

*Scottish*  
**BATS**

Volume 1

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**South-East Scotland Bat Groups**

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## Preface

At the time of publication there are 16 addresses for bat groups in Scotland. At the beginning of the 1980's there were none. Bat work in Scotland continues to expand, with two new groups formed in 1992. This publication has been two years in gestation since the need for it was recognised by members of bat groups in South-East Scotland Region (one of the regions into which the UK bat groups are organised). Although there are a number of existing avenues for publishing work of individual bat groups: scientific journals, natural history journals covering areas of the country, Bat News (newsletter of the Bat Conservation Trust) and Batchat (published by the former Nature Conservancy Council), there is still much information that remains within notebooks, computer files or in peoples' heads. This publication is aimed at compiling some of that information which might otherwise never reach a wide readership. Two bat groups (Fife and Central Scotland) have in the past produced individual reports, however these are time-consuming to produce and the smaller groups are unlikely to be able to gather enough to make publication worthwhile except very infrequently. It is hoped that future volumes of "Scottish Bats" can include articles (or illustrations, maps, even literature?) from all Scottish groups or individual batworkers.

The articles published here have been collected from the authors (by encouragement, cajoling and nagging) by the committee for South-East Scotland bat groups. The distribution maps are based on data provided by all 16 Scottish bat groups.

The opinions stated within the articles are those of the authors themselves, who also retain responsibility for the accuracy of the information contained therein. John Haddow and Jeremy Herman take responsibility for such essential editing as was necessary to provide consistency and for the correction of the final copy.

We would like to thank Dot Hartley who typed the text and provided much needed help with the word-processing and the National Museums of Scotland which provided the facility for this.

We are grateful to the Vincent Wildlife Trust for a grant to cover the cost of printing. Income from the sale of the publication will be kept in a fund for future publications of this nature by Scottish bat groups.

JFH/JSH

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## Bats in Moray

*David and Denice Law*

### Historical background

Historical information on the bat fauna of Moray is rather scarce. St John, Moray's most famous Victorian naturalist, fails to mention them in any of his copious writings; possibly because they were among the few species which he did not feel worthy of the attention of his gun. Harvie-Brown and Buckley (1895) noted that pipistrelle bats *Pipistrellus pipistrellus* were common and widely distributed throughout the Moray Basin and also stated that long-eared bats *Plecotus auritus* were locally common, although curiously the latter observation was not based on any definite records. Moray's first known Daubenton's bat *Myotis daubentonii* is recorded as having been captured near Fochabers in a glass-house, a type of roost site which the authors considered much favoured by bats. Interestingly, Harvie-Brown and Buckley also mention an apparent 19th century population decline of bats in the Elgin area. Captain Dunbar Brander of Pitgaveny stated to the authors that bats were "all but disappeared ..... one may be seen in a week where formerly one could probably find a dozen". This decline is attributed to the disappearance of suitable shelter and the substitution of slated roofs for old stone-flagged roofs. Fortunately, bats are once again abundant around Elgin and several roosts have been located in Captain Dunbar Brander's former estate of Pitgaveny where extensive tree planting has restored the shelter, although stone-flagged roofs have yet to make a come-back.

Moray's bats do not seem to appear again in print for 81 years after Harvie-Brown and Buckley when Richter, writing in Omand (1976), briefly writes that the pipistrelle was found throughout the district, often in abundance, and the brown long-eared bat was common. He considered the Daubenton's bat, however, as being of doubtful occurrence, with no new records since the 19th century.

### Recent studies

Following the implementation of the Wildlife and Countryside Act in the early 1980s the local Nature Conservancy Council office began to accumulate records of bat roosts in Moray, and this has provided a valuable source of information. The first serious work on bats in Moray was undertaken in the mid 1980s by Phil Neville, who studied the feeding ecology of bats in the forests in the western part of the district. This work confirmed that Daubenton's bats were still present in Moray, and also added the first records of Natterer's bat *Myotis nattereri* (Suttie 1985).

The authors' studies of Moray's bats began in 1987 and were largely inspired by the infectious enthusiasm of Stewart Pritchard of Fife Bat Group. Since gaining NCC licences we have been trying to locate and visit roosts throughout the district, and it is data from this work, along with information from NCC/NCC for Scotland roost visit reports, which forms the remainder of this article.

### Roost types

Over 60 summer roosts have been recorded; so far no hibernacula have been located. Of those roosts 50% have been occupied by pipistrelles and 18% by brown long-eared bats. These figures include 3 roosts occupied by both species, although in all three cases the 2 species roosted in separate parts of the buildings concerned. One breeding colony of Daubenton's bats was located in an occupied dwelling house in 1990; this remains the only known roost for this species. For 35% of the roosts the species of bat was unknown; these are mostly NCC/NCCS records where roost visits were made during daytime when no bats were visible, or involve enquiries dealt with on the phone with no follow-up visit.

All but one of these roosts have been in buildings, with 87% in occupied dwelling houses. The age of buildings used ranged from 10 to over 700 years. The majority (57%) of the buildings were of pre 1945 construction, mostly late Victorian and Edwardian. 21% of roosts were in buildings built since 1945.

### Geographical location of roosts

The coastal part of Moray District, known as the Laich, is low-lying and intensively farmed with substantial areas of planted woodland, mostly coniferous. Bat roosts in this lowland area are fairly widely distributed. In the upland part of the district the majority of roosts are restricted to river valleys, notably that of the Spey and its tributaries.

### Disturbance of roosts

We have only encountered one case of deliberate attempted disturbance involving a colony of pipistrelles in the roof space of a small entrance porch. The householders, having become fed up with bat droppings on their doorstep, decided to attempt eviction by lifting part of the roof of the porch and applying liberal quantities of water via a watering can. Fortunately, this appeared to have no effect on the bats which carried on using the roost for the rest of the season. Cases of unintentional destruction or disturbance of roosts are more frequent. One incident involved a house which contained both pipistrelle and brown long-eared bats. Around mid-summer a pest control operator from a well known national company was called in to deal with a house mouse infestation and an unpleasant smell in the roof space. To remove the smell the operator applied a powerful deodorising chemical to several parts of the roof, including the large pile of droppings which had accumulated directly underneath the brown long-eared roost. Shortly after this both species of bats left the roost, probably as a result of the overpowering smell produced in the confined roof space. No bat activity was recorded in the roost for the rest of the season, but happily it was re-occupied the following year, by which time the smell of the chemical was no longer detectable, at least to the human nose. Another case provided our only record of a bat roost in a natural site. A local forester reported how, while sawing up the large hollow limb of a fallen beech tree in late autumn, he encountered several torpid long-eared bats which, after several minutes, revived sufficiently to fly away. Despite our lack of records of other natural roost sites in the district this is perhaps rather drastic as a survey method; it also seems doubtful whether the NCCS would give us a grant towards the purchase of a chain saw!

### Bat boxes

Although Moray is frequently described as one of Scotland's most heavily forested districts, the overwhelming majority of this woodland is relatively young coniferous plantation. This habitat type provides few if any possible roost sites for bats. As part of a wider scheme across its North of Scotland Conservancy, the Forestry Commission, in conjunction with the Scottish Wildlife Trust, erected groups of 90 bat boxes (standard design) in both Culbin and Teindland Forests in the winter of 1986/7. Both sites were chosen for their proximity to ponds; in the case of Culbin it was already known that bats foraged in the chosen area (Neville 1987). Both sites were rapidly colonised, with 12% of the boxes at Culbin and 20% of the boxes at Teindland showing signs of use within the first year. By 1991 annual occupancy rates had risen to 44% and 43% respectively. The Culbin boxes have been utilised by pipistrelles and brown long-eared bats. Teindland, however, had been used solely by pipistrelles until 1991, when a single male Natterer's bat was found in residence; making Teindland the third known locality for this species in Moray. Previous records had come from Neville's work in Darnaway Forest and an injured male which was found in Lossie Forest in 1988 (the most northerly site in Britain) and taken to a local vet who subsequently euthanased it. In 1990 two more, rather smaller, groups of bat boxes were erected by the Forestry Commission alongside ponds in local plantations. Both of these sites are now in use by pipistrelles.

### Conclusion

Inevitably, our rather limited study of bats in Moray has raised far more questions than it has answered. Where, for example, are all the Daubenton's bat roosts? We have recorded this species foraging in several places, but so far have found only one roost. Does Natterer's bat breed in Moray? Would bat boxes in new plantations in truly upland areas be colonised, and where-oh-where do all the bats go in winter?

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## A general species account of bats in Borders Region

*Andrew Panter*

### The Region

Borders Region is comprised of four Districts, viz Ettrick and Lauderdale, Tweeddale, Berwickshire and Roxburgh. The Region is dominated by the Tweed basin, predominantly the Tweed and the River Teviot. The river basin is formed by an almost complete "horseshoe" of hill ranges from the Lammermuirs in the north through the Moorfoots to the Southern Upland Tweedsmuir and Cheviot Hills, ending in the south east with Cheviot itself straddling the Borders.

Habitats range from coastal and marine, through a range of grasslands, woodlands, fen and bog to upland grazed "white hill" and heather moorland or blanket bog. The river system permeates the whole basin forming links throughout this diversity of plant and animal communities. Only in the lower Tweed basin is lowland agriculture dominant and here tends to be fairly intensive with many of the semi-natural habitats much reduced in size and fragmented.

Much of the Border native deciduous woodland has long since been removed over several centuries, including the great Ettrick and Jed Forests of historical note. Only widely dispersed fragments of these remain, often as long narrow woodlands on very steep slopes which proved to be their saviour in the practice of wood extraction. By definition, these steep slopes are invariably river valleys, giving that combination of principal elements essential for good bat habitat, water and trees. But throughout the Borders there are very few places, except in the more remote upland areas, too far from water and trees for a bat to forage. Although ancient woodland may be in very short supply, there is still a reasonable amount of good secondary and policy woodland, though often the physical and age structure leaves much to be desired. There is of course, both localised and dispersed, a great deal of coniferous plantation, most obvious in the great Kielder, Wauchope and Craik forest areas.

Within this there is great scope for most of the six species of bat which occur here. The noctule *Nyctalus noctula* seems to suffer most for the want of over-mature and dead standing timber.

### Pipistrelle *Pipistrellus pipistrellus*

Obviously ubiquitous, constituting over 90% of our statutory enquiries. A species which seems to do very well and is highly adaptable to the changes forced by too high an exclusion record. Most nursery roosts encountered average around 150 individuals, but three roosts have exceeded 900.

### Brown long-eared bat *Plecotus auritus*

The second most common species in the Borders, but surprisingly not encountered that often. Here is a species which occurs invariably in large houses with voluminous, multi-aspect attics, although there are obviously exceptions. It has never been found in a building less than 150 years old. It is probably much more abundant and widespread, having been overlooked due to the small size of the roosts, usually half a dozen or so although there is one roost of around 60. Such small colonies rarely cause a problem and therefore do not come to our attention that often. Large mansions favoured by these bats seem rarely to be the subject of timber preservations, so often the result of an ownership change.

### Daubenton's bat *Myotis daubentonii*

For some odd reason this species has yet to be found in occupied domestic premises. It has been found in houses in other parts of Scotland, but so far not here, being confined to the roofs of vaulted chambers in peel towers, ice houses and one bridge. To date only one peel tower vault has yielded a significant cluster of about 30 individuals during late August. The remainder are records of individuals, occasionally pairs tucked away in crevices. No bat has been found over-wintering in these locations, although they may well

be there but deeper in the masonry. There are no confirmed nursery roosts. An under-recorded species.

#### **Natterer's bat** *Myotis nattereri*

Only three male individuals have been recorded and one of those was dead. As with Daubenton's bat, the live remaining two were in a peel tower and bridge vault. The dead one was killed by a cat and deposited on the doorstep of a remote upland farmhouse. No signs of bats were found in either the house or the farm buildings. Again an under-recorded species.

#### **Whiskered bat** *Myotis mystacinus*

This species was first confirmed in Scotland from a recovery of a dead juvenile in the central Borders in the summer of 1987. Since then a nursery colony has been located, but it is proving very difficult to determine its status. These individuals appear to be highly mobile, constantly changing roost position. The roost seems mainly to be dispersed between the slates and the sarking of a dovecote roof, although they also occupied a space between a floor joist and stone work in the archway under the dovecote. The latter roost position was occupied by pipistrelles in 1988, and in that year no whiskered bats were located. Subsequently they have been seen and heard on detectors every year. Estimated colony size is between 30 and 50. Despite close attention to other pipistrelle roosts, particularly in the vicinity, no other whiskered bats have been found.

#### **Noctule** *Nyctalus noctula*

An elusive animal for which we have no roost records. Noctules have been confirmed in flight over policy woodland on two central Borders estates, and over mature woodland along the Tweed in Berwickshire on the border. As mentioned above, the Borders lacks significant amounts of deciduous dead and over-mature timber and this may be the single factor responsible for a very local distribution. At the same time insufficient effort has been devoted to this species so that it may be overlooked to some extent, but it is here!

## Bats on Skye

*Grace M Yoxon*

One of the problems with working with bats is that they are generally active at a very unpleasant hour: once you have finished your day's work and are feeling ready to relax that is the time to go out and start your "bat work"; and what is worse it is not only the bats which emerge at dusk - it is also the worst time for midges. On a lovely calm summer's evening when you could enjoy watching for bats you can be almost demented by these true blood sucking monsters. And nowhere is this more true than on Skye.

However, this is where bats can become extremely popular - people suddenly develop a new respect when they hear of their voracious appetite for midges. In fact, recently we had a phone call from someone wishing to encourage bats around his garden as he was desperate to do something about the midges.

Perhaps these insects are one of the reasons for the lack of records of bats on Skye until recently. According to the Mammal Atlas records, only two grid squares were recorded as having bats, although they are of course far more widespread.

In June 1991 there was an initial training session for those interested in becoming licensed as Bat Roost Visitors and this was followed up by a further session in August, when four people became licensed. This saw the beginning of the Skye Bat Group and the discovery of various new sites and a previously unconfirmed species for Skye.

Until that time only pipistrelles *Pipistrellus pipistrellus* were definitely recorded as breeding on Skye, although there were unconfirmed records of Daubenton's bats *Myotis daubentonii* and brown long-eared bats *Plecotus auritus* and one odd report of a bat "larger than a pipistrelle" flying around Skeabost.

Since that initial training session last year we now have definite records of bats in sixteen 10km grid squares with nursery roosts confirmed in six 10km grid squares. Roosts have been found in churches, barns, house lofts and even in a smelly old boiler house.

During the August training weekend there was great excitement with the confirmation of brown long-eared bats on the island. There is a nursery roost at Balmacara just across on the mainland and so there was no reason why they should not be here. The confirmation came with a visit to a barn in Strathaird where they were discovered flying in the roof space.

The Skye Bat Group is still in its infancy but a lot has already been learned about bats on Skye. Perhaps soon we may also confirm the presence of Daubenton's bats and discover that brown long-eared bats are far more widespread. Who knows what may come out in time?

## A history of bats in the Lothians

*Nicola Zucker*

This is a historical survey of bats in the Lothians up until the beginning of 1986, when Lothians Bat Group began recording bats in the region. Information was obtained from proceedings and transactions of natural history societies, local "faunas", contemporary works on British mammals, the Biological Records Centre and the collections of the National Museums of Scotland in Edinburgh.

Most of the records are from the late nineteenth century and early twentieth century, a rich period for Scottish natural history. However, relative to today, early records of bats are very few in number both for the Lothians and for Scotland as a whole. There was as yet little wide interest in bats and activity tended to be concentrated within the hands of a few dedicated enthusiasts, individuals such as W. Evans, W. Eagle Clark and J. Harvie Brown, whose names appear time and again in the literature. In fact, without the work of William Evans in particular, this account would hardly have been possible.

This paucity of information makes any assessment of population trends over the time period under consideration impossible to obtain. All the same the early accounts provide us with a fair picture of the contemporary bat species in the area and also give us some fascinating glimpses of the pursuit of natural history at the turn of the century.

### *Pipistrelle Pipistrellus pipistrellus*

The pipistrelle was generally considered to be common and widespread throughout the British Isles (Millais 1904; Barrett-Hamilton 1910). The Lothians were no exception as Evans (1892) states that it is "by far the most abundant and generally distributed" of the three species positively known to the area.

Almost all early records come from Evan's "Fauna" with him detailing it from Aberlady Bay (September 1884), Gosford (May 1890), Yester, Dunbar and East Linton in East Lothian; Morningside (December 1891, February and March 1892), The Inch and Duddingston Loch in Edinburgh; Cramond (January 1883) in Midlothian; Dalmeny Park (January 1891) and Dalmeny (November 1891) in West Lothian. He writes of having "examined examples from many localities" and "identified it on the wing hundreds of times".

It is interesting to read how at Gosford he caught nearly a dozen with an insect net in just a few minutes - an indicator of its abundance. He also notes, exemplifying with a number of the above records, that the species may be seen flying in mild weather throughout the year and occasionally in daylight too. Daylight flying, also observable today, is apparently a propensity of Scottish bats in general - perhaps connected with the less favourable conditions in this part of their range.

Only four pre-1900 specimens exist in the collections of the National Museums of Scotland. These are probably Evans' own specimens, two having been obtained from Aberlady in May 1890, one from Dunbar in June 1891 and one from Broxmouth in June 1891, the latter having been wrongly identified or labelled as Daubenton's bat.

The pipistrelle is again reported from Cramond by Campbell (1904) who mentions it as being "a common bat of the district". Rintoul and Baxter (1935), referring to the Forth area, describe it as "common and generally distributed" and "by far the most abundant bat in the area".

The only other records found come from much more recent times. The BRC distribution map for pipistrelle (Arnold 1984) shows two records for the period from 1960-1983. These consist of a bat mistnetted at Dalkeith in 1972 and a bat seen at Craiglockhart in 1974 (Arnold pers. comm.). A third record refers to one of the May 1890 Aberlady specimens mentioned above.

In December 1975 a pipistrelle was seen flying during daylight hours over the mouth of the river Tyne. In

what appeared to be an attempt to escape the attentions of a sparrowhawk, it flew down into the river and started to swim across. After a short rest on the opposite bank, it flew away (Smith 1975).

Finally two specimens in the collections of the National Museums of Scotland are recorded as having been obtained from Balerno, Midlothian in June 1980.

The information we have indicates that the pipistrelle was both numerous and widely distributed in the Lothians historically, as it remains today. In recent years it has been found in or near to nearly all of its historic localities and many more besides.

#### **Brown long-eared bat *Plecotus auritus***

In the following account, records of long-eared bats have been taken to be of the brown long-eared bat as although the grey long-eared bat was not recognised until 1960, the area in question is well outside its known range.

The long-eared bat is described as being "not uncommon in southern and central counties" of Scotland (Alston 1880) and with reference to the Edinburgh district, although much less abundant than the pipistrelle, "widely distributed" and "by no means rare" (Evans 1892).

Evans (1892) records it from Dunbar (June 1891), Yester (October 1891), Tynefield and Gosford in East Lothian, and from Colinton, Dalkeith Park (October 1891) and Mortonhall (November 1891) in Midlothian and states that he has "seen examples...or had it reported to me from a number of other localities on both sides of the Forth".

His Dunbar record, a male taken on the 10th of June, and still preserved in the collection of the National Museums of Scotland, was captured during daylight hours after it flew in a dazed state into the face of its captor. He gives another example of this strange behaviour, the bat again flying in broad daylight in summer in a "semiconscious state".

Also of interest is his note of how, when collecting specimens, he invariably found their "hiding places" ie roosts, to be about buildings, with the Colinton colony inhabiting the ruins of an ancient castle.

Campbell (1904), referring to the Cramond district, mentions that he saw only one long-eared bat many years before in Cramond School, when a classmate produced one from his pocket. Rintoul and Baxter (1935), repeating Evans, describe the species as being generally distributed, although not very abundant in the Forth area, adding no further localities to his list for the Edinburgh district.

The BRC distribution maps for long-eared and brown Long-eared bats each have one record for the period 1960-1983. These are respectively a bat found at Old Philipstoun in March 1967 and one found in an abandoned limestone mine near Pathhead, Midlothian in 1974 (Arnold pers. comm.).

Coming almost up to date, there is a specimen in the collections of the National Museums of Scotland which was found in Holyrood Park, Edinburgh in October 1983.

It appears therefore that the brown long-eared bat was fairly well distributed throughout the Lothians, although it occurred in very much lower numbers than did the more common pipistrelle. This echoes its relative status and distribution today.

#### **Daubenton's bat *Myotis daubentonii***

Early accounts of Daubenton's bat in Scotland give it as being widespread but local (Alston 1880; Harting 1889; Barrett-Hamilton 1910). It is clear that the species was represented here in the Lothians as Evans (1892) writes that it is "at least locally, not uncommon".

He reports it from several localities, giving the first published record for the region by describing how in the summer of 1869 he saw a number of bats flying over the Esk above Penicuik, one of which he identified after knocking it down with his walking stick. He then gives details of a colony found in an ash tree at the Inch, Liberton in July 1880, and said to contain "many dozens". Specimens taken from the colony were at first thought to be pipistrelles and only some years later correctly identified as Daubenton's bats by Eagle Clark (1891).

A number of records come from the Dunbar area. Hardy (1881) notes that it was "well known about Dunbar" and Evans (1892) mentions receiving three specimens from the area in June 1891. Two of these, a male and female, were shot at Broxmouth on the 20th, and the third obtained by the Tyne at East Linton on the 24th. Another specimen, taken one mile east of Dunbar in March 1893 and identified as a whiskered bat (Evans 1893; 1906) has recently been shown to be a Daubenton's bat (Herman and Smith 1990).

Evans (1892) also records this species from Duddingston Loch "over who's surface....numbers....may generally be seen", identifying several pairs in June 1891 by their size and flight patterns. He goes on to state that "in other suitable localities I have from time to time seen bats that doubtless were of this species".

Millais (1904) mentions having records from Edinburgh, and Rintoul and Baxter (1935), again repeating Evans, describe the species as being "not uncommon locally" with respect to the Forth area.

Examination of specimens in the collections of the National Museums of Scotland yielded, other than the misidentified Dunbar specimen mentioned above, only one jar containing three bats and labelled V. daubentoni, Broxmouth, 20th June 1891. Two of these are female Daubenton's bats but the other is a female pipistrelle. It is very likely that the two Daubenton's bats are two of Evans' three Dunbar specimens, but it is not possible to tell whether the pipistrelle is his third Dunbar specimen misidentified or is simply a pipistrelle from the same locality.

To sum up, Daubenton's bat was certainly not rare in the Lothians, but just how numerous it was is difficult to ascertain. Evans (1892) himself felt that knowledge of its distribution was still incomplete. The probably not infrequent misidentifications could not have helped matters, and this in fact led Eagle Clark (1891) to suggest that the species was being "much overlooked".

#### Natterer's bat *Myotis nattereri*

Historical records of Natterer's bat are locally very few in number, as they are for Scotland as a whole. There are only three records for the region prior to 1986 and the first of these, a nineteenth century record, is unsubstantiated.

This record consists of a report by Harvie-Brown (1881) of a statement by Robert Gray, a well known naturalist of the time, that Natterer's bat had been found in 1880 "in dozens in the hole of a tree" and "in some plenty near Dalkeith". Evans (1892) in compiling his "Fauna" made extensive but unsuccessful enquiries in an attempt to confirm the record. He added some years later that an unlabelled skin of a Natterer's bat had been found among the late Gray's possessions and that he thought it likely to have come from Dalkeith, although he was aware that he had no proof of this (Evans 1901; 1906).

Millais (1904) questioned the Dalkeith record and both Barrett-Hamilton (1910) and Rintoul and Baxter (1935) regarded it as unsatisfactory. Placido (1972) noted that all of the three early Scottish records of Natterer's bat, of which the Dalkeith one was the second, were considered doubtful due to lack of adequate documentation.

The other two records come from more recent times. The first of these, and therefore the first definite record of Natterer's bat in the Lothians, is a bat photographed in an abandoned limestone mine near Pathhead, Midlothian in November 1975 (Arnold pers. comm.) and is depicted on the BRC distribution map for this species. The second record is of a bat found at Carlops, Midlothian in May 1985 (Bullock et al 1986).



Fig. 1. Remains of Natterer's bat which may be from Dalkeith in 1880 (actual size)

Since 1986 the species has been found in a further seven 5km squares across the region. This being the case, it is possible that its apparent scarcity historically may be related more to lack of observers or recognition than to other factors, as suggested by Placido (1972) and Bullock et al (1986) and indeed put forward by Evans (1901) himself some time ago.

#### Whiskered bat *Myotis mystacinus*

This species has very rarely been found in Scotland and for the Lothians in particular only one discredited record exists for the period under consideration.

This was a report by Evans (1893) of a bat passed on to him which had been knocked down "on the links about a mile east of Dunbar" on 20th March 1893. Evans and Eagle Clark of the Royal Scottish Museum together identified it as a whiskered bat. It went down as the second example to have been found in Scotland and was repeatedly mentioned over the years, for example by Millais (1904), Evans (1905), Barrett-Hamilton (1910) and Rintoul and Baxter (1935). However the specimen, a whole adult male preserved in alcohol in the collections of the National Museums of Scotland was recently re-examined and identified as a Daubenton's bat (Herman and Smith 1990).

The first certain record for the region was not obtained until very recently. This, a live adult male, was found in the roofspace of a house near Gorebridge, Midlothian in June 1988. This was only the second record of whiskered bat for Scotland, despite the present interest in bats and the propensity of this species to roost in buildings, which suggests it is very rare in this part of Britain. This also appears to be the case historically, with its local status reflecting the position in the rest of southern Scotland.





## Summary of historical records of bats for the Lothians previous to 1986

*Pipistrelle Pipistrellus pipistrellus*

Date	Locality	Nature of record	Reference/specimen number
January 1883	Cramond	Sighting	Evans 1892
September 1884	Aberlady Bay	Sighting	Evans 1892
May 1890	Aberlady	Female specimen	NMSZ 1890.60.2
May 1890	Aberlady	Female specimen	NMSZ unregistered
May 1890	Gosford	Capture	Evans 1892
January 1891	Dalmeny Park	Sighting	Evans 1892
June 1891	Dunbar	Female specimen	NMSZ unregistered
June 1891	Broxmouth	Female specimen	NMSZ unregistered
November 1891	Dalmeny	Sighting	Evans 1892
December 1891	Morningside	Sighting	Evans 1892
February 1892	Morningside	Sighting	Evans 1892
March 1892	Morningside	Sighting	Evans 1892
prior to 1900	Dunbar	Capture	Evans 1892
prior to 1900	East Linton	Capture	Evans 1892
prior to 1900	Yester	Capture	Evans 1892
prior to 1900	The Inch	Capture	Evans 1892
prior to 1900	Duddingston	Capture	Evans 1892
prior to 1900	Dalmeny Park	Capture	Evans 1892
around 1900	Cramond	Not apparent	Campbell 1904
1972	Dalkeith	Capture	Arnold pers. comm.
1974	Craiglockhart	Sighting	Arnold pers. comm.
December 1975	Mouth of R. Tyne	Sighting	Smith 1975
June 1980	Balerno	Female specimens	NMSZ 1981.19

*Brown long-eared bat Plecotus auritus*

Date	Locality	Nature of record	Reference/specimen number
June 1891	Dunbar	Male specimen	Evans 1892
October 1891	Yester	Capture	Evans 1892
October 1891	Dalkeith Park	Capture	Evans 1892
November 1891	Mortonhall	Capture	Evans 1892
prior to 1900	Tynefield	Capture	Evans 1892
prior to 1900	Gosford	Capture	Evans 1892
prior to 1900	Colinton	Capture	Evans 1892
prior to 1900	Cramond	Sighting	Campbell 1904
March 1967	Old Philipstoun	Specimen	Arnold pers. comm.
1974	Pathhead	Capture	Arnold pers. comm.
October 1983	Holyrood	Male specimen	NMSZ 1984.2

**Daubenton's bat *Myotis daubentonii***

Date	Locality	Nature of record	Reference/specimen number
Summer 1869	Penicuik	Capture	Evans 1892
July 1880	Liberton	Capture	Clark 1891
June 1891	Broxmouth	Captures	Evans 1892
June 1891	East Linton	Capture	Evans 1892
June 1891	Broxmouth	2 female specimens	NMSZ unregistered
June 1891	Duddingston	Sightings	Evans 1892
March 1893	Dunbar	Male specimen	NMSZ 1988.31
Around 1900	Edinburgh	Sighting	Millais 1904

**Natterer's bat *Myotis nattereri***

Date	Locality	Nature of record	Reference/specimen number
[1880	Dalkeith	Capture	Evans 1892]
November 1973	Pathhead	Male in roost	Arnold pers. comm.
May 1985	Carlops	Male at roost	Bullock et al 1986

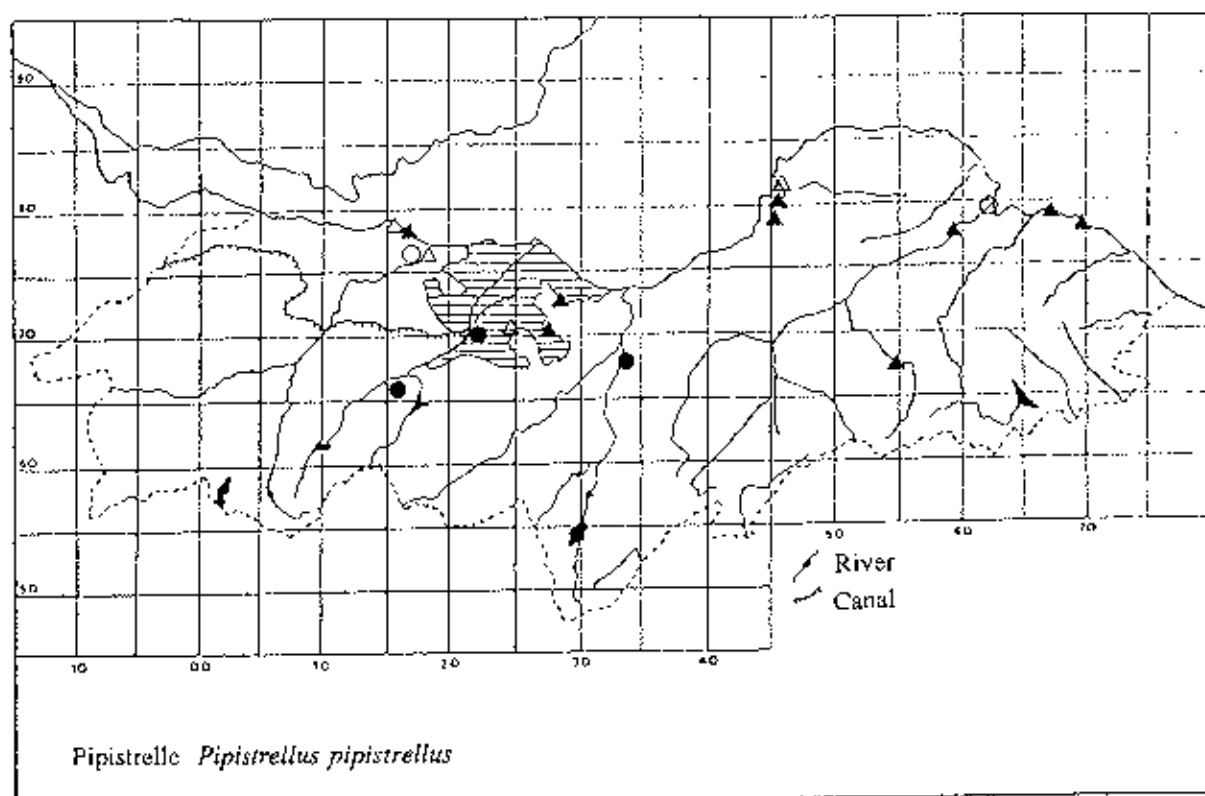
In cases where the record is of a sighting of a flying bat, the identification can only be provisional. Square brackets indicate doubt as to the validity of the record.

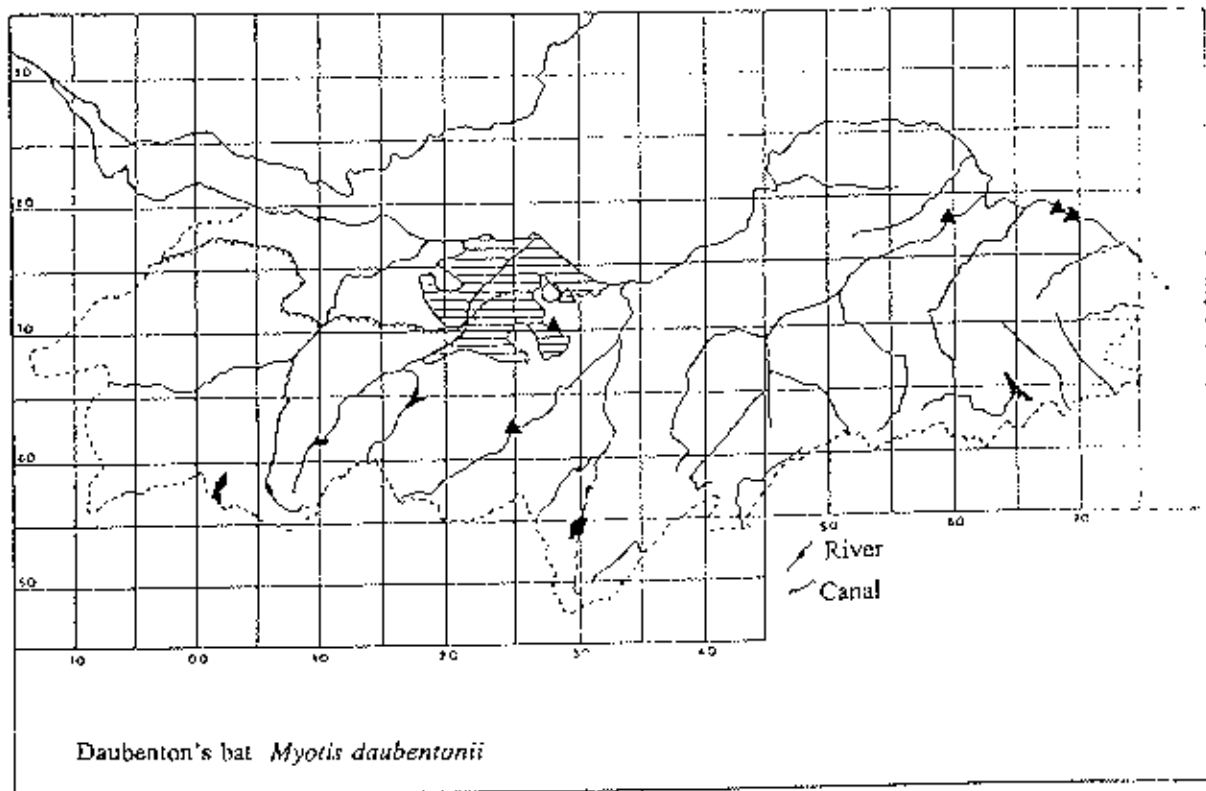
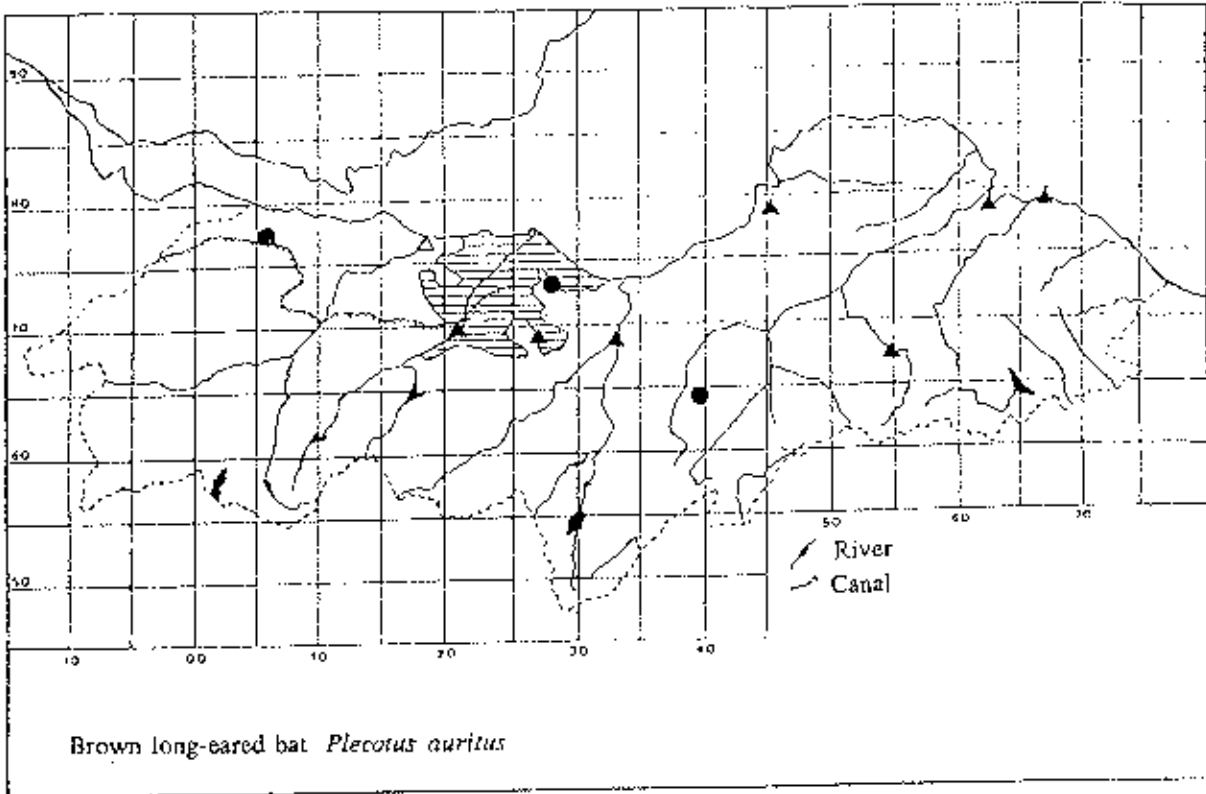
▲ Records previous to 1900

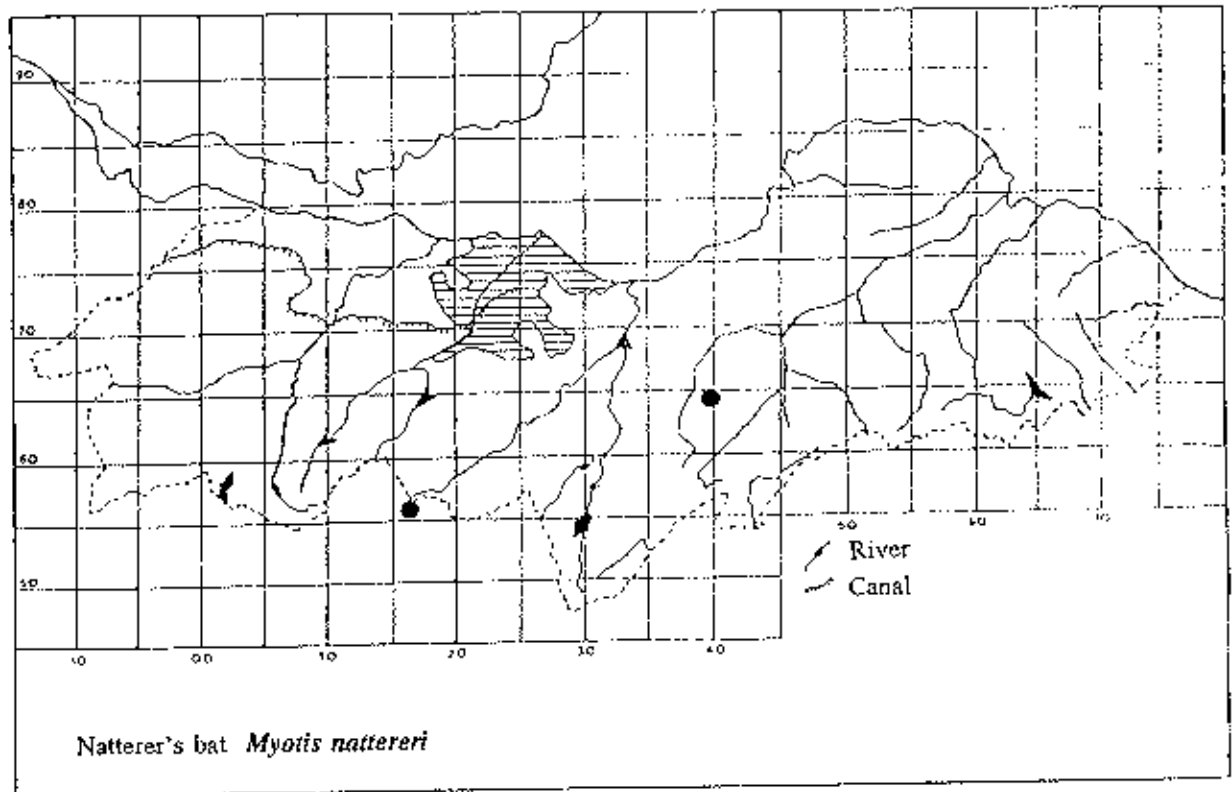
● Records between 1900 and 1985 inclusive

Solid symbols indicate one or more bats identified in the hand.

Hollow symbols indicate one or more bats identified by sight only.







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## A brown long-eared bat maternity roost in Sutherland

*Mick Canham*

In June 1986 I put up 24 bat roost boxes of the Stebbings and Walsh design (1991) in a Forestry Commission plantation 25 kilometres west of Lairg. The boxes were located in a small glade on the edge of a plantation, two boxes per tree. The site is within 30 metres of a moderately fast flowing river. The trees were lodgepole pine planted in 1965 and were 21 years old when the boxes were put up. The surrounding area has a mixture of other tree species including norway and sitka spruce, noble fir and birch. The riparian zone along the river system is lined with alders.

The history of use of these boxes is of interest.

- July 1987 - one box was found to have a few unidentified bat droppings - Phil Neville helped with this check.
- 1988 - no further droppings or bats were found.
- September 1989 - 58% of the boxes contained droppings, all of which were from brown long-eared bats *Plecotus auritus* except for one box which had both brown long-eared and pipistrelle *Pipistrellus pipistrellus* droppings. One box also contained five mature male and one mature female brown long-eared bats.
- September 1990 - Three extra boxes of the modified Tanglewood wedge type were added to the group. 41% of the boxes contained droppings from brown long-eared bats. One box contained three mature male brown long-eared bats.
- August 1991 - 18% of the boxes contained brown long-eared bat droppings. One box also contained one adult and two young (not flying) brown long-eared bats. Another box contained two adult and two young (not flying) brown long-eared bats and a third box contained eight adult brown long-eared bats and one pipistrelle all clustered closely together!

This is the first maternity roost in a bat box in the Forestry Commission's bat box scheme in North Scotland, and also the first time I have found a mixed species cluster in one box.

I would be interested to hear from anyone else with breeding records in roost boxes in northern Scotland.

### Reference

Stebbings, R E and Walsh, S T 1991. *Bat boxes. A guide to the history, function, construction and use in the conservation of bats.* London: The Bat Conservation Trust.

## An ongoing study of a large pipistrelle colony in East Lothian

Stuart Smith

Lothians Bat Group were first informed of the presence of bats at Whittingehame "Coach House" in 1987 when the owner requested advice about treating, for wood boring beetle infestation, the roof of a building known to be used by bats. During that summer the first count was made of the bats which had been identified as pipistrelles *Pipistrellus pipistrellus*. When the bats left in late summer the roof space was timber treated with "safe chemicals".

Since then the bats have been counted annually in June in order to provide data for the "National Bat Colony Survey" coordinated by Bob Stebbings and of course for our own local information. A summary of the counts is shown in Fig. 1.

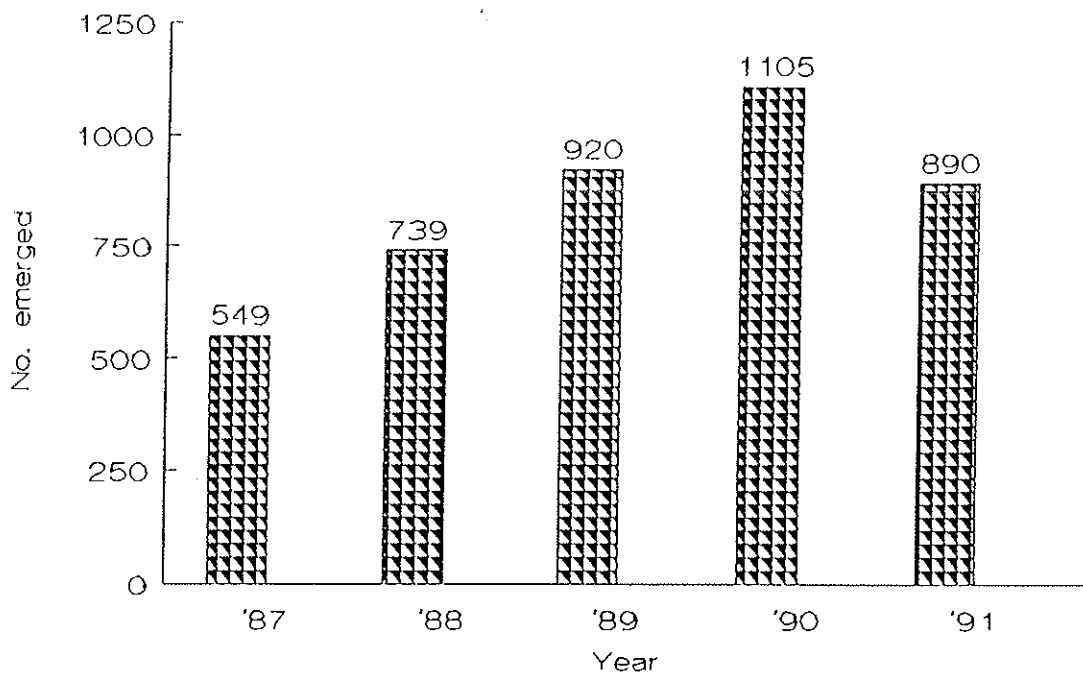


Fig.1. Annual counts

The figures shown are averages of counts made in the first half of June. In 1987 only one count was made, in 1988 and 1989 two counts and in the last two years three counts. It would appear from these results that there has been an increase in the size of the colony for the first four years with a drop of about 20% in 1991.

These counts alone however probably do not give an accurate record of the numbers of adult bats using the roost in early summer. In 1991 counts were also made throughout May after the bats had first returned, in addition to six counts in June including those made in the first half, shown as an average in Fig. 1 above. Counts made during May and June 1991 were shown below in Fig. 2.

The first count was made two days after fresh droppings were seen below the roost entrance. As seen from the results an increase in numbers using the roost was observed for the first three weeks of occupancy. The numbers then dropped back and steadied at around 870-880 towards the end of June. Why this happened is uncertain. Two possible reasons are suggested below.

1. The roost was getting too crowded so some of the bats left for an alternative roost before that years' new babies were born. These bats could possibly be either expectant mothers or non-breeding females. Since the sexes were not checked we cannot exclude the possibility that they were males perhaps from the previous years' young. From the description of the location of droppings in the penultimate paragraph of this article however, overcrowding would seem to be unlikely.

2. The roost temperature was not suitable to one of the groups states in 1. above.

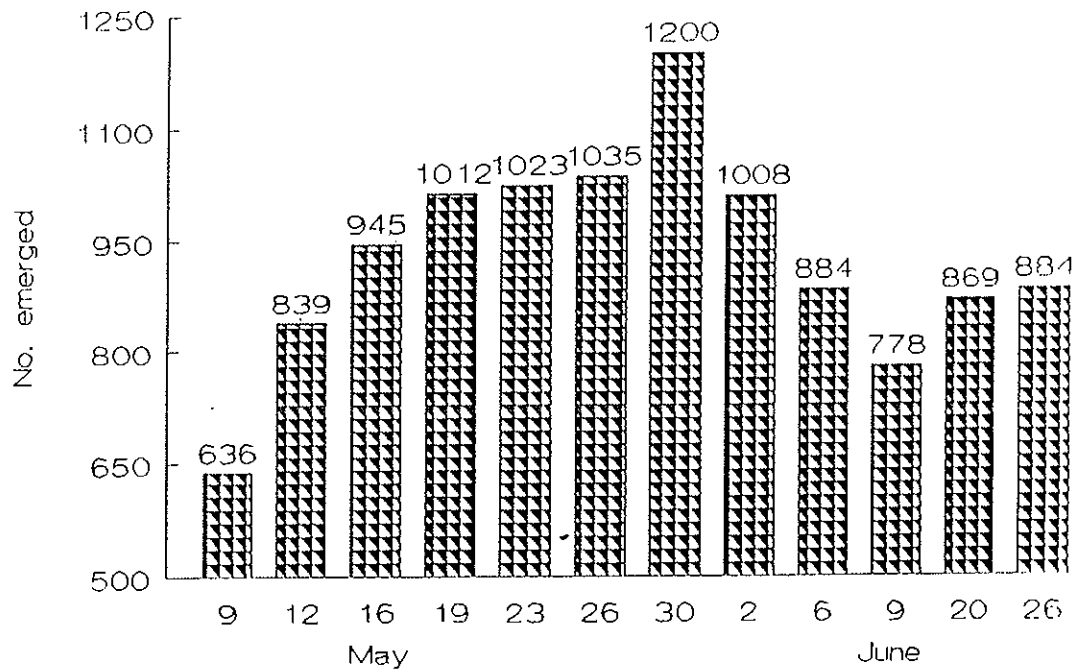


Fig.2. Daily totals 1991

Since 1991 was the first summer that these more extensive counts were made we don't yet know whether this fluctuation in numbers is typical and was purely the result of circumstances such as those suggested above. This may also account for the "annual count" drop noted above (Fig. 1). By doing a similar number of counts in 1992 we hope to get more information about the pattern of occupation of the roost during the early summer.

The photograph below (Fig.3) shows the roost. When the roost was first surveyed the majority of the bats were found to be hanging near the right hand chimney-breast. At emergence the main exit was under the guttering between the first and second windows from the left as shown below. In addition a few bats emerged from between the second and third windows.

In the years following the timber treatment the majority of bats emerged from the same place as before but some bats were seen to emerge from under the lead flashing beside the chimney. Very occasionally bats were seen to emerge from between other windows. The numbers of bats emerging from under the flashing varied from 10-20 on average to 93 out of a total of 1012 on one occasion in 1991. We think that this may be due to some of the bats moving around within the roof space depending on the temperature therein and subsequently emerging from the nearest exit.

The roost owners reported an increase in noxious odours emanating from the roof space during last summer (1991). We decided that it was probably time to try and clear the droppings away as this had not been done at any time since the roof-space was first surveyed by us in 1987. The numbers of bats using the roost declined rapidly from mid to late August so we entered the roof space in early



September to clean up as many of the droppings as possible. The droppings were found to be concentrated below the ridge board nearest the windows from where the majority of the bats emerged. Two rows of droppings led from the centre on either side of a tie beam towards the exit between the windows. It was apparent therefore that the bats were now roosting near the centre of the roof space along the ridge board and not in any great numbers by the chimney breast (the droppings here looked much older), where the bats were first seen in 1987.



Fig. 3. Exterior of the building

We cleared out as many of the droppings as possible without removing too much loft insulation as well. Bat droppings stick very well to it! Hopefully the bats will appreciate the autumn (spring!) clean up of their summer home and return in equally large numbers for us to count in 1992.

#### Acknowledgements

I would like to thank all those friends and members of Lothians Bat Group who have helped with the counts. I would especially like to thank Kate, Jo and Dan Moulin for their tolerance of our many visits and for the encouragement they have given us.

#### Footnote - 1992 counts:

24th April - 7; 3rd May - 288; 10th May - 31; 18th May - 1023; 25th May - 1113; 2nd June - 1124; 8th June - 1076; 14th June - 1134; 20th June - 1183; 28th June - 1129; 13th July - 908; 20th July - 1711; 7th August - 675.

## Annual roost patterns of bats in Doune Castle

John F Haddow

### Introduction

Doune Castle, the hereditary home of the earls of Moray, dates back to the 14th century. Presently the building is the responsibility of Historic Scotland (part of the Scottish Development Department) under a 999 year lease which began in 1984. The castle consists of roofed apartments on the northern side, with a tall curtain wall on the other three sides, surrounding a courtyard. The castle is a popular tourist attraction, and 25,000 people per year pay to explore it.

Four bat species roost in the building at some time during the year: Daubenton's bat *Myotis daubentonii*, Natterer's bat *Myotis nattereri*, pipistrelle *Pipistrellus pipistrellus* and brown long-eared bat *Plecotus auritus*. Two of these species (Daubenton's bat and pipistrelle) are regular users for part of the year, one species (brown long-eared bat) uses the building during its active season as a night time feeding roost, and Natterer's bats are found there very occasionally, mainly in Spring and Autumn.

### Background

Knowledge of the roosting bats in the castle has built up from the first visit in response to information from the then caretaker, James Stewart, in 1980. A large cluster of bats could be seen on the ceiling of one of the cellars on occasions during the summer. A photograph taken by Mr Stewart showed approximately 50 in a tight cluster with sufficient clarity to identify them as Daubenton's bats. My first visit however revealed only a single pregnant female pipistrelle roosting in the spot normally occupied by Daubenton's bats. Subsequent visits that summer proved fruitless - no other bats were encountered. The presence of Daubenton's bats during the summer months was confirmed in 1981, and in 1982 a programme of catching and marking the bats using Mammal Society 3mm forearm rings was started, initially with Carmen Placido, then Chief Warden for South West Scotland for the Nature Conservancy Council. Marking the bats began very cautiously in the first few years for fear of disturbing the colony, and also because of the difficulties in catching them without excessive disturbance. Knowledge of other species roosting in the castle developed from the Daubenton's bat study. From 1984 the custodians took an interest in "their" bats and helped to establish the roosting pattern for the Daubenton's bats, and allow more accurate prediction of when the bats could be caught for examination.

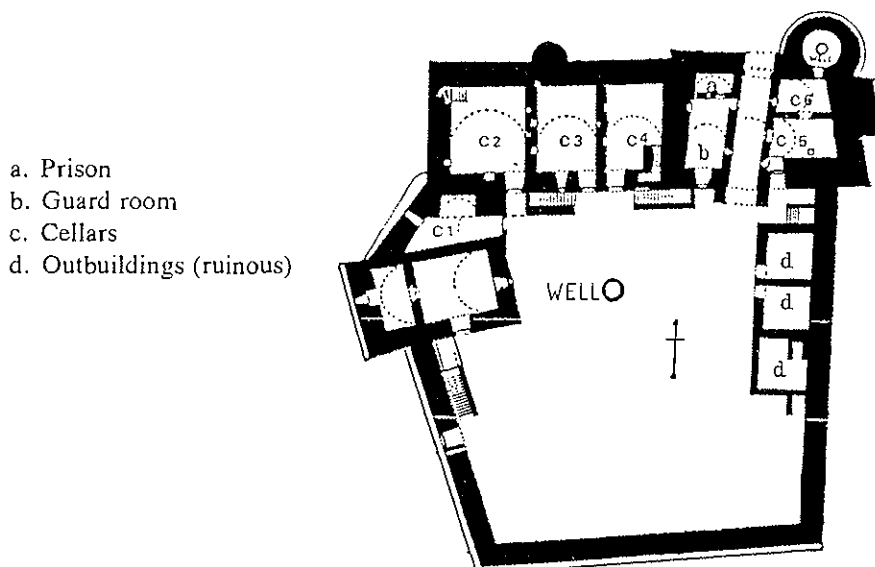


Fig.1. Plan of Doune Castle, ground floor

As soon as the lease of the building was taken on by Historic Scotland they began to plan renovation work to the castle's fabric, and a complete survey of the upper rooms in the castle was made involving an NCC officer and an architect for Historic Scotland. No signs of any roosting, other than very casual, were found in any of the upper areas, including those rooms and attics closed to the public. Evidence of roosting brown long-eared bats (*viz.* droppings and Lepidopteran wings) is regularly found at the east end of the Great Hall, in the fireplace of the chamber above the kitchen, and in cellar no.1 (see Fig.1). A torpid wintering brown long-eared bat has only once been seen, in cellar no.5. The first Natterer's bat recorded in the castle was found in September 1988, and this species is irregularly recorded in April-May and September-October in cellars 1, 2 and 5 (between one and three bats at any time).

In an attempt to establish whether Daubenton's bats roost out of sight in crevices during the winter, a fibre optics device was used to examine some of the deeper crevices within the walls. This established that no Daubenton's bats roost in the castle during a period from November to March, but also that pipistrelles roost in crevices within all the ground floor cellars and passages during that same period. So from January 1988 continuous recording of the presence of all species in the cellars which have public access has taken place. The castle is visited at intervals of two to four weeks for this purpose. The ground floor cellars not regularly inspected are: the two southernmost cellars under the kitchens which are used as a store for equipment; cellar no.3 which houses an interpretive display.

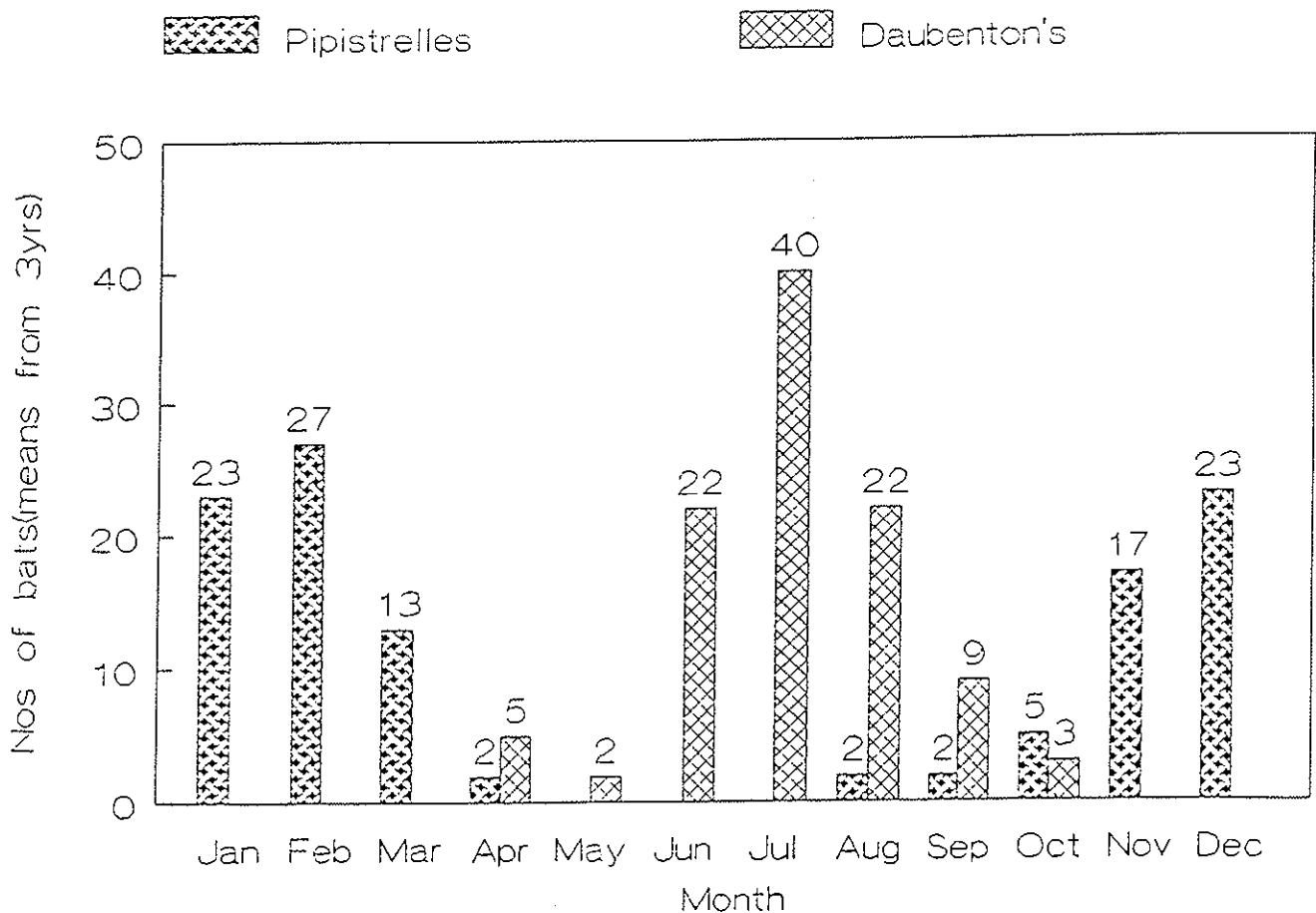


Fig.2. Numbers of pipistrelles and Daubenton's bats found in the castle per month, means from 1988-92

**Pipistrelles and Daubenton's bats**

Two species can be regarded as important users of the castle as a roost: pipistrelles and Daubenton's bats. These have distinctly different requirements. Daubenton's bats can be found in the building from April to October, during their "active" season, i.e. outside their hibernation period. Pipistrelles mainly roost in the cellars from November to March, so there is an apparently neat separation of the roost seasons of the two species. Pipistrelles can be regarded as common during the summer around Doune - there are two summer maternity roosts known within 1km radius of the castle with maximum counts of 633 bats (2nd July 1991) and 537 bats (6th July 1990). Winter roosting pipistrelles are very difficult to find in Scotland and their occurrence in the northern part of the UK has been the subject of much debate. The winter roost of pipistrelles in Doune Castle is currently one of only two in Scotland which are regularly monitored.

**Daubenton's bat annual roost pattern**

After an interval of five months, this species begins to appear in the cellars in small numbers during April. The preferred cellars are no.2 (largest cellar) and no.6. Typically they roost in gaps in the vaulted cellar ceiling where old mortar has fallen out, attached to the stone by their hind claws at an angle of between 5° and 45° from vertical. Both cellars nos.2 and 6 have a gap between the vaulted ceiling and the end (outer) wall of approximately 5cm, and this space, up to 50cm in height, is also used. During May and June this pattern continues. Examination of marked bats shows that the same individual is rarely found twice, in other words these are part of a larger colony roosting elsewhere. There is no predominance of one sex over the other. By July a group of bats has begun to roost on the stone surface in a particular area of the ceiling in cellar no.6. This area is 40cm in diameter, 4m from the floor, and at an angle of 50° from vertical. It shows up clearly as a dark stained area of stone, made smooth and shiny by the contact of bats' bodies, and a combination of their humidity, oil and urine. From July to September in particular this cluster can be seen, sometimes several days in succession, sometimes it is absent for two weeks or more. The numbers in the cluster are generally from 20 to 50 bats, though a maximum of 120 has been recorded. Normally during the middle of the day (from 11.00 onwards) individuals rouse from torpor and fly from the exposed patch to the vertical crevice at the end wall of the cellar. By 15.00 there are normally no bats roosting in the exposed site. On some days the crevice only is used, and no bats roost in the exposed site. Their presence in the crevice may only be indicated by audible squeaks. One particular part of the similar crevice in cellar no.2 is also used regularly, as indicated by the accumulated droppings on the floor below.

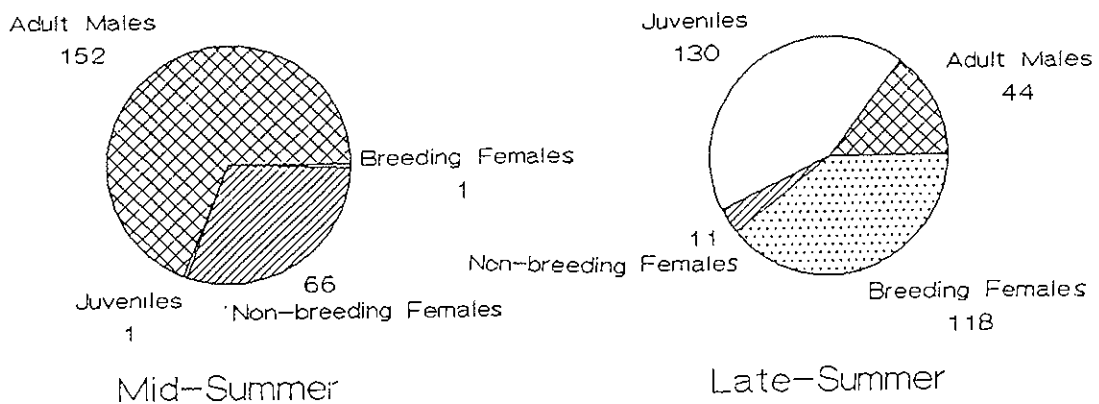


Fig.3. Pie charts showing classes of Daubenton's bat roosting during the summer and late-summer/autumn periods

From examination of bats caught during the April to October period, and particularly from capture of the large cluster of bats in cellar no.2, a pattern has emerged which can be separated into three periods:

1. Spring to midsummer: Small numbers of individuals, males, pregnant females and non-pregnant females, moving between this roost and others.
2. Summer (July to early August): Males and non-breeding females - both immature females and older females who have bred before and who breed in subsequent years.
3. Late summer to autumn (mid-August to October): Equal numbers of flying juveniles and females which have bred in that season, with smaller numbers of mature males and non-breeding females.

This pattern suggests that there is a maternity roost elsewhere, as yet unknown, where pregnant females roost during late June to early August, for the purpose of giving birth and nursing their offspring until they fly. This is likely to be a warm tree hole or roof space (only two large maternity colonies have been recorded in Central Region, both in roofs of large houses). Bats other than mothers and young have no need to maintain high body temperatures during daytime, in the summer period, and in fact torpidity during the day will be an advantage in reducing the energy requirement. A "cool" secure roost such as these cellars provide will be likely to increase survival chances.

Numbers of Daubenton's bats found in the castle decline during late September - October, and they are absent from the building until the following April. Little is known of the winter roosts of these bats, other than the circumstantial evidence that this species can be found in disused mine adits across central and southern Scotland in the winter period, normally in cool, humid sites with a temperature range of 6° to 8°C. Only one bat ringed at Doune has been found in a winter site, recorded by the author on 3rd January 1988 in an underground site 21km west of Doune Castle. This was a mature female ringed on 22nd August 1987. She has not been since recorded in the castle.

### **Pipistrelle annual roost pattern**

At the time of year when Daubenton's bats are moving out of their castle roost sites, pipistrelles are moving in. One or two may be found in October, or even September (eg one pipistrelle on 21st September 1991) but numbers begin to increase from November, peaking from December to February and by the beginning or middle of April all have gone (eg 1992 last pipistrelle seen on 8th April 1992 - and the first Daubenton's bats seen on 25th April 1992). The pattern has been similar for the last four winter seasons when there has been regular monitoring. The maximum numbers recorded were: 21 (5th February 1989), 26 (11th February 1990), 34 (15th December 1990 - maximum number in February 1991 was 25), 36 (15th February 1992). Pipistrelles typically roost singly (occasionally two or three together) in tight crevices in walls of the cellars or gate passage. Some are found in up to near-vertical crevices in vaulted ceilings, particularly in crevices which allow contact with both dorsal and ventral surfaces (12-15mm). The bats are rarely more than 15cm from the wall surface, and normally at a depth of about 10cm. The height varies between 1.5m and the maximum height of the cellars (approx 5m). Where more than one bat occupies the same crevice some vocalisation may be heard. This may indicate mating taking place, but only on one occasion have I clearly witnessed this (November 1989). On other occasions two bats have been seen together in the mating position, but were torpid.

The largest proportion of pipistrelles is seen in the gate passage and cellar nos.5 and 6, for example, of the 36 recorded on 15th February 1992 the number breaks down into: cellar no.1 (two bats); no.2 (7); no.4 (6); no.5 (3); no.6 (7); gate passage (11).

On all occasions the bats were subjected to the minimum disturbance, namely shining a torch for long enough to allow identification, and no marking of individuals has been done. Some positions have a pipistrelle present for weeks or months continuously, possibly the same individual. Otherwise there is clearly much movement at all times during the winter. On one occasion (15.56 on 19th January 1992) a pipistrelle was observed flying within the courtyard at the height of the curtain walls and appeared to be catching insects.

### In conclusion

1. Study of a group of summer roosting Daubenton's bats has been possible in an accessible and secure site. Similar roosts must occur elsewhere in Scotland and investigation of them would provide valuable comparisons. Further knowledge is needed of the requirements for nursery roosts at the northern limits of the range of this species in the UK.

2. Our knowledge of wintering pipistrelles in Scotland is at a primitive stage. This is probably the first regularly used winter roost that has had any systematic monitoring. Only small numbers of bats make use of it relative to the total population in the local area. Much more information needs to be gathered, and it is hoped that this article will stimulate the discovery of more winter pipistrelle roosts, and further knowledge of the movements of pipistrelles between different types of roost.

### Acknowledgements

Thanks are due to the custodians at Doune Castle, past and present, for their interest and friendly assistance.



Fig.4. Doune Castle from the north

## Hibernating bats in underground sites in Scotland

*Jeremy S Herman and Stuart Smith*

In February 1987 a study of hibernating bats in underground sites in the central belt of Scotland was instigated by Tom McOwat, drawing on preliminary work carried out by him in the 1970's. Scotland has few natural caves of any size but has many abandoned ore and limestone mines, however there are few published records of the presence of bats in these.

By the early 1970's, bats had been noted in three sites thanks to the efforts of Carmen Placido and the Glasgow Speleological Society (Placido 1972; Harvey 1973). Natterer's bats *Myotis nattereri* and Daubenton's bats *Myotis daubentonii* were recorded in an abandoned slate quarry tunnel near Aberfoyle, while Daubenton's bats were recorded in two sites near the village of Wanlockhead in the Southern Uplands. Of these sites, the Aberfoyle tunnel, where small numbers of Natterer's bats, Daubenton's bats and brown long-eared bats *Plecotus auritus* and also a solitary pipistrelle *Pipistrellus pipistrellus* have been recorded, has been grilled as a Scottish Wildlife Trust reserve, while the entrance to one of the sites at Wanlockhead has been filled in. The other site near Wanlockhead has been regularly surveyed by us, with Natterer's and brown long-eared bats recorded in addition to the Daubenton's bats previously recorded (Harvey 1973). Tom McOwat had noted the presence of Natterer's bats in a limestone mine near Pathhead in Midlothian (Arnold 1984) which has since been closed by tipping.

Tom McOwat began the current survey by examining four sites in the Lothians and one in Central Scotland, four of which contained bats of three species, Natterer's, Daubenton's and brown long-eared. Since then we have expanded the survey to cover as many sites as we could locate within reasonable reach of our base in Edinburgh, in an attempt to give a realistic picture of the use of such sites by hibernating bats in this part of Britain. The sites which we visited were of two types, limestone mines and ore mines.

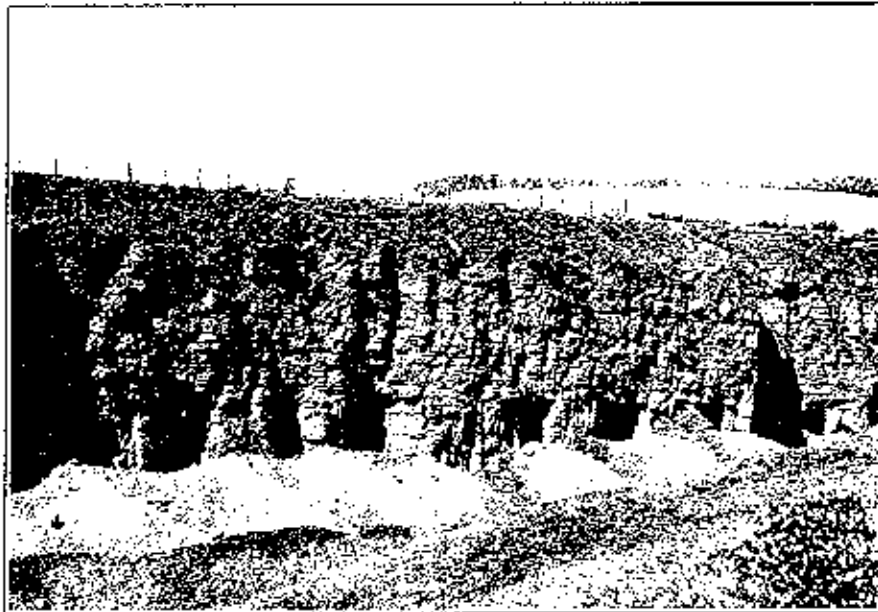


Fig.1. Entrances to a limestone mine in a Midlothian quarry (Robertson, Simpson and Anderson 1949)

Central and southern Scotland has many areas with carboniferous limestone outcropping. The limestone has been extensively quarried, mainly to provide stone which was burned in kilns to produce agricultural lime. When the overburden of rock became too great for quarrying, the limestone was instead extracted by mining (Fig. 1). In the sites in question, this took the form of the traditional stoop and room (or pillar and stall)

method, where as much stone was removed as possible from the seam, leaving pillars of stone to support the roof. The result is a large open area with pillars at intervals (Fig. 2). The area of these sites varies from a few thousand square metres up to a maximum of 0.5 km in diameter, and the roof height from less than 1m to around 5m. Most of the mines tend towards the smaller area with a roof height of about 3m.

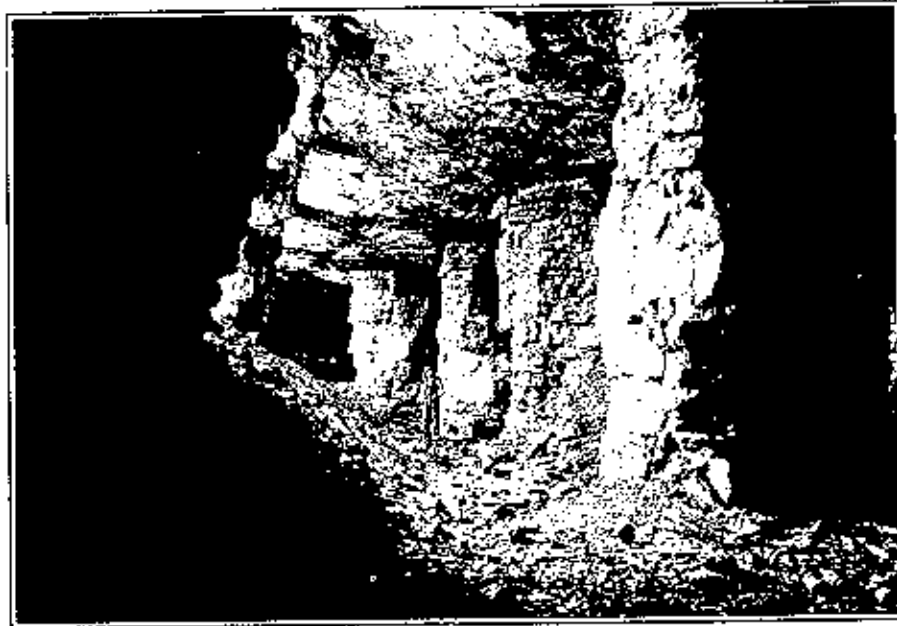


Fig. 2. Interior of the mine shown above (Robertson, Simpson and Anderson 1949)

There are many limekilns associated with mines and quarries in Scotland but they do not seem to provide enough shelter for hibernating bats. We have only found single Natterer's and brown long-eared bats in one of these in winter, when weather conditions were mild, despite repeated examinations of them. This seems to contrast with similar constructions further south.

The other mines which we have visited are typical ore mines where levels and shafts were driven in to follow mineral veins. Sites visited have included lead, copper and silver mines. These were generally in upland areas and although they are often extensive they are difficult to survey (Fig. 3).

Sites of both types were located by speaking to local geologists and cavers and by using the geological literature, for example Robertson, Simpson and Anderson (1949). We think we have visited most of the potential sites within 80 miles of Edinburgh but most of the ore mines in Scotland, which are outside our present range, remain to be checked. Sixty one sites which were known to have been open in recent years were located. Of these, 27 (44%) had now been closed. One problem was building developments with mines being filled in for safety because of their proximity to housing. Another problem was that the entrances to the limestone mines tended to be in quarries, which are often identified as useful places for the tipping of rubbish. Many of the currently open sites are under threat from landfill operations or simply from being closed by tipping of refuse by the local landowner.

Twenty nine of the sites which remained open were surveyed, in most cases several times, between the months of December and March of the years 1987 to 1992, 17 of which were found to contain bats (Fig. 4). One mine which had been blocked recently contained bats in 1971. Bats were present throughout the months of December to March but only one active individual, a Daubenton's bat, was ever found in summer (August).





Fig.3. The interior of a Kirkcudbrightshire copper mine in which we were unable to carry out a full survey (Brian Jackson)

Six species of bat have been recorded as resident in southern Scotland, together with a single specimen of Brandt's Bat. These are pipistrelle, Natterer's bat, Daubenton's bat, brown long-eared bat, noctule *Nyctalus noctula* and whiskered bat *Myotis mystacinus*. All of those which are normally found to hibernate in underground sites in Britain were seen during this survey (Table 1). Natterer's and Daubenton's bats were most commonly found as expected from results in southern Britain. Natterer's bats were the most common, despite very few summer roosts being identified in this area. Daubenton's bats were also relatively common, despite the fact that few summer roosts are known. Brown long-eared bats were widespread but in low numbers, possibly because of their ability to withstand cooler temperatures and greater fluctuations in these. Solitary whiskered bats were only found on three occasions, all in the west, possibly because this species is rare and on the edge of its range in this part of the country.

Site	Altitude (m)	Temp (°C)	<i>Myotis nattereri</i>	<i>Myotis daubentonii</i>	<i>Myotis mystacinus</i>	<i>Plecotus auritus</i>
1.	350	4-7	18	3	1	5
2.	175	5.5-8	20	5	0	1
3.	400	5-7.8	11	10	0	2
4.	175	4.9-7	10	3	0	2
5.	325	5-7.2	11	1	0	0
6.	250	-----	2	1	0	2
7.	200	5.5-6	2	1	0	3
8.	300	-----	3	?	0	1
9.	60	6.9-10	4	3	1	0
10.	200	4.5	2	0	0	1
11.	100	-----	1	1	0	0
12.	450	4	0	4	0	0
13.	50	6	1	0	0	0
14.	150	5-6	0	0	0	1
15.	125	-----	0	0	0	1
16.	175	5.5	4	0	0	0
17.	125	8.8-9	0	2	0	0

Table 1. Maximum numbers of bats of each species recorded in winter between 1987 and 1992

In general, sites at higher altitudes were favoured by bats, presumably because these sites had parts with stable temperatures between 4°C and 8°C, whereas sites at lower altitudes were too warm for hibernation (Table 2). This reflects the situation in south-western Germany as reported by Nagel and Nagel (1991). An exception to this was a site where a whiskered bat was found in a warm higher part of a mine at a

temperature of 10°C. This followed a spell of particularly cold weather which may have driven this individual into the site.

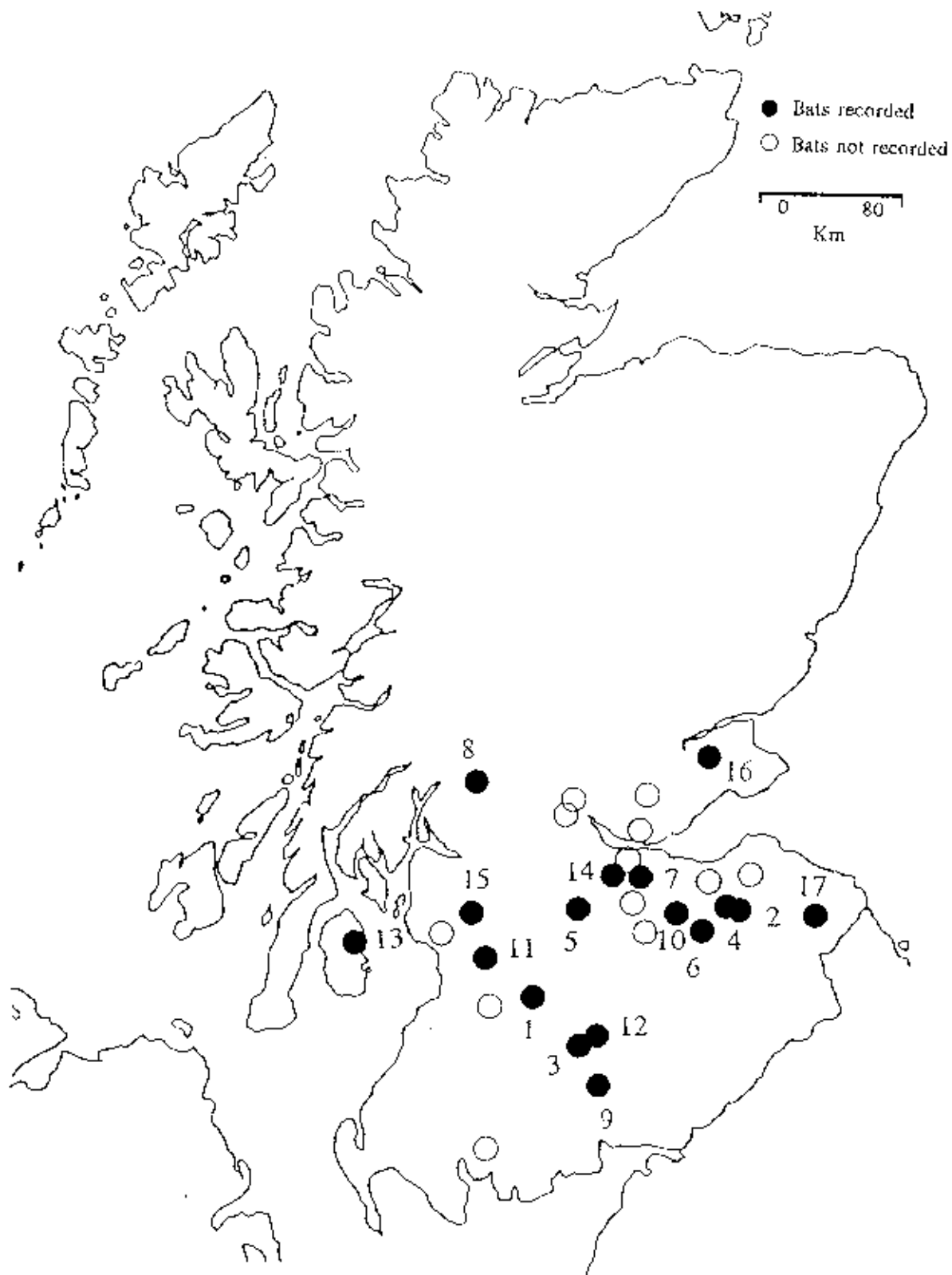


Fig.4. Underground sites surveyed in winter between 1987 and 1992. Site numbers refer to Table 1

Most of the sites were not in suitable habitat for feeding but in exposed, often treeless, upland areas, however this did not deter the bats which may have located them by following small watercourses leading into the hills from their river valley feeding habitat (Fig.5). Distances of 10km were common from the nearest identifiable feeding habitat and this would appear to represent a considerable expenditure of energy by the bats when making these journeys. This would surely indicate the importance of these sites to the bats for their hibernation. There is only one record of a longer migration to an overwintering site in Scotland. This is of a Daubenton's bat ringed at Doune Castle on 22nd August 1987 and found on 3rd January 1988 21km away in the aforementioned Aberfoyle tunnel (Haddow 1992).

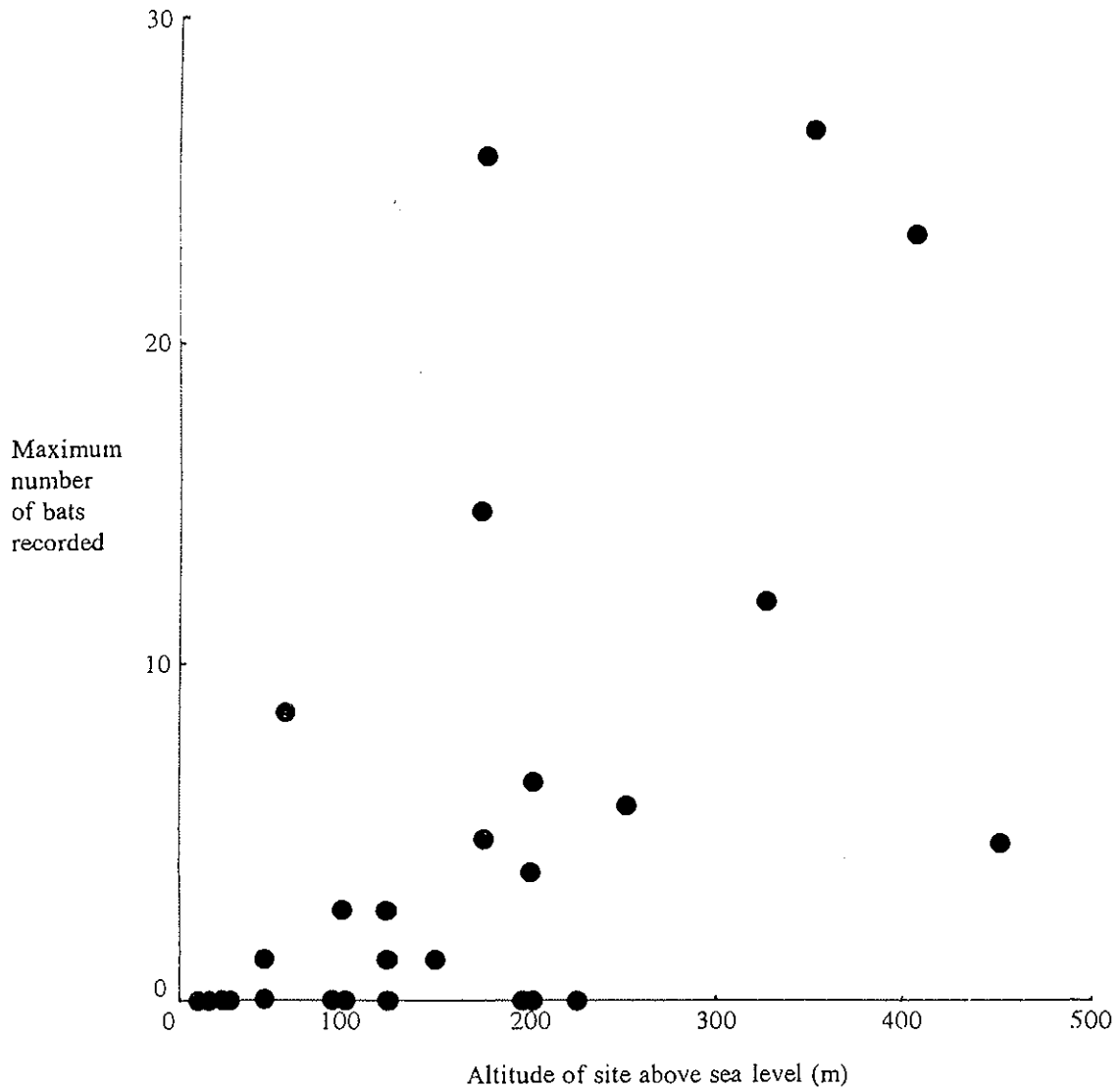


Table 2. Maximum numbers of bats of all species recorded in winter between 1987 and 1992

Only small numbers of bats were found. An explanation for this in the case of the limestone mines is the difficulty of finding bats in crevices in the large underground stone quarries coupled with a possible preference on the part of the bats for the least disturbed and hence least accessible parts of crevices. The temperatures within the mines were stable within three degrees C throughout the year but in particularly cold winter weather were about one degree lower than usual at that time of year. Lower numbers of bats were seen at such times, despite the expectation of finding larger numbers during harsh weather. It may be that the bats had disappeared further into crevices thus making themselves invisible to us. Temperatures in the sites were never so low as would be expected to actually drive the bats out of them. In the case of the ore mines the bats may prefer the least accessible and therefore the least disturbed levels.



Fig.5. Typical habitat surrounding hibernacula (Brian Jackson)

In summary, a significant proportion, perhaps 10%, of the underground sites of any substantial size which are available to bats for hibernation in Scotland have been surveyed with small numbers of bats found. This nevertheless raises the question as to where the bulk of the summer populations of the locally widespread and normally sedentary Natterer's and brown long-eared bats (Schober and Grimmerberger 1989) and the short range migrant Daubenton's Bats are hibernating. This seems to mirror the position in England where more survey work has been carried out over a much longer period. It would appear that other hibernation sites used by these species have not so far been found in Scotland or even in other parts of Britain, with the obvious exception of the Greywell tunnel in Hampshire. Perhaps they may be using buildings and tree holes as seems to be the case with pipistrelles and noctules. Obviously the difficulty of locating bats hibernating in such places would lead to a similar lack of recording except when damaging events took place such as the felling of trees and the dismantling of parts of buildings in winter.

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#### Acknowledgements

Thanks are due to Chick Calder, Brian Jackson and everyone else who helps with the survey.

## Winter Behaviour of Bats in Scotland

*J Stewart Pritchard*

As any bat worker will tell you, bats are scarcely seen during the winter months and, for most of our species, relatively little is known of their wintering behaviour. Recent work by members of bat groups (e.g. Central, Lothians and Fife) has produced limited results despite a considerable input of effort, and the apparent dearth of records (compared to those in "summer" - see elsewhere in this publication) has given rise to some interesting explanations to account for their disappearance.

This report aims to bring together a large collection of winter records from widely scattered sources to establish the current level of knowledge and to guide and promote further investigation.

### Methods

In 1986 and again in 1992, a variety of individuals and groups who might hold records of or encounter bats during winter were approached. Further ad hoc contacts were made during the intervening years and occasional articles published in the newsletters of interested organisations and in the local press.

### Results

#### *Records Received*

Details of more than 86 observations involving more than 317 bats were received. The level of detail and accuracy of records varied considerably e.g. for 14 records the date was given as just "winter" and for 16 sites summaries of repeated visits over several years were supplied. As a result, sample sizes for the following analysis vary accordingly. The potential for confusion between true "winter" behaviour and the occupancy of summer or breeding roosts was also recognised (Speakman pers. comm.) and only the 65 observations made between 1st December and 15th April are considered here, unless otherwise stated.

The month of observation was specified in 41 cases, in addition to the 17 site summaries for December to March, involving a total of 58 different sites (Table 1). Sample sizes are too small for statistical analysis of differences between the months though the total for April (2) is low, even allowing for the inclusion of only the first half of the month.

#### *Distribution*

Winter record distribution (Fig.1) shows a geographic bias towards the east, southeast and southwest with few or no records being received from the north and west highlands and islands, the Outer Hebrides or Shetland. Records for November were, with the exception of those for the Islands of Mull and possibly also Arran, all within OS 10km squares adjoining those with winter records.

#### *Activity*

Of the 65 winter records, 42 (65%) concerned one or more torpid bats. Bats were also observed emerging from hibernacula (four records, including three associated with local disturbance), entering a hibernaculum (1), in flight (17 - including 4 when feeding was noted) and apparently sunbathing (1).

#### *Hibernacula*

In 58 cases the type of hibernaculum was identified and they included 26 (45%) underground sites (disused limestone, sandstone and copper mines and tunnels, lime kilns), 15 (26%) crevices in building walls (cellars, walls of castles and houses, crevices around windows, behind notice boards), 11 (19%) roofs of buildings (under slates, in roof ridge, in eaves, between timbers and gable walls) and 6 (10%) tree holes (ash, oak, log pile, bat box) (Table 1). Three buildings used as hibernacula were also reported to be used as

summer roosts for maternity colonies. Occupancy of underground sites was most frequently reported in February. However, without further details of the summary accounts for December to March (58% of sites) more specific comments would be unwise. One record was received of a single unidentified bat found torpid within a drystone dyke. The date was given only as winter and this record has not been included in the analysis.

### *Species Recorded*

More than 276 bats of six species were positively identified over the period of eight winters, notably whiskered bat *Myotis mystacinus* (2 sites, 2 bats), Natterer's bat *Myotis nattereri* (17 sites, 101 bats), Daubenton's bat *Myotis daubentonii* (15 sites, 38+ bats), Leisler's bat *Nyctalus leisleri* (1 site, 1 bat), pipistrelle *Pipistrellus pipistrellus* (13 sites, 83+ bats), brown long-eared bat *Plecotus auritus* (17) and unidentified species (10 sites, 22 bats) (Table 2).

Natterer's, Daubenton's and brown long-eared bats were observed as the only species using three, four and four sites respectively. Various combinations of these species were recorded at 12 sites and at a further two with whiskered bat. Pipistrelle used the same sites as brown long-eared on three occasions and was the only species observed to use a further six sites.

Whiskered, Natterer's, Daubenton's and brown long-eared bats were most frequently reported from underground sites although Daubenton's used wall and tree sites and brown long-eared bats used wall sites. Pipistrelle was observed underground on only one occasion but used wall, roof and tree sites more frequently than any other species (Table 2). The single Leisler's bat record involved a single animal reported to have been found on the ground and which subsequently hibernated in the roof space of a garage. Tree sites including a log pile and a bat box were reported to be used by pipistrelle and Daubenton's bat only.

### **Discussion**

Whilst the number of records received was insufficient for detailed statistical analysis several trends were apparent.

All the species commonly resident in Scotland, except noctule *Nyctalus noctula*, were recorded as well as whiskered and Leisler's bats which are considered scarce and rare respectively. Nathusius' pipistrelle *Pipistrellus nathusii* has not been recorded in Scotland during the December to mid-April period (Speakman et al 1991).

The geographic distribution (all winter records) shows a bias towards the east, southeast and southwest. Whilst I suspect it can be attributed largely to the greater observer effort in these areas it may be explained in part by differences in the availability of certain hibernaculum types.

The underground sites, which accounted for the largest proportion of hibernacula (61%) and held the largest proportion of the total number of bats observed (59%), were all located in the southeast and southwest of the country. Comprising disused commercial mine workings of various forms, such sites are limited in their distribution by the prevailing geology and similar sites in the northeast and northwest are relatively scarce or absent.

Hibernation sites of a wide variety of descriptions were reported but did not differ significantly from those reported for the species from other areas of Britain and Europe (Corbet and Southern 1977). The observation of a single pipistrelle in a mine tunnel more commonly used by Natterer's, Daubenton's and brown long-eared bats was considered unusual, but again such behaviour has been reported from elsewhere in Europe (Corbet and Southern 1977). The potential role of drystone dykes as hibernacula deserves further attention. If even a small proportion of such walls, or indeed scree slopes, did provide suitable conditions for hibernation it would present a vast choice of sites.

With the exception of the underground sites and approximately seven others, all the hibernacula were



encountered by chance (e.g. during building repairs). The relative ease with which potential underground sites can be systematically identified and investigated, compared for example to the roofs of buildings or tree holes, is likely to lead to an over-emphasis of their importance. This is clearly illustrated by the comparative frequencies of occurrence of Natterer's bat and pipistrelle in summer and winter. Natterer's bat which accounts for the greatest number of the bats identified in underground hibernacula in the present study (62%) is relatively rarely recorded in summer. In comparison, the pipistrelle, which displayed an almost complete avoidance of underground sites (<0.1%) is the most commonly recorded species in summer.

The sample size was insufficient to allow a month by month analysis of the occupancy of different hibernacula types by the different species. The relative lack of records for the first half of April was however surprising. With the impending start of "summer" bat activity might have been expected to increase during April. It is however possible that observers did not regard April as "winter" and bat activity went largely unrecorded.

The total number of bats observed is insignificant in comparison to those of known maternity colonies in the same areas during the summer months. This however should not be taken as evidence that the bats are not still present. Consider the case for the pipistrelle. During the summer months large numbers of females of this species gather in maternity roosts which are often reported as a result of their indiscretion. Meanwhile an approximately equal number of males remain largely undiscovered nearby, roosting solitarily or in small groups. They appear also to be using roosts of types that are both common and widespread and not dissimilar to those in which pipistrelles are observed during winter. It is suggested that in winter when both sexes are seeking similar conditions, it is relatively easy for entire colonies to "disappear" into obscure sites.

## Conclusions

Records were received from widespread locations across Scotland and of all the species (except noctule) that are known to commonly occur in summer. The choices of hibernacula were similar to those reported from other parts of Europe for the same species. The difference in relative ease of identification and accessibility of roost types was highlighted as a major source of bias in the frequency of occurrence of the different species. Species reported to hibernate predominantly in the widespread and common hibernacula types appear to have been under-recorded.

Clearly, large gaps remain in our understanding of the winter behaviour of bats in Scotland and any conclusions are based on a relatively insignificant sample size (compared to summer population numbers). It is recommended that the collection of records continues and that relevant publicity is targeted at specific groups such as slaters, roofers and dykers who may provide valuable information on those species less frequently recorded in the present study. In addition, suitable underground sites in the northeast and northwest should be sought out and investigated to provide data comparative to that for the southeast and southwest.

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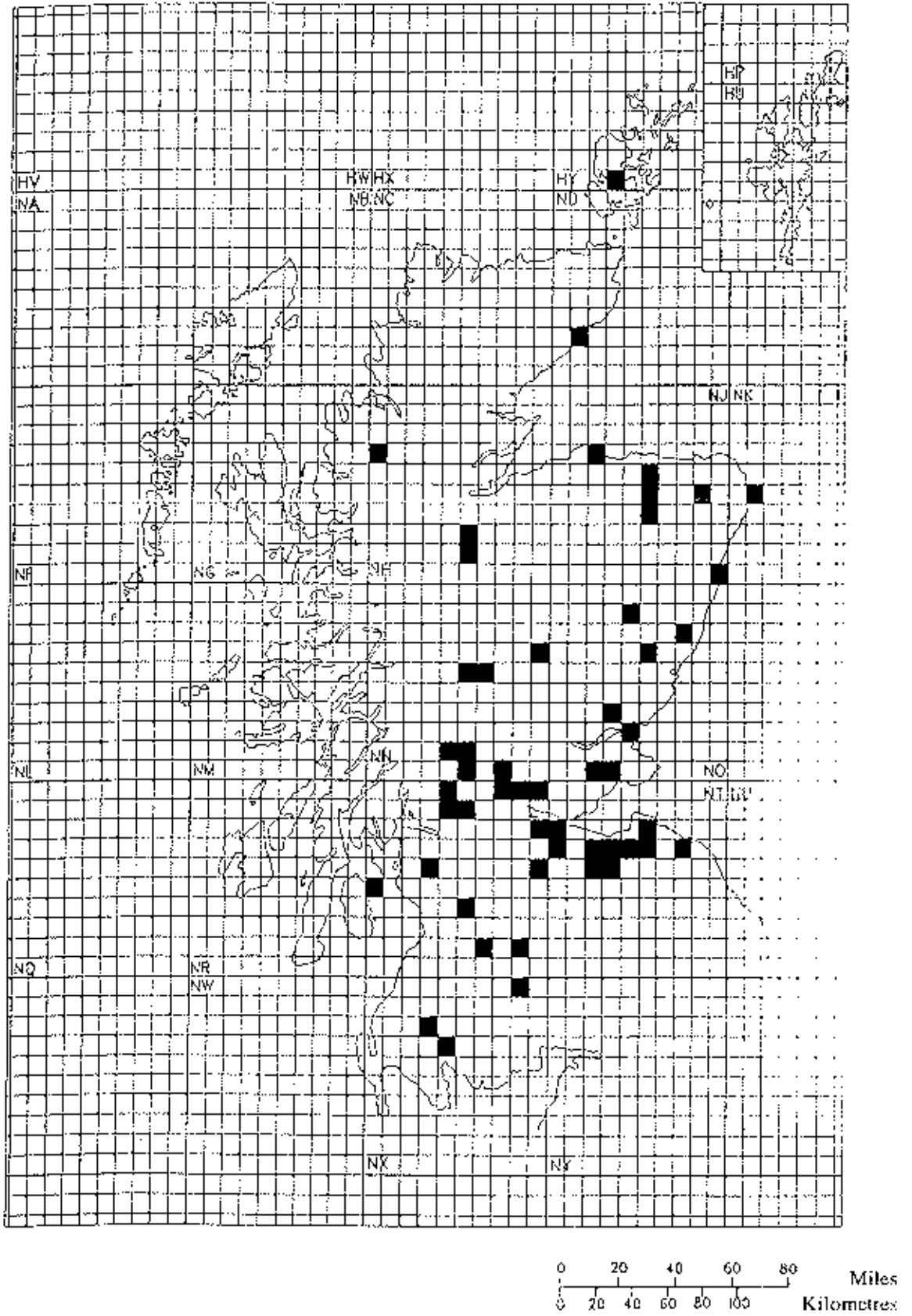


Fig. 1. Distribution of winter bat records (1st December 1986 to 15th April 1992)

Hibernaculum Type	Month						Total No. of sites
	December	January	February	March	April	Dec - Mar	
Underground	0	2	7	2	0	15	26
		N1 D2 P1 L2	N5 D5 P1 L3	N2 D1 W1		N10 D 9 W 1 L12	
Wall	5	4	1	2	2	1	15
		N1 P2 L2	P1	D1 L1	P2	L1	
Roof	5	4	0	1	0	1	11
		P2 X3	P1 X2	X1		X1	
Tree	1	2	1	2	0	0	6
		P1 X1	D1 X1	P1 X1			
Total No. of Observations	11	12	9	7	2	17	58

For each entry number of sites is followed by number per species  
 N - Mattered's Bat, D - Daubenton's Bat, W - Whiskered Bat,  
 P - Pipistrelle, L - Brown Long-eared Bat  
 Leisler's Bat record not included

Table 1. Occupancy of hibernacula by type and month (1st December to 15th April)

Species of Bat	Hibernaculum Type				Total No. of Bats (Sites)
	Underground Bats (Sites)	Walls Bats (Sites)	Roofs Bats (Sites)	Trees Bats (Sites)	
Whiskered	2 (2)	-	-	-	2 (2)
Natterer's	101 (17)	-	-	-	101 (17)
Daubenton's	35 (13)	2 (1)	-	1 (1)	38 (15)
Leisler's	-	-	1 (1)	-	1 (1)
Pipistrelle	1 (1)	67+ (6)	8 (3)	7 (3)	83 (13)
Brown Long-eared	24 (13)	5 (4)	-	-	29 (17)
Unidentified	-	10+ (3)	10+ (5)	2 (2)	22 (10)
Total number of Bats (Sites)	163 (46)	84+ (14)	19 (9)	10 (6)	276 (75)

Table 2. Occupancy of hibernacula by type and species (1st December to 15th April)

**Acknowledgements**

This report would not have been possible without the cooperation and effort of many individuals, groups and organisations. Thanks are due to Professor Paul Racey, Alf Robertson, Alastair Urquhart, the wardens of the Royal Society for the Protection of Birds, the organisers and members of the Scottish bat groups and last, but not least, all the owners of the hibernacula.

Scottish Natural Heritage prepared the tables and base map and provided word processing facilities.

## 1991 summary of the bat boxes in the Forestry Commission North Scotland Region

*Mick Canham*

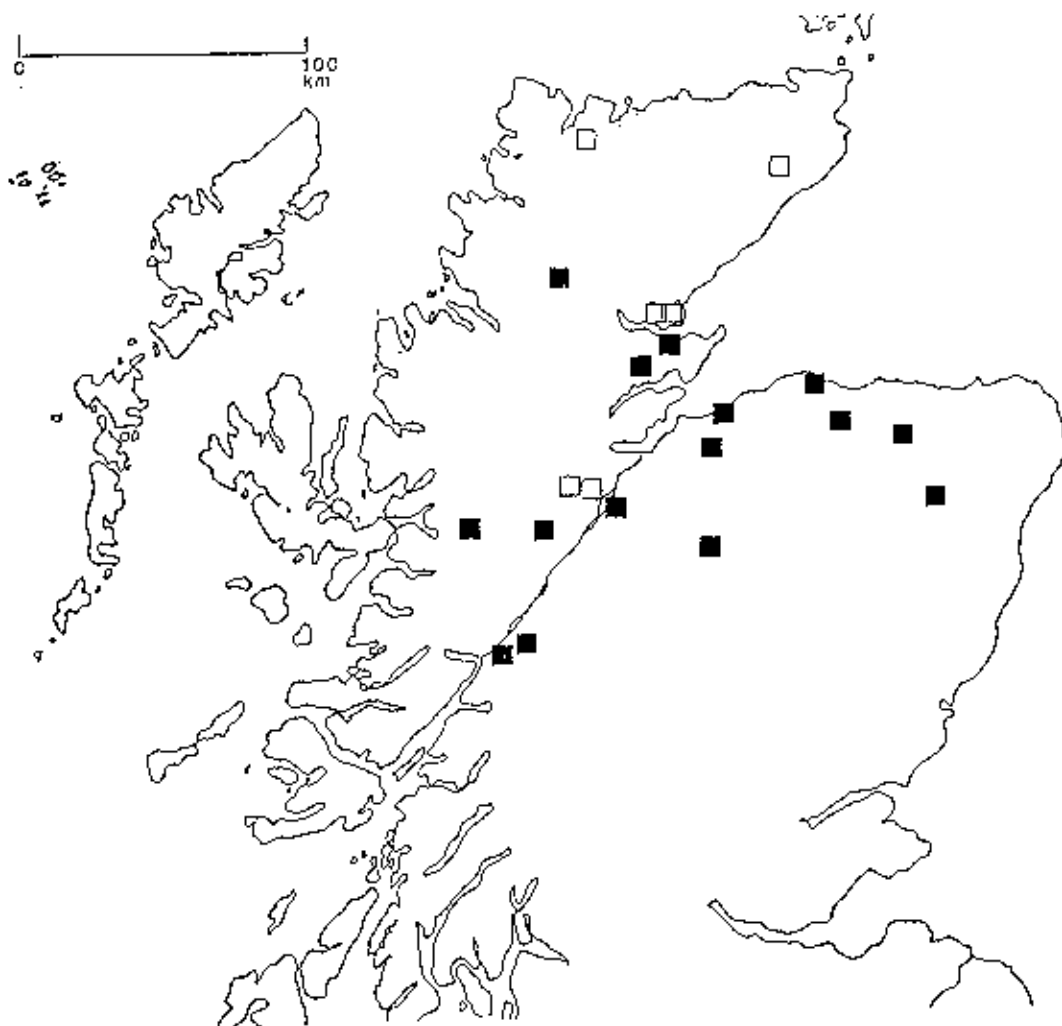
We now have some 867 bat roost boxes in 21 groups throughout North Scotland (see map).

Fifteen of the groups now show evidence of use by bats, and 11 of the groups had bats present at the time of checking.

Most of our groups of bat boxes are being used by either brown long-eared bats *Plecotus auritus* or pipistrelles *Pipistrellus pipistrellus*, but this year we had our second record of Natterer's bat *Myotis nattereri* in our North Scotland boxes. 1991 also produced our first maternity roost in a bat box, where brown long-eared bats were found breeding.

We plan to continue to site boxes in suitable areas as well as other projects like converting an old Second World War pillbox to a bat roost/hibernaculum and building roosts into new bridges.

- Box sites with evidence of use by bats
- Box sites with no evidence of use by bats



Forestry Commission North Scotland Region bat box sites

## At last ears open to the voice of bat conservationists

*Andrew Collins*

On May 22nd 1991 the Scottish Office Environment Department announced an important decision for Calderglen Country Park in East Kilbride. It supported the District Council in its opposition to the application for planning permission for the opencast extraction of fire clay and coal from land adjoining the Country Park.

The decision, however, was important not only to the Country Park but also for bat conservation and showed that perhaps people are starting to listen to the voice of bat conservationists.

On a warm summer night the riverbank of the Rotten Calder, which runs through Calderglen Country Park, is an ideal place to watch both pipistrelles *Pipistrellus pipistrellus* and Daubenton's bats *Myotis daubentonii* feeding. There is abundant insect life associated with both the river and the surrounding woodlands and many of the older trees are used as roosting sites by the bats.

The potential threat to this area prompted Clyde Bat Group to attend the public enquiry and make a statement protesting against the proposed development. The statement highlighted the threat that the development posed to the surrounding woodlands. In particular, a row of old beech trees which were ideal roosting sites would have been lost due to the changing drainage pattern resulting from the proximity of the site. As well as the threat to the woodlands, an equally serious threat confronted the river. Other, similar operations in the area had proven that it was impossible to guarantee that no river pollution would result and in the past the Calder has been seen to run grey due to the coal-dust content.

The public enquiry was held in February 1992 and a statement was made on behalf of the Clyde Bat Group by myself as Chairman, listing various threats to the bat population, with the recommendation that the proposal be refused. Two and a half nail-biting months passed before the Secretary of State's decision was announced. Finally I received a letter from the Scottish Office saying that the case had gone our way.

The report summarised what was seen as being the most important points made in the Clyde Bat Group's statement and included reference to the Wildlife and Countryside Act and the fact that all British bat species are protected. It also referred to the effects of pollution on water courses and the associated effect on insect life and hence bats. Loss of habitat was also highlighted and reference was made separately to the potential environmental disturbance when the report pointed out that "Many of the species referred to by Mr O'Neill [park manager and district ranger], the Calderglen Bird Club and the Clyde Bat Group require a relatively undisturbed environment".

An amended appeal has since been lodged by S.B. Minerals. If another public enquiry is to be held then the Clyde Bat Group will be just as vocal if there is perceived to be any threat to the local bat population.

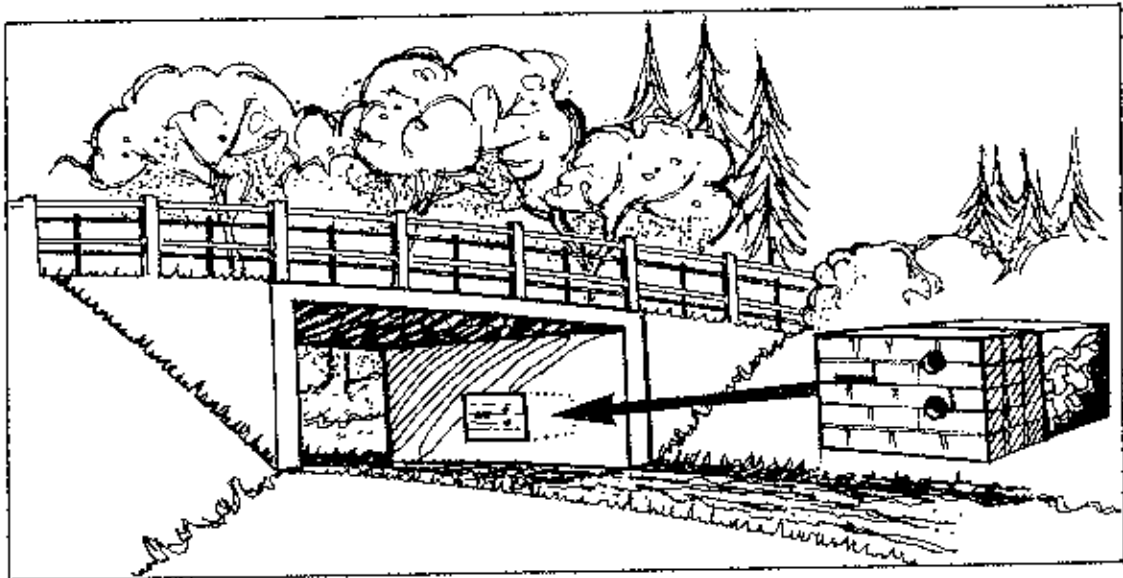
## Roost sites for bats in new Forestry Commission bridges

*Mick Canham*

Observing the increasing number of bridges being built which have no natural roosting places for bats (unlike many other stone built bridges), it was decided to try to build into Forestry Commission new bridges some sort of roost site suitable for bats and especially Daubenton's bats *Myotis daubentonii*. After consultation with the Commission's civil engineers a design was drawn and the first roost was completed in a bridge in Inverness-shire in February 1992.

The roost site was built into one of the bridge abutments about 60cm above the water level (see figure). The roost cavity is approximately 45cm cubed and is bricked in to the outside leaving an access slit 13mm x 65mm and two round access holes of about 13mm in diameter. The interior of the cavity was partly filled with loose rocks as shown in the figure.

We look forward with interest to see if the bats find this design to their liking but expect that there may be the need for a "mark 2" design in the future.





## The earliest record of Nathusius' pipistrelle from the British Isles

Jeremy S Herman

During a recent routine examination of the mammal collection in the Department of Natural History of the National Museums of Scotland, a complete specimen of an unidentified bat was discovered. The bat had been preserved in alcohol and was labelled "Bat. Ibister, Whalsay, 2/11/40". Presumably it had been found in or near the village of Isbister on the island of Whalsay, one of the Shetland Islands, on or around 2nd November 1940. The specimen proved to be a female Nathusius' pipistrelle *Pipistrellus nathusii*, and has now been registered in the museum collection as NMSZ 1991.8.

Previous to the discovery of this specimen, the earliest recorded example of this species from the British Isles was the adult male from Dorset in 1969 which was identified by Stebbings (1970) and was believed by him to be a vagrant of continental European origin.

Speakman et al (1991) recently reviewed the status of Nathusius' pipistrelle in the British Isles and concluded that this species should be regarded as a winter visitor of which some continental populations hibernate in Britain. They pointed out that the majority of records appear in the south of mainland Britain during the expected migratory months of September and May and cited the fact that these records did not follow weeks of south easterly winds to support their view that these bats had not been blown off their normal migratory course within continental Europe. However their only record from Shetland, of a bat found in March, did follow a week with predominantly easterly winds and could well have been of a vagrant bat from Scandinavia, the nearest continental land mass to Shetland.

The earlier Nathusius' pipistrelle from Shetland was collected near the eastern coast of one of the most easterly islands in Shetland and a very likely first landfall for a bat blown off course to the west from Scandinavia. It does not seem reasonable that it should have migrated to this location by intent, nor that this location be on its normal migration route from southern Scandinavia, the species most northerly summer quarters, to more southerly parts of Britain.

It is of interest that Whalsay was the island on which the first vagrant particoloured bat *Vespertilio murinus* was found in the British Isles, in late March 1927, and Ritchie (1927) then alluded to the position of this particular island with regard to that species' normal range in Scandinavia and its migratory habit.

It seems reasonable to assume that the two Shetland Nathusius' pipistrelles, and possibly the other records of this species from northerly localities in the British Isles, are indeed vagrant individuals rather than part of a population of bats which migrates from continental Europe into Britain for the purpose of hibernation.

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## Recorded distribution of bats in Scotland

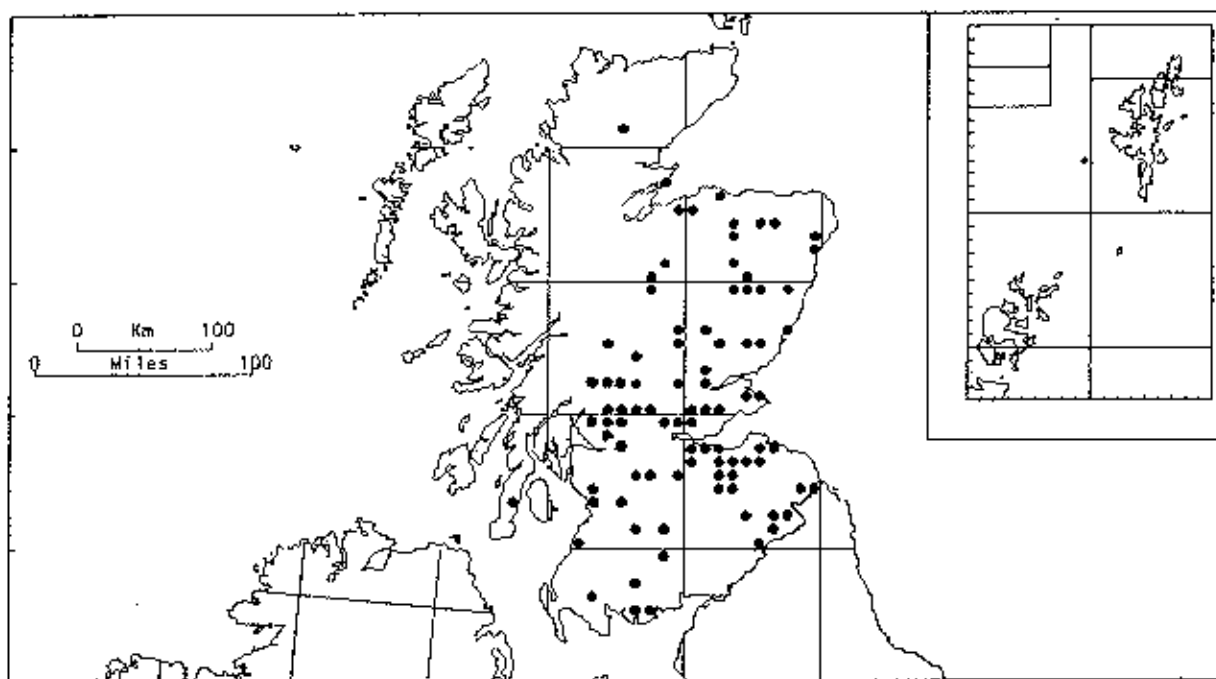
*John F Haddow*

The basis for the distribution records used in these maps are the records held by the current bat groups in Scotland. The criteria were that records had to be from identified roosts or from live or dead specimens "in the hand". Only records from 1980 onwards are included. Daubenton's bat records were accepted from confidently identified feeding bats, since their feeding behaviour over water is distinctive and the use of an ultrasonic bat detector assists in location and identification. Likewise noctule bats can be identified in flight visually and with a bat detector, so some records of this type are included in view of the scarcity of knowledge of this species in Scotland. Records of vagrant species are not included.

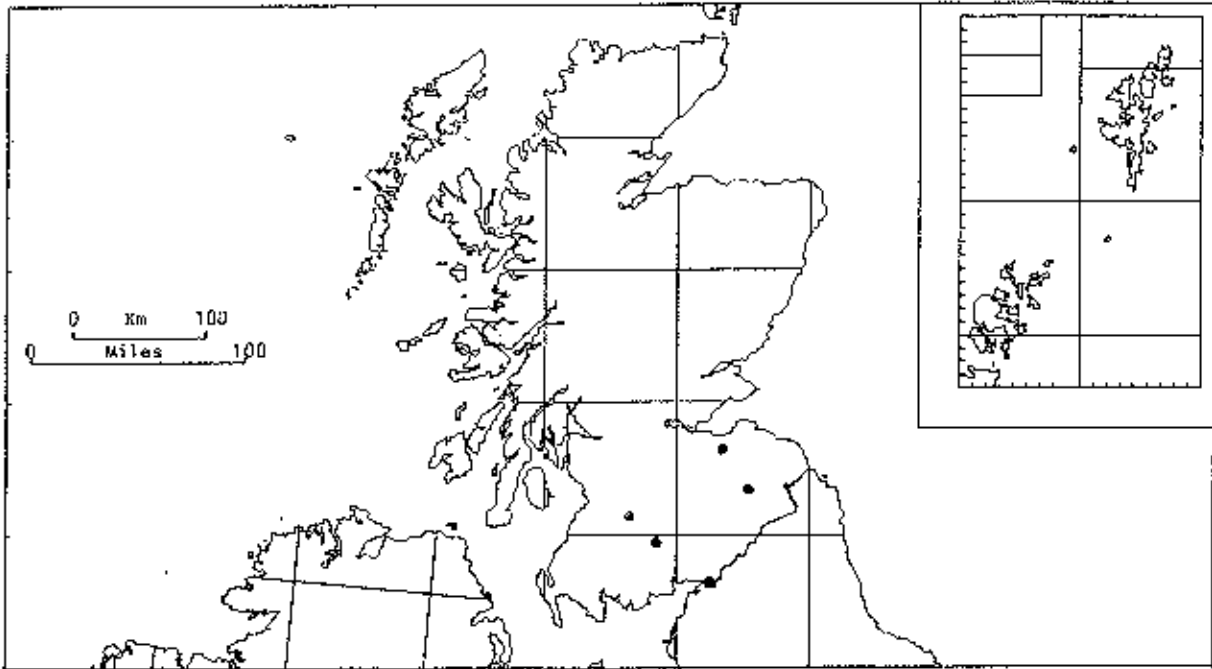
The distribution maps were produced by Henry Arnold of the Environment Information Centre of the Institute of Terrestrial Ecology at Monks Wood Experimental Station.

While the maps provide information on bat distribution, inevitably they also reflect the distribution of recorders, in this case bat groups. They provide a base for the development of our knowledge of bat distribution and a stimulus for further record gathering.

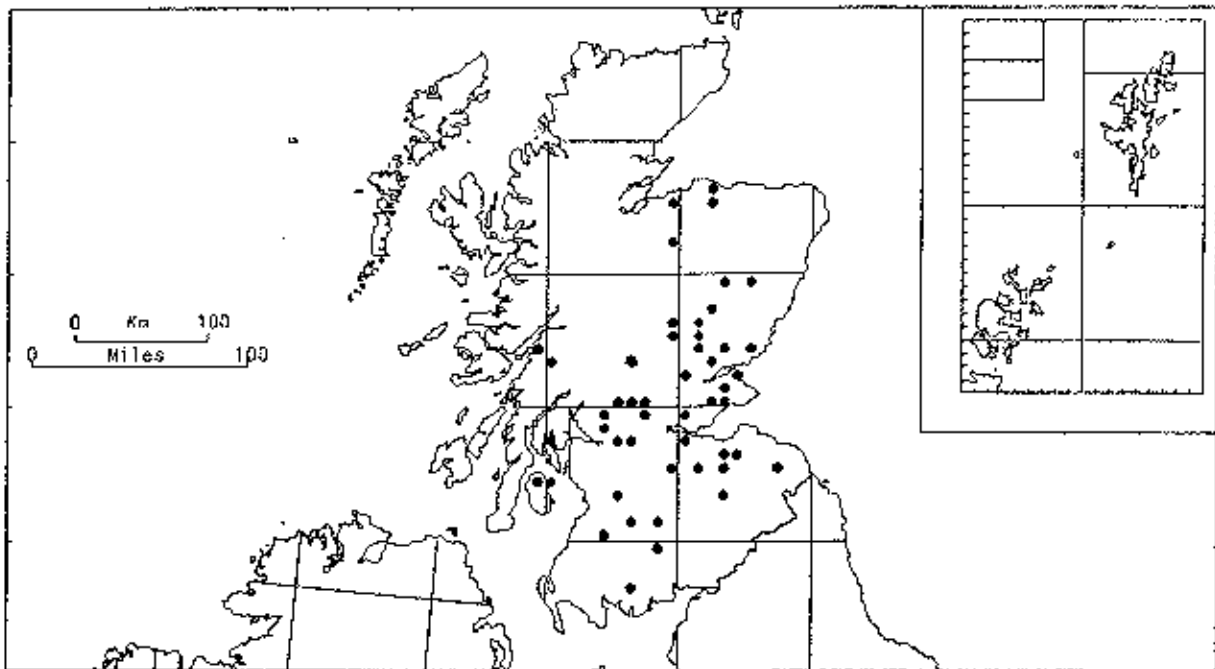
Daubenton's bat  
*Myotis daubentonii*



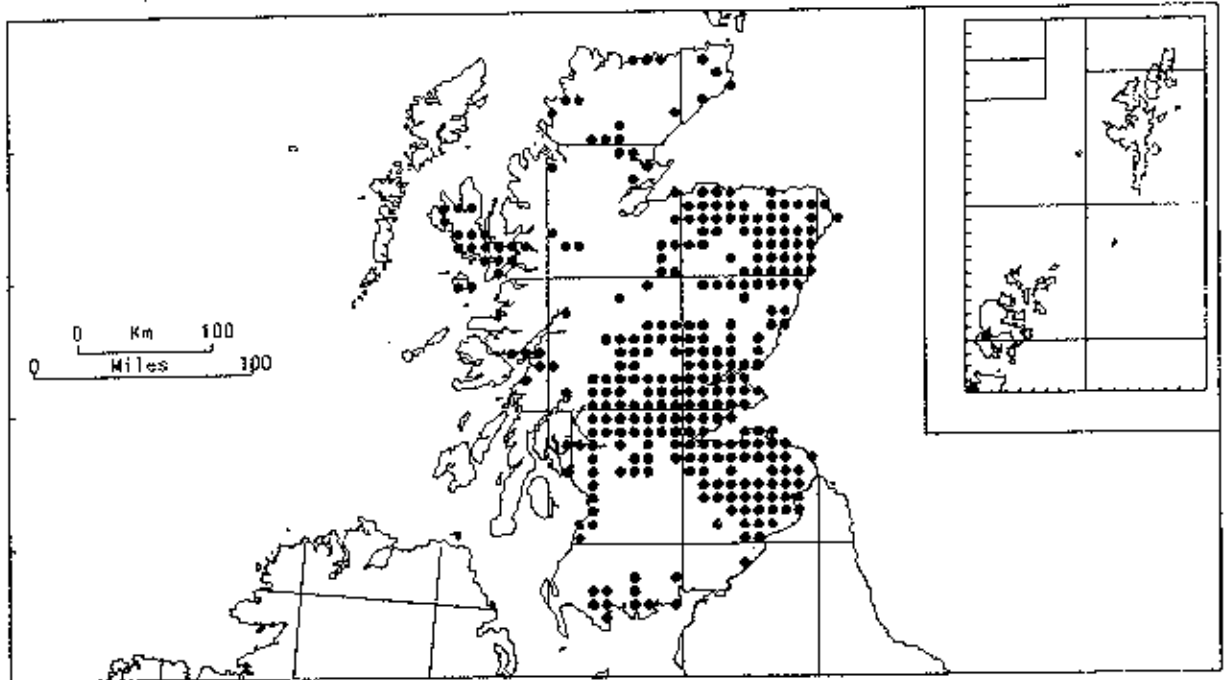
**Whiskered bat**  
*Myotis mystacinus*



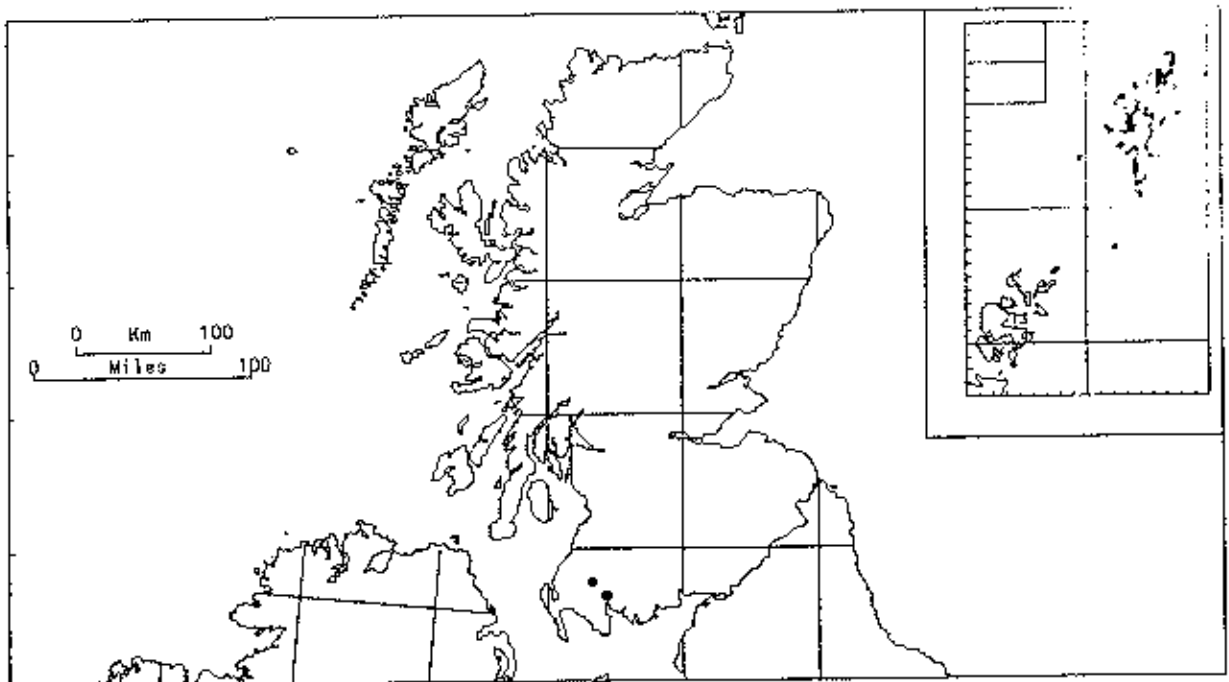
**Natterer's bat**  
*Myotis nattereri*



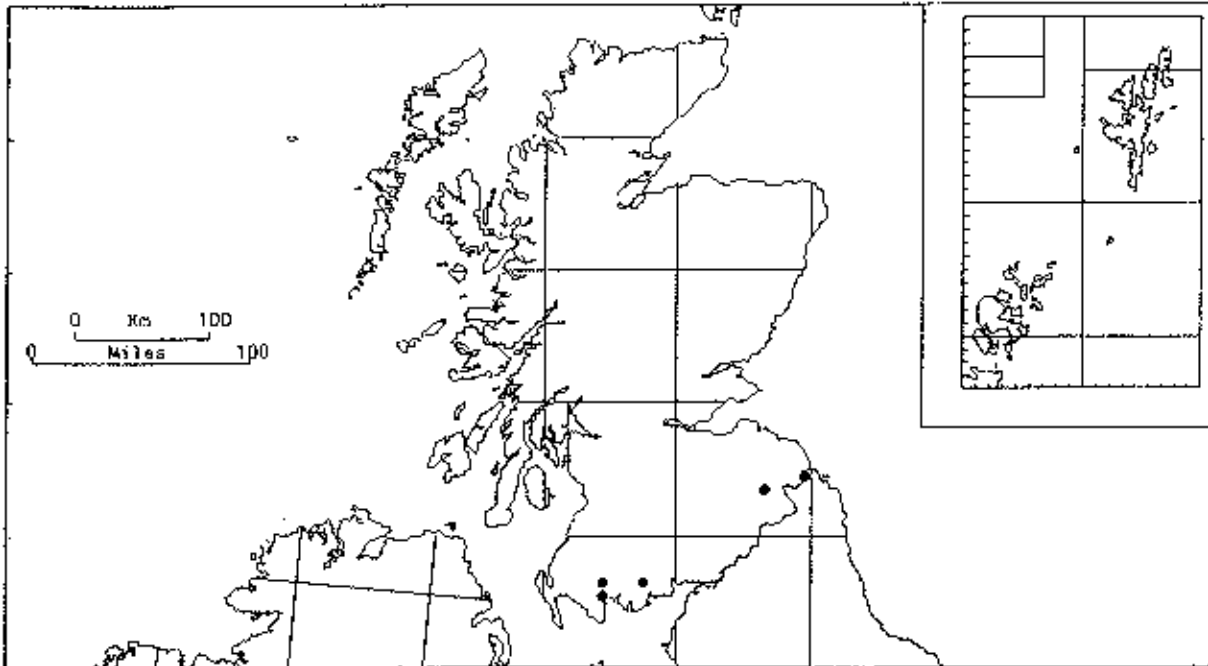
Pipistrelle  
*Pipistrellus pipistrellus*



Leisler's bat  
*Nyctalus leisleri*



Noctule  
*Nyctalus noctula*



Brown long-eared bat  
*Plecotus auritus*

