

Bats in Britain — a Status Report

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This report was made by the Mammal Society at the request of the FPS. It confirms, as far as Great Britain is concerned, earlier reports of an apparently serious decline in bat numbers in Europe and America (see *Oryx*, Sept 1970, page 311). In Britain at least two species, the greater horseshoe and the mouse-eared bats, are in danger of extinction. Disturbance and destruction by man, sometimes for superstitious reasons, and loss of habitat are major causes.

There has been increasing concern in recent years about the apparent decline in bat numbers in Europe and North America. Several scientists have reported decreases in the populations they were studying (Hanak & Gaisler, 1970; Krzanowski, 1959; Sluiter & Van Heerdt, 1957 & 1964). However, these reports have often been based on observations made during regular visits to hibernacula, and may reflect the adverse effect that such visits are now known to have on the numbers of resident bats (Hooper, 1964; Stebbings, 1969). Nevertheless, since most reports indicated reduced numbers, it seemed that the overall size of populations was decreasing, and some assessment of the situation was required. Protection measures have often been advocated (e.g. Harmata, 1968; Kulczynska, 1968; Randik, 1969), and in 1964 the American Society of Mammalogists passed a resolution condemning the disturbance of bats in their roosts and their removal for non-scientific purposes. Legislation protecting bats currently exists in Austria, Bulgaria, Czechoslovakia, Denmark, East and West Germany, Finland, Hungary, Italy, Mexico, Poland, Switzerland, USA (some states), USSR and Yugoslavia.

In March, 1970, at the Second International Bat Research Conference in Amsterdam, delegates representing 20 nations confirmed that in temperate climates many species appeared to be declining (Punt, 1970), due mainly to loss of habitat, accumulation of pesticides, large scale bat-banding and direct killing by man. Since some bats migrate long distances, the conference recommended active conservation measures on an international basis. The Fauna Preservation Society followed this up by asking the Mammal Society to report on the status of bats in Britain, and the secretaries of the Bat Group undertook to carry out appropriate investigations.

The following questionnaire was circulated to all Mammal Society members and published in the Council for Nature's Bulletin *Habitat*.

1. What roosts are known to you?

- a species (if known)
- b situation of roosts; (house, tree, cave, etc.)
- c estimated numbers of bats in roost (state if seasonal)
- d how long have you known of its existence

2. Have any of these roosts been threatened in any way? If so, how and with what result?
3. What do you consider would be feasible methods of protecting these threatened roosts?
4. Have the numbers of bats in the roosts known to you declined or increased over the period of your observations?
5. Have you ever seen dead bats anywhere? If so, how many, when and where? Do you have any idea of the cause of death?
6. Any other information

Both national and local press, together with the BBC, assisted in bringing the survey to the attention of the public during the first four months of 1971, and many people with special knowledge of bats were questioned individually.

Problems of interpretation

The fourteen species of bats resident in Britain are listed in Table 1. They are difficult animals to locate and study, and little is known about their distribution and habits; they are also difficult to identify in flight. The only objective evidence of population changes comes from observations made on bat roosts where individuals can more easily be identified and captured. Bats often roost individually or in small groups under roof tiles, loose pieces of bark or crevices in walls. If one of these small, often temporary, roosting places is destroyed or becomes unsuitable there are so many alternatives available that the bats are unlikely to be affected. Bats roosting individually seldom draw attention to themselves by their droppings or the noise they make, as

TABLE 1 Bat species occurring in Britain and their usual roost sites

Family Vespertilionidae

Species		Winter roosts	Summer roosts
1. Noctule	<i>Nyctalus noctula</i>	Trees and houses	Trees and houses
2. Leisler's	<i>N. leisleri</i>	Trees and houses	Trees and houses
3. Serotine	<i>Eptesicus serotinus</i>	Buildings	Buildings and trees
4. Barbastelle	<i>Barbastella barbastellus</i>	Caves* and trees	Buildings
5. Common long-eared	<i>Plecotus auritus</i>	Caves, houses and trees	Houses and trees
6. Grey long-eared	<i>P. austriacus</i>	Houses and caves	Houses
7. Pipistrelle	<i>Pipistrellus pipistrellus</i>	Churches and houses	Houses, churches and trees
8. Mouse-eared	<i>Myotis myotis</i>	Caves	Houses
9. Natterer's	<i>M. nattereri</i>	Caves	Houses
10. Daubenton's	<i>M. daubentoni</i>	Caves	Houses and trees
11. Whiskered	<i>M. mystacinus</i>	Caves	Houses and trees
12. Bechstein's	<i>M. bechsteini</i>	Caves	Houses and trees

Family Rhinolophidae

13. Greater Horseshoe	<i>Rhinolophus ferrumequinum</i>	Caves	Houses
14. Lesser Horseshoe	<i>R. hipposideros</i>	Caves	Houses

*Note: Caves include cellars, ice houses, grottos and all types of tunnel.

TABLE 2 Replies giving information on colonies of bats

	Number	Species arranged in decreasing order of occurrence (see Table 1 for key)
Colonies whose numbers have remained static over period of observations	22	7,5,10,9,11,14
Colonies whose numbers have increased	2	7
Colonies whose numbers have declined	26	7,5,13,10,9,8,1
Colonies where declines* and increases have been noted	2	6,7
Colonies exterminated	27	7,5,11
New colonies	15	7,2
Colonies where removal has been requested	130	7,5,3,1
Number of replies containing no useful information	186	

*attributed to the long winter of 1962-3, when bats died of starvation.

do bats in a large roost, and there is no means of ascertaining whether the numbers of solitary bats are changing. It is thought that most species of bats originally lived in holes in trees and caves and that adaptation to buildings has taken place relatively recently.

Pregnant females usually aggregate into nursery colonies in the early summer where the young are born and reared. Pipistrelles generally form large breeding colonies in houses and churches. Hibernating pipistrelles and greater horseshoes also congregate in large groups in churches, houses, and all types of underground spaces (caves, potholes, mines, cellars, etc.). It is observations on these larger nursery colonies and hibernation roosts that have provided most of the significant evidence.

Spontaneous movements of colonies or individuals between roosts occur at all times of the year and are probably the result of variations in environmental requirements. Major changes occur twice a year when bats move between summer roosts and hibernacula. A reduction in the number of bats inhabiting a roost may therefore be the result of mortality, poor reproductive performance, or emigration, which may either be spontaneous or caused by interference. Since it is unlikely that all the alternative roosts in any locality will be known to an investigator, the fate of bats emigrating from any one roost is difficult to establish. A few studies involving marking bats with forearm bands have been carried out (Cranbrook & Barrett, 1965; Ransome, 1968; Stebbings, 1970) has made it possible to estimate and the total population size in certain areas. Natural changes in the range of species and the size of populations are also occurring continuously, and further complicate the interpretation of results.

A recent study of insecticides in British bats revealed that they were more sensitive to DDT than other mammals, and contained slightly less than the lethal level of insecticide after hibernation. This suggests that

the decline in bat populations may be further complicated by insecticide poisoning (Jefferies, 1972).

Results of the Inquiry

Eleven members of the Mammal Society returned questionnaires and 345 letters were received from the public; three replies came from readers of *Habitat* or Naturalists' Trust newsletters. Most information was contained in the replies from Mammal Society members, several of whom have had colonies under observation for up to 20 years. A few less critical but still valuable observations covering a similar time span from members of the public consisted of impressions rather than counts, so that there is some doubt as to their validity. One of the most striking facts to emerge was the extent of the ignorance and misapprehension about the habits of bats, whose bad public image is based largely on superstition. The results (Table 2) are also complicated by reports of 15 new colonies, some of which were found in houses less than a year old. In one case 70 pipistrelles had taken up residence before a house was completed. Such colonisation is probably occurring continuously and its significance is difficult to assess.

It has not been possible to determine whether the reductions in colony size recorded in table 2 were real or were the result of emigration. However, since the number of diminishing and exterminated colonies substantially exceeds the number of new and increasing colonies, the survey suggests an overall decrease in the numbers of bats. Whole colonies were reported to have been slaughtered in man-made roosts such as houses and churches, and 58 roosting sites are known to have been destroyed (Table 3).

The reasons people gave for requesting that bats be removed included smell, noise, accumulation of faeces, supposed deterioration of the fabric, and a variety of superstitions. In houses, the damage done is psychological rather than physical; in one case wall capping stones each weighing about 150kg, were said to have been displaced by a colony of 300 bats which together would have weighed less than 2kg!

Bats occupying houses usually congregate among rafters, in hollow walls and above soffit boards. They build no nests, do no damage to the fabric and in this country are not implicated in the transmission of disease to man. Their faeces, consisting of the indigestible remains of insects, soon dry and disintegrate to a fine powder and do not attract flies, although in churches they often fall on the pews and altar, which then have to be cleaned before a service. Sometimes people are alarmed by an occasional bat flying into the house.

Until recently bats roosting in inaccessible parts of churches and houses could not be removed, but insecticidal smoke generators now make it easy to kill large numbers of bats, although they seldom destroy a colony completely. A householder in Scotland boasted of removing seven polythene buckets full of bodies (about 1500 bats) from his roof the day after igniting four smoke generators, but ten months later there was still a colony of about 200 bats living in the roof. In South Wales 196 dead bats were recovered from a roof after

TABLE 3 Destruction of known roosts

	Known	Lost
Cave or mine roosts	120	42
House roosts	200	11
Tree roosts	12	5

similar fumigation. In the past year the authors have been asked to remove bats from the houses or churches of 73 householders and 57 vicars, many of whom had found reputable pest control firms unwilling to attempt the task, mainly because long-term success cannot be guaranteed. Only one firm is known to undertake routine fumigation of bat roosts. In most cases people troubled by an 'infestation' show little concern about the death of the bats, and there is evidence of widespread killing of bats in their roosts by householders, RDC, UDC and Ministry of Agriculture and Fisheries pest officers. Chemicals used include Gamma BHC, DDT, sulphur candles and hydrogen cyanide, and large quantities of paradichlorobenzene and naphthalene are used as deterrents.

Even when roosts have been occupied for years, few of those complaining about them will have noted precisely when the bats were in residence. If all the bats are killed, the roost is likely to be reoccupied unless the entrance hole is blocked. This is possible in a house roost, but should only be done after the bats have left of their own accord; churches usually have too many potential entrances for this to be practicable. Loss of a roosting site in a house or church is not, however, likely to affect the bats who will probably find another roost, since few buildings are bat proof. Only one organisation, the Devon Trust for Nature Conservation, has published instructions to householders on how to clear a house of bats without killing them (Stebbing, 1971).

Greater horseshoe bat colonies have declined substantially. This species is now distributed mainly in the area bounded by Devon, Dorset, Wiltshire and Gloucestershire, and historical information indicates that its range has decreased considerably in recent years (Corbet, 1971). Mammal Society members have had the three main centres of population under continuous observation, and the total number of horseshoe bats in Britain in 1971 was estimated (by mark and recapture methods) to be about 500. Estimates made in 1955 indicate that colonies were then at least five times the current size.

Greater horseshoe bats hibernate in caves where they hang free from the ceiling. They are thus easily seen, and often disturbed by naturalists and speleologists, who seldom realise that such disturbance rouses them from hibernation, a process that uses up energy and metabolises fat which would otherwise sustain the bat through many days of continuous torpor. Frequent arousal is thus likely to cause premature death. Horseshoe bats have suffered the loss of many cave hibernacula and this, coupled with the fact that the species is at the limit of its geographical range in Britain, has caused a marked decrease in numbers. Unless this decrease is halted, it is likely that

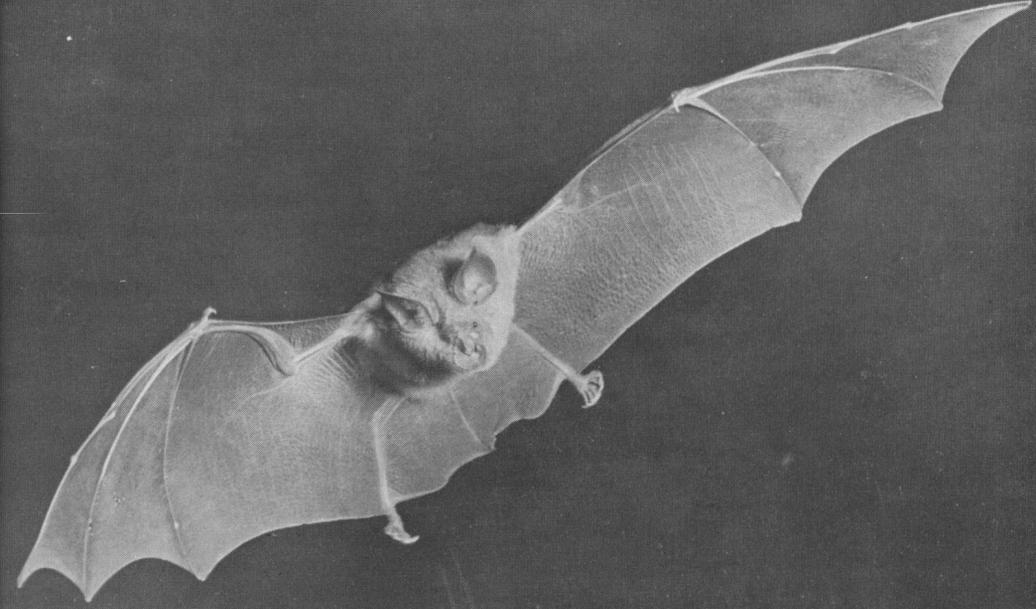
within a few years the greater horseshoe bat will be extinct here.

As regards other species, the mouse-eared bat was common on the continent of Europe until about 1950, but its numbers have decreased alarmingly in recent years. In England it occurred in several roosts in Dorset from 1957 onwards but suffered extensive disturbance, exploitation and loss of roosts, and had not been found since 1966 until recently when a new colony was discovered in Sussex (Phillips & Blackmore, 1970). There can be little doubt, however, that the chances of it surviving in this country are precarious unless roosts are adequately protected. Similarly, the grey long-eared bat is found in only one roost in Britain. Little is known of the present status of any of the other species living in this country, and the limits of their distribution have yet to be determined (Corbet, 1971).

The permanent loss of important roosts, particularly hibernacula, is much more likely to affect the status of some species of bats than is the unnecessary killing of colonies, except where this involves rare or local species. Details of such losses are given in Table 3, which contains information provided solely by Mammal Society members, and concerns roosts that have been under observation for up to 20 years. House roosts were lost either as a result of fire (3), collapse (5), or rebuilding (3). Holes in trees are important roost sites for several species, such as noctules, and are more often found in deciduous trees than in conifers, especially where these occur in parkland and hedgerows. Present agricultural and arboricultural practice is reducing the number of such trees.

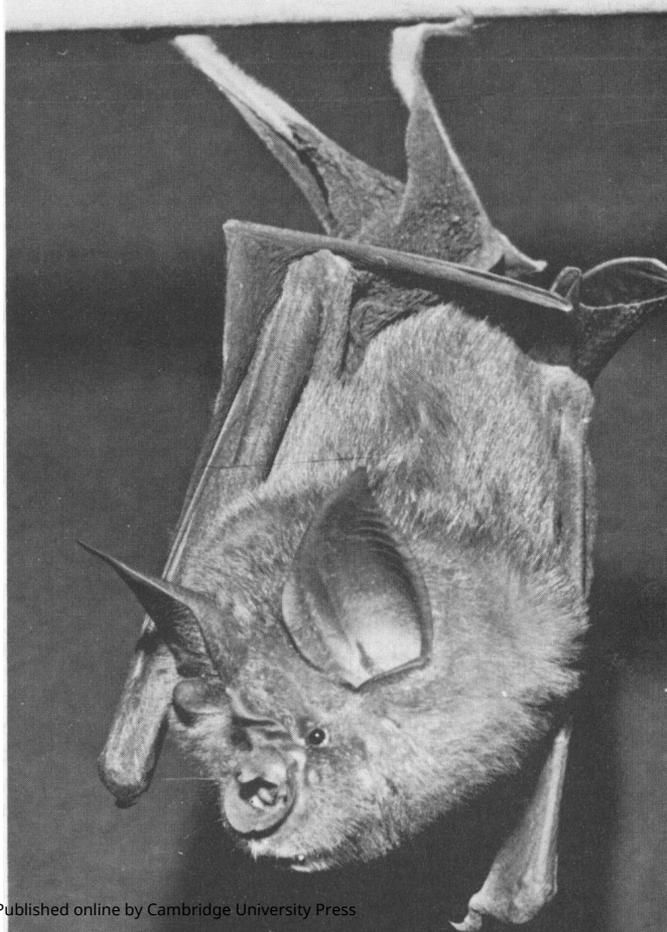
The loss of 42 underground roosts in southern England is serious, and nothing is known of the bats which were once found there. All but two of these roosts were man-made tunnels which have been filled in, often because they served as convenient refuse tips. The continued loss of such roosts could have a considerable effect on the status of cave-dwelling species, especially since the few habitable caves which still exist are the subject of many conflicting interests. Many miles of tunnels along the North Downs from Guildford to Chislehurst are shortly to be permanently blocked by grouting near their entrances during the construction of the M23 motorway. Apart from the effect of these closures on the bat population, these roosts also provide ideal situations for the study of bats in their natural hibernacula and under conditions impossible to simulate in the laboratory. Such sites are, in addition, often important for historical, geological and archaeological reasons.

The only feasible method of protecting underground roosts is to close their entrances with grilles through which bats but not humans can pass, and this has been successfully done in a number of caves in the past ten years. In one tunnel system, which has been under continuous study since 1947, the number of bats hibernating increased substantially to the highest total ever recorded in the winter following the installation of a grille, which kept out the many children who frequently played there. Artificial roosts, in the form of small wooden boxes similar to bird boxes but with an entrance slit



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**GREATER
HORSESHOE
BATS**



P.A. Racey



MOUSE-EARED BAT *Sdeuard C. Bisseröt*

on the lower surface, are now being evaluated in several habitats.

Some reports have been received of physical damage inflicted on bats by bat rings, already noted by other authors (Beaucornu, 1962; Herreid, Davis & Short, 1960). The only rings suitable for use on bats are those specially designed for the purpose and issued in this country by the Mammal Society. Unsuitable rings, such as bird rings, inevitably cause damage, and combined with disturbance could seriously affect a population.

There have been several reports of bats being taken for sale to museums, biological suppliers, and research workers, so that many people are unwilling to reveal the location of a roost. Cavernicolous bats are most easily collected for such purposes.

Summary

A survey has been carried out on the status of bats in Britain. Of the 14 species, the status of two, the greater horseshoe and mouse-eared bats, is precarious. The survival of these and other cavernicolous species depends on the availability of underground roosts, many of which are being destroyed, or rendered uninhabitable by extensive disturbance during hibernation. Where such disturbance is prevented by a grille at the cave entrance, the number of bats using the roost increases. There is a trade in cave-dwelling bats for museums, schools and research. Large numbers of pipistrelles and other species are killed each year in buildings. In many cases, the slaughter is fruitless because

the roost is subsequently reoccupied. Ignorance and fear of bats is widespread among members of the public. With the decrease in deciduous trees, fewer roosts are available for tree-dwelling species.

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