch on horizontal surfaces like branches, but its needle-sharp claws enable it to

grip rough vertical surfaces like brick or rough-cast walls. Unless forced down by accident or storm, it only stops flying during three months of each year in order to breed and therefore sleeps on the wing for three-quarters of the year. It feeds on aerial insects, sometimes swerving and diving to catch large specimens, at other times flying through swarms with its gape wide open, collecting anything in its path. Martins and Swallows also feed on aerial food, Martins at the same level as Swifts or a little lower, Swallows much lower.

Annual life cycle

The Swift, like the House Martin and Swallow, spends the European winter over the southern part of central Africa; of the tiny number of Swifts ringed in Britain and recovered in Africa, most are found in Malawi and southern Zaire[3]. Unlike House Martins and Swallows it doesn't touch ground in Africa. After a 5000 mile journey the first Swifts arrive in Buckinghamshire in the last weeks of April[4], (Swallows and House Martins arrive in early and mid-April respectively), and the main migration usually arrives in the first week of May. The Swift returns to the location in which it bred in the preceding year and reoccupies last year's nest or makes a new one immediately. It usually mates with the same partner, although this is believed to be more because both return to the same nest than because they are paired throughout the year. Two or three eggs are laid in late May, after which the adults take it in turns to incubate and hunt. The eggs hatch after about nineteen days (e.g. mid to late June) and the fledglings then spend six to eight weeks in the nest, growing to a state of physical and mental completeness in which they are fully ready to live independently of their parents. The fledglings make their first and only exit from the nest in late July or early August and immediately join up with other youngsters to set off for Africa. Adults follow them after a few days spent resting and fattening up for the return migration. (Swallows and Martins set off for Africa in early October). Of all migrants breeding in Britain, Swifts make the shortest visit; with such a tight schedule, they cannot have two broods.

Swifts below breeding age have their own agenda for the summer season

Hardly any one-year-old birds are caught in ringers' nets in Britain until late in the season, after which they begin to be caught in the general area in which they have been bred. This is interpreted[5] as showing that the northward migration of yearlings is more hesitant than that of older birds so that it can be July before they arrive for a brief visit to the region in which they were hatched before setting off on the homeward migration. Ringing records suggest that 2–year-old birds return more promptly to Britain and spend the summer in the same region, hopefully pairing up and then finding a nest site in which to breed in the following year. It is usually July before the new pair find an empty site for a nest and stop flying for the first time in 23 months; they may build a trial nest which they occupy for the rest of the month without breeding. Some second year birds don't find a mate, and therefore may not select a nest site; they make another one or even two more round trips to Africa, flying continuously for some 35 or 47 months respectively before finally pairing up, finding a nest site, and making a trial nest during their third or fourth summer[6].

The lifespan of Swifts

Recoveries of ringed birds show that over half the fledgling Swifts die in their first year. The annual death rate of those that survive beyond this falls to 17%[7], so that the average life of one which reaches adulthood is six years; however Swifts are among Europe's longest-lived birds and the oldest known Swift was at least 20 years old when last recorded[8].

The nest site

Characteristics and requirements

Swallows build rough nests on ledges inside barns and outhouses, while House Martins build hemispherical mud nests cemented to the underside of house eaves.

The Swift cannot build a self-supporting nest so it occupies spaces in the higher parts of buildings in which material collected in the air is used to build a simple cup-shaped nest which prevents the eggs from rolling around. These spaces, which are categorised in figure 2 (lower), vary from the gap between the tops of external walls and the roof (which can be accessed where roof eaves are open and unboxed), to holes which appear in walls and under roof tiles when cement falls out. Swifts also use the void areas within boxed eaves which can be entered when rot creates holes in wooden barge

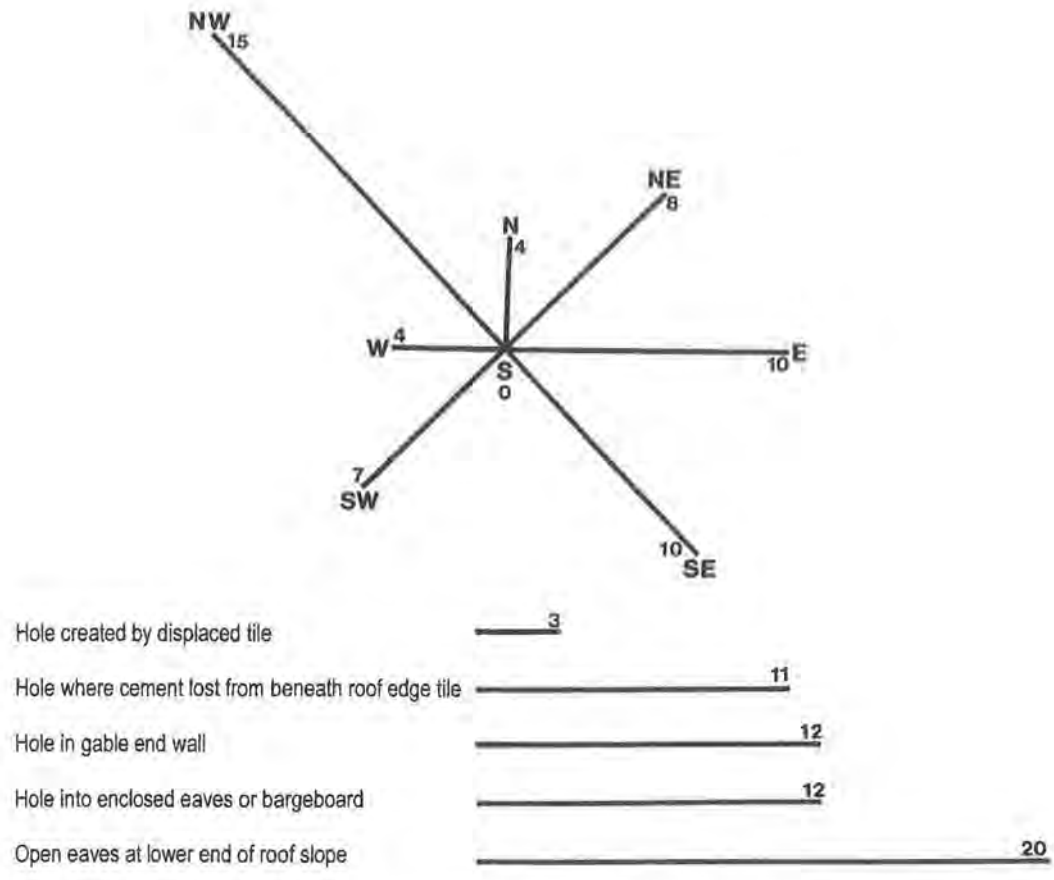

FIGURE 2 Nest characteristics. Upper: direction in which nest entrance faces. Lower: means of access to the nest site. These figures result from a study of the 58 identified nests in Haddenham which were occupied, or empty but available for occupation, in 2002.

boards or fascias. Entrance holes are often surprisingly small and difficult for the observer to detect. Walls and roof spaces can become uncomfortably warm in hot weather so it is not surprising that the upper diagram in figure 2 shows that Haddenham's Swifts prefer nest sites which do not face the sun during the hottest parts of the day, with only 19% of the studied nests facing south-west or west, and none facing due south. Nests often appear to be extremely cramped. During July, as the fledglings grow and take up more space, adults can be seen awkwardly positioned in the entrance to the nest site, with their tail and wing tips projecting outside, as they feed unseen youngsters which are presumably blocking deeper entry to the nest.

The Swift approaches its nest at some speed in an upward-swooping flight before grabbing the entrance with its strong, sharp claws and pulling itself in; it leaves by shuffling to the entrance and then launching out in a dive. To do this it needs nest sites well above the ground and with a clear flight path in front of the entrance. Most of the village's nests thus face large gardens or wide roads; a rare exception is one in High Street which fronts on to what looks like an impossibly narrow gap between buildings and is only usable because its occupants are willing to enter and leave at an awkwardly oblique angle. In Haddenham the lowest known nest is 3.7 metres above ground while all the others which have been identified are between 4.0 and 7.9

metres up, with 73% of them at 4.6–5.8 metres. Since all nests are in buildings, these figures say more about the height of Haddenham's eaves, purlins, and gables than of actual preferences for a precise height by the Swifts.

Evolution of the present type of nest site

Loss of natural habitat

In sparsely inhabited areas European Swifts still nest in small recesses high in cliffs, caves and old trees, which implies that such places were their natural breeding sites everywhere until Man began to alter the landscape[9]. In Buckinghamshire the absence of cliffs and caves meant that Swifts would have been dependant on holes in old trees, and thus could have been distributed fairly evenly throughout the county, before permanent agriculture made serious inroads into native forest in the Iron Age. Clearance of tree cover as agriculture expanded from 500 BC to 900 AD would have steadily reduced the opportunities for Swifts to nest and breed and would thus have progressively reduced the size of the Swift population.

By the time of the Norman conquest open field cultivation probably covered the great majority of Haddenham and the surrounding parishes, creating an arable prairie in which trees were largely restricted to villages and watercourses. Those few trees which existed were jealously guarded as a source of timber and firewood so were unlikely to have had many decayed limbs with rot pockets in which Swifts could nest. Thus, by the eleventh century, natural nest sites for Swifts in mid-Buckinghamshire were probably restricted to pockets of surviving woodland such as parts of Bernwood Forest and the Chiltern Hills.

Replacement of natural nest sites by man-made sites

As natural nest sites became scarce, the displaced Swifts presumably investigated the possibilities of man-made alternatives. Initially the upper parts of some Roman villas and, subsequently, the occasional Saxon manor house and church tower, would have been high enough to meet the nesting requirements of a small population of Swifts. However, until well after the Norman conquest, the vast majority of dwellings were single storied affairs of which few had gable ends peaking above the minimum height needed by Swifts for a nest site. As a result, nesting sites would have been at a premium and Swifts were probably rare around Norman Haddenham.

A few two-storied houses were being built in eleventh century towns[10] and this had spread to some villages by the thirteenth century[11]. As the Middle Ages progressed more village houses and barns became two-storied in height, presumably leading to a revival in the number of Swifts in Haddenham as they completed their adaptation from nesting in trees, independent of Man, to becoming completely dependant on Man for house room. This fundamental late mediaeval change in their nesting habits was the reason for their modern presence in the county.

By the time that Haddenham's open fields were enclosed in 1833 it seems likely that Swifts in the parish were concentrated in the village buildings. Figure 3 shows the distribution of available nests in the village in 2002 with 48 out of 72 still being within the envelope of the 1833 village.

Lost sites in the twentieth century

Until the 1950s the maintenance of many properties was rather less intensive than we are accustomed to see today. This more relaxed approach left many small holes in building fabrics and these gave Swifts access to nest sites. With the post-war trend to restore, improve, and extend, involving the removal of rotten barge boards, filling of holes in walls, and blocking of open routes under the eaves, older buildings which once housed Swifts have become progressively less accessible to them. Figure 3 also includes seven nests lost in this way between 1997 and 2002, and all but one of these are in the pre-1833 part of the village. Church towers have almost ceased to provide nesting sites since the extensive introduction of anti-pigeon wire netting in belfries. A survey by David Snow[12] found only 3 out of 38 church towers in east Vale of Aylesbury and west Bedfordshire still containing Swift nests.

New sites in the twentieth century

Fresh hope for Haddenham's Swifts came from a period of extensive house building in the 1960s and 1970s which, in many cases, featured gable end barge boards and eaves fascia boards which were wooden and boxed in by an asbestos soffit. While initially Swift-proof, the development of rot pockets in the barge boards and irregularities at the

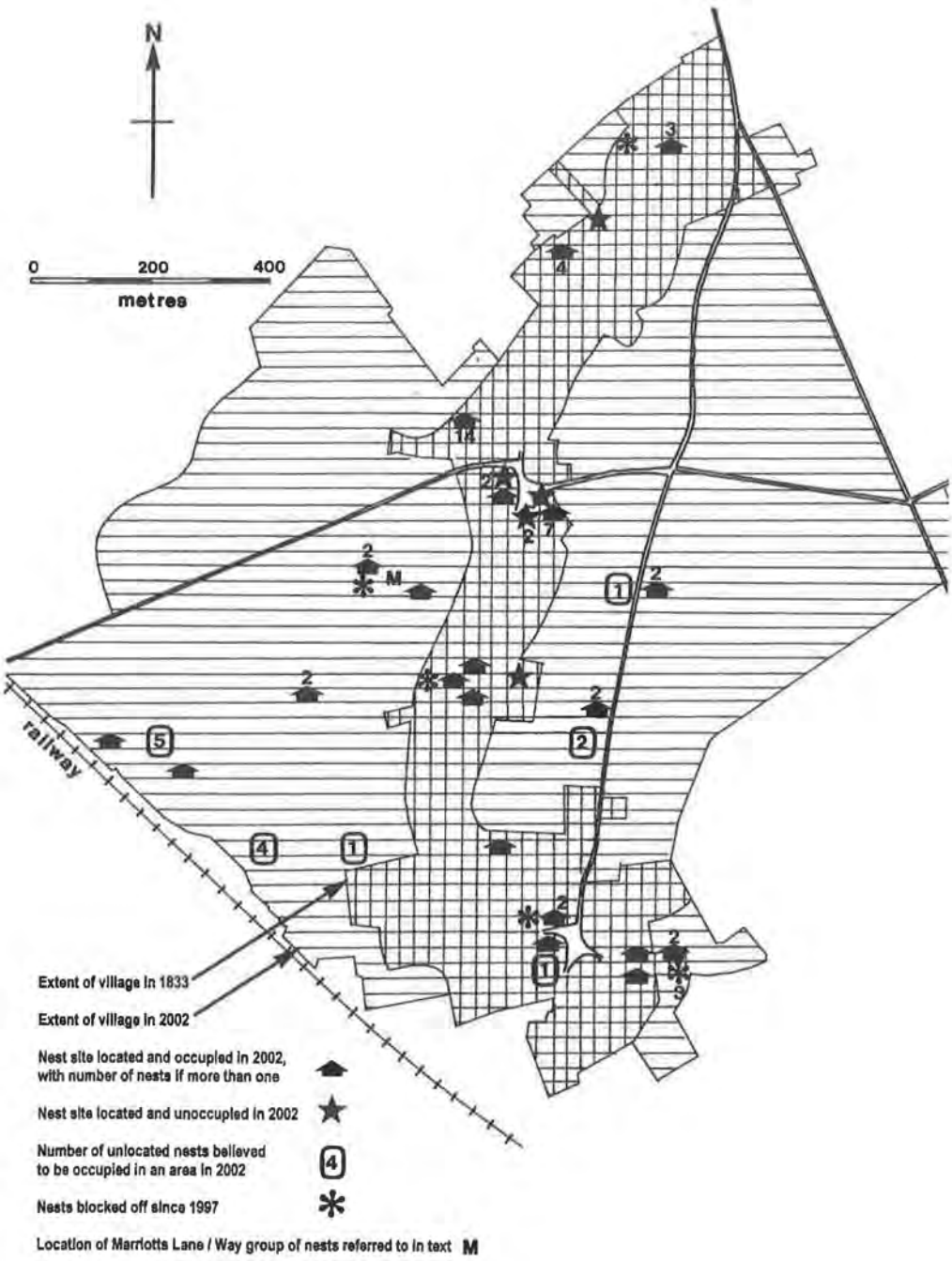

FIGURE 3 Distribution of 58 identified and 14 suspected Swift's nests which were occupied (or empty but available for occupation) in Haddenham in 2002.

junction of soffit with wall created small holes through which Swifts could enter the void behind the barge board or fascia. By the mid-1990s Swifts were nesting in houses in the Marriotts Lane/Way group of roads, which were then little over twenty years old, and are identified in figure 3.

The solid block of postwar housing on the east side of the village in the Willis Road and Buttfurlong areas, and in enclaves elsewhere at Bridens Way and Stokes End does not feature boxed barge boards on its gables and does not appear to have been penetrated by Swifts. In contrast the large late-1970s estate at the western end of the village (Sheerstock/Slave Hill) likewise lacks boxed barge boards but its houses were built with a tiny gap in their eaves which has since become big enough in a few properties to enable Swifts to enter during the late 1990s and form the village's largest scatter of single nest sites. While this shows that 'new' houses can admit Swifts, the modern trend to impenetrable pvc facing materials augurs badly for them in future. (It goes without saying that no evidence of nests has been noticed in the modern pvc/aluminium-clad industrial buildings which now form the north-western corner of the village).

Current distribution of nest sites

Since the tiny entrance is all that is visible of a Swift's nest, the confirmation of an active site is dependent on seeing a bird enter or leave it. With long gaps between unpredictable and rapid arrivals and departures, routine observation of properties from a discreet distance has to be minimised to avoid accusations of loitering with intent! Happily the owners of several 'Swift houses' have taken an interest and allowed viewing from their gardens or have been agreeable to being stared at from the road. The outcome is that 65 nests have been positively located in the village at one time or another during the 13 years of the survey, and the approximate location of another 14 has been established. Ten of the latter fourteen are on the late-1970s estates on the western edge of the village which, because of their complicated layout, defy detailed observation. In the evenings, when Swifts regularly circle close above the roofs of certain clusters of houses on these estates, it indicates that some buildings in the cluster contain nests, but it needs freak luck for the observer to be in the right place at the right time to see a bird actually enter or leave and thus confirm the exact location.

As shown on figure 3 the spacing of nests through the village is far from uniform. Within the pre-1833 village the densely-developed southern half has most nest sites in tightly clustered colonies with several nearby buildings containing one or two nests each; at the less-densely developed northern end three buildings accommodate self-contained colonies of 4, 7, and 14 nests respectively. In contrast the post-1965 estates on the west side of the village rarely seem to have more than one nest per house, and these houses are well spaced.

The swifts arrive in haddenham

In 1988–2002 the first Swifts were seen over Haddenham between 28 April and 12 May, with 4–6 May being the peak days for first sighting. Birds heading for further north are passing over the village and those destined for Haddenham are detaching from the general migration. These lone first arrivals, small black sickle-shaped silhouettes in a big sky, beat silently and purposefully over the village as they repossess the airspace that they left the previous August, and await the arrival of their mates. In some years a noticeable number of Haddenham birds seem to arrive on one or two days when suddenly the airspace over the larger nest colonies comes alive and the first thin, high-pitched screams are heard above village roofs. In 2001 the first big wave of Haddenham's adults arrived on 11 May, when 20% of the village flock appeared. In 2002 this first wave was delayed until 15 May, possibly by prolonged wet weather reported in the western Mediterranean. The main arrival in Haddenham is followed by a week in which Swifts re-enter last year's nest sites[13], feed and rest after migration, and conduct courtship flights. The village becomes clearly divided between those areas which have nests (and which thus frequently see Swifts overhead) and those which have none (over which they are rarely seen). Courtship starts as soon as pairs have met up in their nest; virtuoso aerobatic chases by pairs of birds and occasional instances of mating on the wing have been noted over Haddenham mainly between 11 and 20 May, after which most eggs are laid in the last half of May.

Unfortunately some Haddenham nests have

entrances large enough to be attractive to Starlings and House Sparrows who, of course, are on hand to move in before the Swifts arrive. On an early May evening the writer watched an explosion of fury when a newly-arrived Swift mistakenly entered a nest which had been taken by a Starling, to emerge moments later at high speed pursued by the angry Starling only inches behind it. In addition to these 'natural' problems, most seasons start with one or two Swifts discovering that last year's nest has been lost through human action; between 1997 and 2002 seven individual nests in the village were recorded as blocked by building works or human obstruction. This leads initially to frantic attempts by the dispossessed birds to re-enter the site, then, presumably, to a laborious search for a fresh site which may not be found in time to breed.

By the end of May a number of nests remain empty due, presumably, to the death of one or both of the partners since last summer. During July some of these will be taken over by non-breeding youngsters in preparation for their first brood in the following year; others remain empty throughout the summer. In 2002 there were 72 nests apparently available in the village, but only 65 of these appeared to be occupied by late July. The work of other observers suggests that about five of these 65 nests would have been taken by non-breeders.

Food gathering and social activities

Hunting

Once the eggs have been laid, parents brood them alternately so that (except in early morning and late evening when both may be out of the nest) the number of Swifts visible in hunting mode would normally represent a maximum of half of the adult population. From late June, when the eggs have hatched and there are young to be fed, both adults are out of the nest for long periods, and this starts to become obvious in Haddenham at some time between 24 June and 7 July when the number of Swifts seen hunting regularly over the village during the day almost doubles.

Hunting areas near nest sites

Swifts hunt silently, usually alone or in twos and threes, patrolling back and forth with an alternation of wing-beats and glides, in pursuit of minute airborn insects. The hunt can look erratic as birds suddenly feint to one side or the other in pursuit of a target invisible to humans, or unexpectedly change altitude for the same reason. They only return to their fledglings in the nest when they have a pouch-full of food in their throat; a typical pouch-full consists of 300–500 insects[14], and it can take an hour or much longer to collect this amount[15]. While they *could* hunt anywhere, efficient use of energy and time means that, if there are no other constraints, each Haddenham Swift appears to hunt mainly in an area of village airspace some 200–300 metres across, focussed on its nest site. This hunting pattern identifies the general location of the nest at the centre of it and is most clearly seen over single or small groups of nest sites where the number of birds does not crowd the airspace. At the larger multiple nest sites, competition for hunting airspace is greater in the immediate vicinity of the nests, so the number hunting near them is not proportionate to the number of nests. This competition, which is particularly noticeable at the three largest sites in Haddenham, presumably forces some Swifts nesting in these sites to hunt over the fields beyond the village for part of the day.

Consistent numbers indicate the same birds hunting

The peak periods of activity over nests each day are from sunrise to 09.00 hrs, when many adults are out of their nests to hunt, and from 20.00 hrs to dusk, when most take part in communal display flights. Between 09.00 and 20.00 the routine is dominated by hunting, but by smaller numbers of birds because some have returned to their nests with food or to rest; aerial activity is at its lowest in late morning and mid-afternoon. The writer spent many hours in 2000 watching the airspace over the small group of nests in and around Marriotts Lane/Way – an area believed to contain 4 nests at that time, with a fifth nest 200 metres away. Figure 4 shows the highest number seen hunting over this area each day in that season. Although village-wide counts in the evenings of 2000 suggested that there were 108–116 nesting Swifts in Haddenham, a series of 375 five-minute observations found a range of only 1–11 hunting over the Marriotts group of streets. Indeed 77% of sightings over these streets were of 2–8 Swifts suggesting a small but consistent group of birds, whose numbers were in scale with the number of known nests in the vicinity.

The Swifts thus recorded in those surveys were

not individually identifiable but were 'recognisable' by the sheer repetition of the same numbers of birds hour after hour as trios, pairs, or single Swifts trawled back and forth across the same area. This number of birds was consistent with the results of daily observations of the same hunting area during 2001.

The number of Swifts visible in hunting areas changes as the season progresses

The number of adults hunting near a nest site shows two clear phases during the season. Taking the 2000 season as an example (figure 4), the maximum number of Swifts over the Marriotts Lane/Way group of nests averaged 3.5 from 5 May to 18 June, and, with eggs hatched and both adults increasingly having to leave the nest and hunt to feed their growing young, rose to average 6.4 from 19 June to 2 August. The number of hunters fell rapidly to average 3.2 in early August after the young had flown from their nests so that the parents were relieved of the responsibility of food gathering. Figure 4 shows three departures from this simple picture. The eight Swifts hunting on 12 May possibly included some northbound migrants who had broken their journey in Haddenham to feed. The complete absence of Swifts on 26–28 May, and low numbers of them on 7–15 July were both prompted by cool, wet periods of weather when adults were probably sheltering in their nests. They can roost in the nest for several consecutive days without feeding and chicks can become torpid for days, thereby reducing their energy loss. The speed with which adults resume hunting when heavy rain ends shows the pressures caused by such enforced periods of idleness in the nest.

Relationship between hunting areas of Swifts and House Martins

It has been noticeable in Haddenham that, although they hunt for the same airborne food, House Martins and Swifts tend to have distinct and separate hunting territories over the village. This does not prevent them from merging to attack what is presumably a particularly large flock of passing aphids but, once the moment has gone, they tend to return to their own areas, which are determined mainly by the location of houses which meet the nesting requirements of each species. (The major exception to this is at the west end of the village, in south Sheerstock/Slave Hill, where both species have nests and hunt together, thereby complicating the author's routine counting of Swifts). In early August House Martins move in to hunt some areas vacated by the Swifts with an audible indication of the changing season when the twittering of Martins is heard overhead in an area where, only a week earlier, the air reverberated to the screams of Swifts.

Hunting outside the village

While Swifts from small groups of nests seem to hunt mainly in the vicinity of their nests, some of those from the three large sites are presumably forced by the competition near those sites to hunt outside the village. Unsystematic observation over

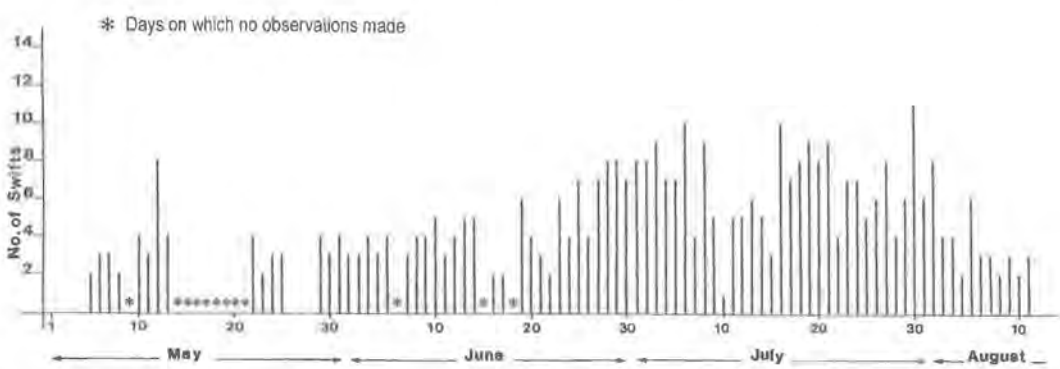

FIGURE 4 Highest daily number of Swifts seen hunting simultaneously over Marriotts Lane/Way group of nests in 2000. Based on 375 five-minute periods of observation and excluding incursions by believed non-breeding birds.

the fields around the village (constrained by the routes of public footpaths) finds very few Swifts, and these are usually isolated individuals or pairs. Most are seen within a few hundred metres of the edge of the village, but a few are up to a mile from it. The numbers usually seen over the fields are thus noticeably small in relation to the village's population. Occasionally, however, a concentration of insects over a particular field crop leads to a mass exodus from the village. On various days between 9 and 14 July 1997 a milling flock of 20–45 Swifts was hunting back and forth for hours over a large field of ripening oil seed rape at Budnall Farm (on the north side of the village) while the village airspace was noticeably emptier than usual.

It is well known that Swifts like to hunt over large bodies of water[16] because of high concentrations of insects over the water and because, due to their speed, they cannot work at low level along hedgerows like House Martins or Swallows[17] and thus prefer the open expanses above water. The six nearest large water bodies to Haddenham range between 3½ and 7½ miles from the village and it is technically possible for a Swift to travel from Haddenham to (say) the lakes at Wotton Underwood or the reservoir at Weston Turville in fifteen minutes or less. The records of the Buckinghamshire Bird Club (BBC) show concentrations of typically up to 200 Swifts over individual reservoirs and flooded gravel pits in the county, particularly during the migration periods when birds bound to and from places further north may pause to feed. However there are other villages with Swift populations in the Vale of Aylesbury in addition to the large population at Aylesbury itself. If these water bodies were attracting a significant proportion of adult Swifts from any but the settlements nearest to them the number over these lakes and reservoirs should far exceed those recorded by the BBC. It must thus be assumed that, while some of Haddenham's nesting adults might occasionally hunt as far as these water bodies, most stay much closer to home.

Social Activities

Daytime

Every now and then during the day the adult Swifts break from hunting mode. Sometimes a pair engage in tightly-manoeuvred aerobatics. Sometimes several come together in a brief, wild chase over the rooftops, often screaming as they go. As the air suddenly electrifies to the sound of a low level burst of screaming it is easy to see how Swifts acquired the name 'Devil Birds' among country people. Particularly in July these 'screaming parties' are sometimes prompted by the noisy arrival of a visiting group of Swifts who, as argued below, may be non-breeders, but at other times the chases are probably to reaffirm the bonds between members of the local colony.

Evening

In the evening most adults end their hunting about half an hour before sunset and then engage in noisy chasing at high speed over and around the nest site for over an hour. These chases, which consist of extremely skilled formation flying, are thought[18] to maintain the social cohesion of the colony through the discipline needed to perform them. They are most spectacular in July, when most adults are out of the nest in the evening; (detailed counts of Swifts leaving and entering Haddenham's four largest colonies (containing 27 nests) in July 2002 showed that, at this time of day, about 80% of adults are in the air). The chasing often takes on an almost ritual form as Swifts climb separately to form a silent group in the sky, wheel around, and then dive together to race, momentarily stiff-winged, beside the eaves of a house which contains nests, screaming loudly as they go. Wings beat again as they climb to disperse widely and silently across the sky before regrouping and quickly repeating the screaming circuit. After only a few minutes' break the whole manoeuvre is repeated again. In Haddenham such performances are mainly witnessed at the larger multiple nest sites, where several nests are in one building, or where several houses in a small area contain one or two nests each. This implies that nesters in isolated sites visit more populous sites nearby to take part in these activities. An occasional feature of these fly-pasts is that one or two Swifts are seen to drop out of the flock and enter a nest, almost as if the passage of the flock was being used to conceal the individual's actions.

VISITS BY NON-BREEDERS

The pattern of incursions by Swifts into hunting territories

The point has already been made that there is a consistency in the number of Swifts visible during

the day near most Haddenham nest sites because adults appear to hunt the airspace nearest to their nests unless there is competition from other Swifts at a large multiple nest site. Figure 4 shows the consistency of the daily maximum number of Swifts recorded hunting in 2000 over the Marriotts Lane/Way group of nests.

From time to time, rarely in May and June, but with sudden frequency in July, this pattern of stability is broken as a small, whirling, screaming flock of Swifts crosses the airspace over a nest site, usually at high level. Sometimes they pass straight over and continue out of sight. At other times they break off briefly to circle the nest site, occasionally coming down low over it to make two or three high speed circuits over roofs or through narrow gaps between buildings, before regrouping to continue their wild journey or returning whence they came. Sometimes the local hunting adults will continue their trawling at low level, ignoring the temporary invasion, but at other times they break off to join in the excitement and sudden burst of noise before returning to silent hunting after the 'visitors' have departed.

In the years 1997 to 1999, 84 of these incursions were seen at times when the Marriotts Lane/Way group of nest sites was being observed. A range of 6–38 Swifts took part in them, although 80% of groups consisted of 12–25 birds (figure 5).

Source of incursions

Who were these 'visitors'? The writer has searched published sources without success for a description or explanation of this departure from the daily routine and has thus resorted to a process of elimination. Since the visiting groups often appeared at high level while the Marriotts Lane/Way group hunted at low level, and since comparison of figures 4 and 5 shows that the groups of 'visitors' were almost always significantly larger than the

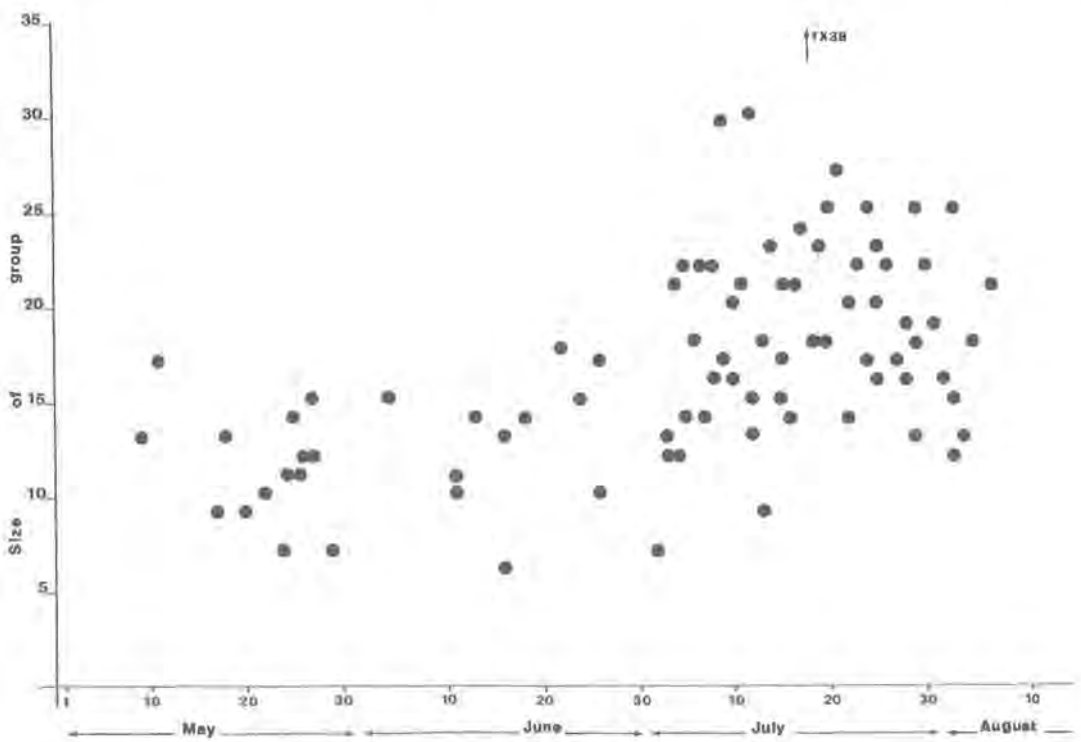

FIGURE 5 Largest group of Swifts seen making an incursion over Marriotts Lane/Way group of nests each day in 1997–1999. Each year had some days on which no observations were made, but every day was covered at least twice in the course of three years.

groups of local hunting adults, they clearly were not from the small number of nests in Marriotts Lane/Way. Equally, the rough consistency in the size of the visiting groups over several years suggests that they were not randomly assembled and that they may have been drawn from the same source group or groups on each occasion. When similar incursions have been seen in other parts of the village they have had the same size range as those recorded in detail over Marriotts Way, suggesting that they are formed by the same birds.

The average size of visiting flock, and the frequency of their visits, increase after late June at the time when, with eggs hatched and both adults having to hunt for food simultaneously, the number of nesters hunting over Marriotts Lane/Way increases (compare figures 4 and 5). This could suggest that the visitors are nesting birds from elsewhere in the village. However it is difficult to see why nesters should suddenly decide to stop their hunting, (which is so vital to the rearing of their fledglings), and combine to tour the village. If they were to do so, it is highly unlikely that a village population of roughly 112 adults (in 1999) would so consistently field only 12–25 birds for the 'village tours'.

Thus an origin of the wandering group among Haddenham nesters is difficult to accept. A more likely answer is that the group consists of non-breeders. Having arrived in late May, well behind the breeding adults, these two- and three-year-olds are believed to spend much of June ranging widely over the general area in which they had been hatched. In the course of this they pair up before beginning the search, from late June onwards, for nest sites which they will use next year. The writer believes that it is this search which would bring them in July from the countryside, where nest sites are rare, into those villages and towns where the presence of breeding adults would advertise the existence of nest sites. If non-breeders form the visiting groups it would explain why the majority of incursions are in July, with the infrequent May and June visits representing the random moments when these youngsters happen to drift across Haddenham (and presumably many other villages) during their wanderings over the countryside. The increase in size of the visiting groups in late June/early July is noteworthy because this is the time when the one-year-old birds, which take much longer than the two- and three-year-olds to travel from Africa, are finally reaching the area in which they had been bred and joining the flocks of older non-breeders who have arrived earlier.

Another pointer towards the 'visitors' being non-breeders is that periods of prolonged cold or wet weather cause a virtual cessation of incursions. This happened, for example, in 2000 when, during the period of cool, unsettled weather from 20 June to 15 July, only one incursion was observed in Haddenham. It is well-recorded that, whereas adults retire to their nests in wet weather and quickly emerge to hunt during gaps in the rain, non-breeders which have not found a nest in which to shelter try to fly away from bad weather (perhaps travelling several hundred miles) and return much later when things improve[19].

The final suggestion that incursions are by non-breeders is that 'visits' end abruptly between 30 July and 6 August, just when the non-breeders are known to set off for Africa in the first wave of return migrants, along with the current year's fledglings.

Watching non-breeders search for nest sites

During July there is a danger that the search for next year's nest site by non-breeders can confuse human monitoring of nest occupancy by breeders. The non-breeders seek empty nest sites by flying close in front of potential nest entrances, or by clinging on to the house wall just below them. At a quick glance this activity could occasionally be mistaken for an adult entering or leaving the nest, and could thus erroneously register an empty nest as occupied, so extra care is needed by the observer during this month. More spectacular, but less likely to lead to misinterpretation, is what appears to the writer to be the non-breeders' process of learning how to fly up to a nest site. Bearing in mind that these youngsters have not stopped flying for the past 23 or 35 months (depending on whether they paired up in their first or second years), we can understand that they need practice before actually trying to land on a building and enter a nest. On a late-June evening in Haddenham the writer watched a party of six Swifts, who were assumed to be non-breeders, repeatedly flying up against one specific point in the tightly-sealed pvc. eaves of a house which definitely did not contain a nest. Each time, one after another, they almost touched that point on the fascia with their beaks and then fell away to circle

round and go through the same performance again. It was assumed that they were practising the accuracy of flight needed for entering nests. The outcome of this July house hunting is that a small number of paired non-breeders will take up daytime occupancy of some empty Haddenham nests for the rest of the season, although it is far too late in the year for them to breed. The work of other observers suggests that five or six of the 65 nests occupied in Haddenham by the end of the 2002 season may have been in use by non-breeders during July.

Flocks ascending to sleep on the wing

Preparations for the ascent

The almost-ritual late-evening screaming chases by groups of nesters over the larger Haddenham nest colonies have already been described. In late June and throughout July these chases are briefly swollen by visiting parties of what the writer assumes (from their numbers) to be non-breeders. How this appears at one location was illustrated on 28 July 1997 when the local breeders circling the Marriotts Lane/Way group of nests during the evening numbered 6–10. They were visited by a flock which flew in to join them on five occasions between 20.45 and 21.10 hrs, going away for 4 minutes between each visit. The intruders increased in number from 14 to 19 as the visits progressed, implying that they were picking up other non-breeders during their absences. In the course of the writer's evening observation of nest sites in July a similar performance has been seen at this time at several of the larger colonies. This gives the clear impression that small knots of non-breeders, normally numbering between 8 and 20, are moving around Haddenham as sunset approaches, visiting each group of nests one or more times to gather up fellow youngsters. On a few evenings, while cycling between nest sites, the author has been overtaken by a flock of this size, beating purposefully towards its next objective.

These evening village tours by Swifts are a speeded up and more regular version of the daytime visits by assumed non-breeders, and, as with the daytime visits, the writer has been unable to find published accounts or explanations of them. They appear to be a preliminary gathering up process for what is called the vespers flight in which non-breeders ascend to spend the night sleeping on the wing. In Haddenham the touring can go on for half an hour or more, with several dispersals and regatherings of the group, or it can be brief and decisive. It has parallels with Lack's description of Swifts at Oxford coming together for the autumn migration[20] and it seems reasonable that the annual gathering for the big journey is a large scale version of a ritual played out on a small scale on many occasions throughout the summer.

The ascent

As dusk approaches most other birds have settled down to roost, leaving the sky to the Swifts. There is silence in the village gardens, broken from time to time by the final treetop songs from Robins and Blackbirds. Daylight is going fast and the bats will shortly be starting their silent circuits. Adult Swifts, which will spend the night in their nests, are seen singly, at low level, making a last hunt for food and then slipping quietly into shadowy nest entrances. Between 5 and 29 minutes after the time of sunset in Oxford (the nearest place for which an official time of sunset is given), the touring group (or groups) of what the writer believes to be non-breeders become consolidated over a single location (usually a nest colony) and chase in wide circles for a minute or two. They then begin to rise together in their vespers flight, beating their wings fast and continuously as a milling cluster of birds keeps tight together but with individuals constantly changing position within the group as they rise in the half light, usually screaming as they go. There are often latecomers who missed the gathering up process but now fly in to join the group; one by one they imperceptibly join the whirling ball of activity as it grows and rises into the darkening evening sky. As the flock gains altitude the ball-shaped whirl of birds spreads out into a flat raft formation, all facing in the same direction and flying hard to keep station, frequently switching between close and open spacing of birds within the raft. At the same time individual birds continue to exchange positions within the raft. Throughout the ascent the group usually remains consistently over the colony above which it started. In 4–10 minutes they have reached a height at which they can no longer be seen through the writer's 10 x 42 binoculars, after which they will soon be settling down to 'sleep'. Some vespering flocks merge and become large enough to appear on air traffic

control radar screens which reveal that the altitude for sleeping is between 1000 and 2000 metres.[21]

As the flock's height increases the continuous screaming becomes muffled to earthbound listeners but, even so, it throbs down the airwaves on still evenings with electric vibrancy. Curiously, the writer has noticed that the sound stops quite suddenly, as if shut off by command, at about the time that the Swifts reach the altitude where they go beyond binocular vision. This sudden silence parallels that of flocks of Swallows as they descend into reedbed roosts in the evening.

Figure 6 shows the time at which each of 66 vespers flights observed over the Marriots Lane/Way group of nests from 1988 to 1999 disappeared from view high in the sky (or, in 20 cases, into stratus cloud). While five ascents (usually on cloudy evenings) disappeared less than 15 minutes after the time of sunset, 70% of all observed ascents disappeared between 19 and 29 minutes after it. The average 'disappearance time' of all 66 ascents was 24.1 minutes after the sun should have set.

Number of Swifts taking part in vespers ascents

In 62 of the 66 ascents recorded in figure 6 the number of participating Swifts was noted. Group size averaged nearly 17 and ranged from 4 to 30 but 74% of ascents consisted of 13–24 Swifts. All of the 9 ascents with 10 or less birds occurred before 11 July, and all with 24 or more birds occurred after 4 July.

Relationship between vespers ascents and the presence of non-breeders

D. Lack[22] stated that vespers flights are formed mainly by non-breeders because those youngsters which occupy nest boxes on a trial basis in the Oxford University Museum tower are absent from

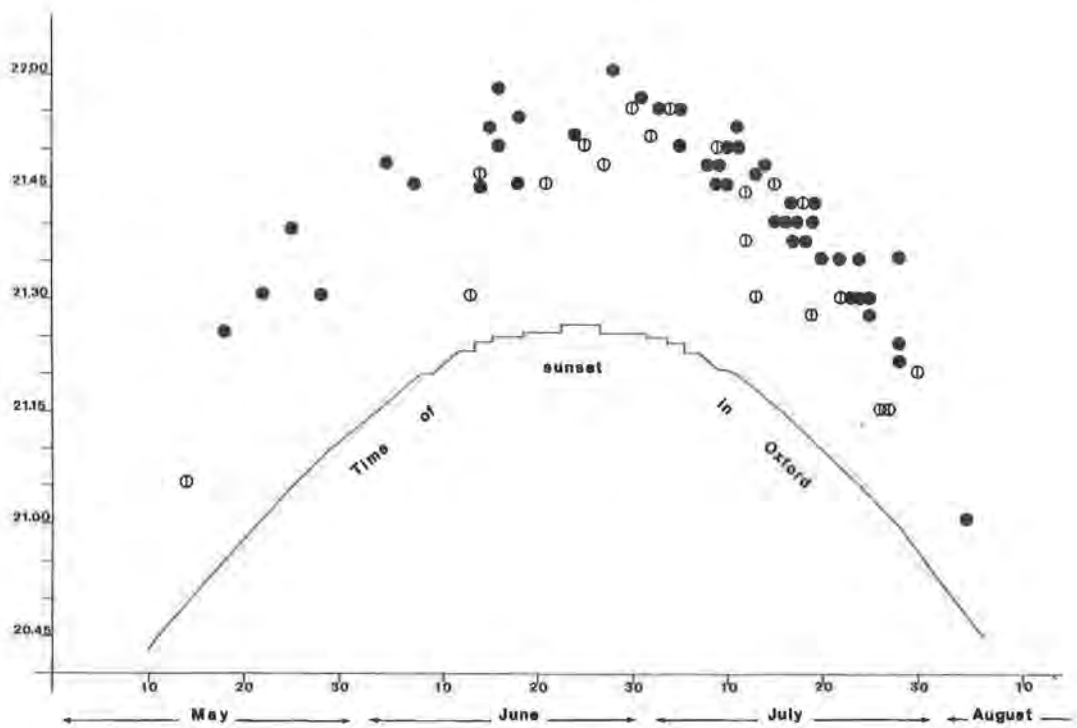

FIGURE 6 Vespers ascents observed over Marriotts Lane/Way group of nests 1988–1999, showing time at which each observed ascent disappeared from view in the sky. Each circle represents one group ascent. Solid circles indicate ascent into a largely cloudless sky, and open circles show ascents into a mainly cloudy sky.

them at night. Certainly throughout the season the number of birds taking part in vespers flights at Haddenham reflects very closely the sizes of the groups of Swifts which tour the village during the day and which have been suggested above as being non-breeders. Figure 6 shows that 44 out of 66 ascents were seen in July, while figure 5 records that two-thirds of daytime incursions by assumed non-breeders were also made in July. The rare vespers ascents seen before mid-June tend to be made by small numbers of Swifts which are assumed to be non-breeders which just happen to be over Haddenham on those days.

Location of vespers ascents

Watching vespers ascents is a hit-and-miss affair because there is no way of predicting where they will start from. It is simplest to wait in one place, evening after evening, until the ascent comes to the observer, rather than circling the village in a short window of time (the half hour after sunset) in the hope of finding it. As often as possible during 1988–99 the author watched the airspace over the Marriotts Lane/Way group of nests at this time in the evening in the hope that an ascent would start over them, and on 66 occasions he was rewarded. During these vigils there were several occasions when vespers ascents were seen on two consecutive nights, but not once in twelve years were three or more ascents seen on consecutive evenings over the same colony. Clearly the venue moves around the village and all of the small number of vespers ascents observed by chance away from Marriotts Lane/Way have risen from the vicinity of other groups of nest sites; the inference thus has to be that, in July at least, vespers ascents are usually made over nest colonies.

Return to earth next morning

During a number of chilly waits in his garden at dawn the author found that the return of the vesperers to earth is an anticlimax in comparison to their spectacular ascent the evening before. At about the time of sunrise, and a good few minutes after several of the garden birds had become active, several small groups of Swifts, never numbering more than eight, flew purposefully across the village and out of sight. Usually they were silent. The fact that they were in groups and that they were not trying to hunt suggested that these were part of a flock of non-breeders returning from a night spent on the wing. Certainly their behaviour contrasted noticeably with that of the lone adult Swifts which, shortly afterwards, began to appear one by one at low level over the gardens as they emerged from their nests and started the day's hunting.

Departure on return migration

At the end of July Swift activity over the village reaches its peak. Then, without warning, the village airspace becomes quiet as most of its Swifts leave in the course of two or three days, usually in the first week of August during the 1990s. Mass departure in 2001 and 2002 came forward to 29/30 July, suggesting that food-gathering during those summers had been slightly easier, enabling the young to leave their nests slightly earlier. After this a low level of activity is maintained until mid-August by adults whose young have not yet fledged, but by then the last of these, too, set off. Thereafter Swift sightings in Haddenham are confined to isolated groups of birds migrating from further north as they pass above the village, sometimes pausing briefly to feed. This last phase often goes on until late August; in 1998 the last one seen was on 3rd September.

Are swifts holding their own in Haddenham?

Observers have feared for the survival of the Swift for a long time. An *1868* report claimed, without statistics, 'The Swift is numerous in the vicinity of Windsor itself, but has sadly decreased in numbers in many places throughout the two counties *[Berkshire and Buckinghamshire]* where it used to be common'[23]. Nowadays, however, such fears have a more scientific base. The Breeding Bird Survey of the British Trust for Ornithology has been carried out annually since 1994 and has indicated that, by 2000, Swift numbers nationally were 18% less than those recorded in 1994[24] but that the rate of decline has been very uneven, possibly due to the particular difficulties in censusing Swifts. At present Haddenham appears to be making a local exception to this trend with Swift numbers fluctuating rather than declining. This situation is probably due to the present condition of Haddenham's houses enabling Swifts to find new nest sites faster than humans are blocking or removing old ones. If this respite is true it is precarious because a sudden

burst of house repairs or a rapid spread of pvc fascia and barge boards could exclude Swifts from many nesting sites with an immediate resultant drop in population.

ACKNOWLEDGEMENT

The author is indebted to Dr. J. H. Cooper of the Bird Group, The Natural History Museum, Tring, and to Mr. R. Overall, of Oxford, for their comments and advice on the draft for this article.

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