Appendix 1

Glossary of architectutral terms

Abutment	The end supports of a bridge or other structure
Aisle	Part of a church flanking the nave
Apse	Semicircular or polygonal end of a chancel or chapel
Architrave	Moulded frame surrounding door or window
Ashlar	Dressed stone with square edges
Balustrade	Series of small pillars supporting a handrail or coping
Bargeboards	Projecting boards on the sloping sides of the roof at the gable ends concealing the ends of the horizontal roof timbers
Barrel vault	Continuous plain semicircular or pointed arch
Battens	Horizontal timbers across the rafters to which the roof covering is fixed
Batter	A wall with an inclined face
Battlement (also crenellation)	Parapet with alternating indentations and raised portions
Bearing plate	Separates the main girder of a bridge from the impost of the abutment or pier
Bellcote	Turret in which the bells are found, usually at the west end of the church
Braces	Diagonal subsidiary timbers strengthening the frame of a roof and connecting a tie-beam with the wall below or a collar-beam with the rafters below
Bressumer	A large horizontal beam spanning a wide opening; the main horizontal beam in a timber-framed building
Buttress	A mass of masonry built against a wall to give added strength
Campanile	Isolated bell tower
Canopy	Decorated covering over pulpit, altar etc.
Castellated	Durmounted by battlements or turrets
Cavity wall	External wall built with two leaves, usually of brick or blockwork, separated by a gap or cavity 50 mm wide
Cellarium	Medieval Latin for a cellar or storeroom
Chancel	The east end of the church, where the altar is located; generally all that part of the church east of the crossing
Chancel arch	Arch at the west end of the chancel
Chantry chapel	Chapel attracted to or inside a church
Clerestory	Upper part of the walls of a church nave with windows above the roofs of the aisles; sometimes there is a narrow wall passage on the inside of the clerestory
Collar-beam	A horizontal beam connecting the rafters inside a roof; it is found higher up the slope of the roof than a tie-beam
Coom	The sloping part of the ceiling within an attic room
Coom space	The small triangular roof space below and behind a coom
Corbel	A projecting block, normally of stone, supporting a beam

Cornice	Any projecting ornamental moulding on the top of a building or in a room
Coursed rubble	Undressed stone laid in courses like bricks. The uneven gaps are packed with mortar
Cover flashing	A flashing that waterproofs a junction between, e.g. a roof pitch and a vertical surface such as a chimney
Coving	Concave moulding at the junction between wall and ceiling
Crenellation	See battlement
Crossing	Space where the nave, chancel and transepts of a church meet
Crowsteps	These perform a similar function to skews but are formed from smaller squarish blocks of stone, giving a stepped appearance to the top of the gable
Cupola	A small dome crowning a roof or turret
Cutwater	Additional footing added to a bridge pier at water level
Doorcase	The case lining a doorway, on which the door is hung
Dressings	Stonework in dressed blocks around doorways, windows and the corners of buildings
Dripstone	A projecting mould above an arch, doorway, window or other feature of a building
Eaves	The lowest part of a pitched roof, and its junction with the wall
Extrados	The upper curve of an arch
Facing	A dressed timber finishing piece, edging the face, e.g. a door hatching or opening
Fascia	Board on edge, running horizontally and fixed to the ends of the rafters; the guttering is screwed to this
Flashings	Strips of metal, usually lead, used on roofs to protect joints against damp
Fluting	Channelling running vertically up a column
Gable	The triangular upper portion of an end wall supporting a pitched roof
Gallery	Upper storey above an aisle, sometimes with arches looking into nave
Girder	A large longitudinal beam, frequently of steel
Haunches	Shoulders of an arch barrel between the arch spring and crown
Hip	The external angle formed by the meeting of two sloping roofs
Hipped roof	A roof with sloped rather than vertical ends
Hip rafters	The two ridge boards running in an inverted 'V' shape between the ridge and the eaves to form the hipped end of a roof
Impost	Upper stone course of a pier or abutment below the springing line, sometimes decorated with a moulded rim
Intrados	The inner curve of an arch
Jack rafters	Shortened rafters fastened between the eaves and the hip rafters
Jamb	Straight side of door, window or arch
Joists	Horizontal timbers to support ceilings, floors or both
Keystone	The central stone of a voussoir ring, sometimes larger than the rest

King-post	A vertical post standing on the collar- or tie-beam and reaching to the ridge to support it
Lintel	Single solid piece of concrete, steel, stone or timber built over an opening to support the wall above
Mansard roof	A ridged roof with the lower half of the ridge at a very steep angle
Mullion	A vertical division of a window or other opening, usually of stone
Narthex	Covered porch at main entrance to a church
Nave	Principal part of a church, seating the congregation, often flanked by one or two aisles
Nogging	Brick infill between timbers in a half-timbered building
Pantile	An 'S'-shaped roofing tile
Parapet wall	External wall of a building extended above the roof line and exposed on both sides
Parvis	Room over church porch, often for Sunday school
Pier	A solid masonry support; square or rectangular in section, unlike a column, which is circular
Portico	A roofed space forming the entrance of a house, church or temple; it is generally open or partly enclosed
Precast	Material (concrete) shaped in moulds before being built into a structure
Presbytery	The part of the church east of the choir
Pre-stressed	Concrete given tensile strength before exposure to loads
Pulpitum	A rood screen made of stone in a large church
Purlins	Continuous timbers running horizontally on the underside of the rafters just above the collar-beam (if present)
Puttock hole	Hole in wall into which beam or joist end fits
Queen-post	One of a pair of vertical posts located close to the ends of a tie-beam or collar-beam and connecting it to the rafters above
Quoins	Dressed stones at the outside angles of a building, often arranged so that their faces are alternately large and small
Rafter	Timber set at an angle to form a pitched roof and bearing on the wall-plate at the bottom and fastened to the ridge-board at the top
Rainwater head	A box-shaped structure at the top of a down pipe to collect water from a gutter
Reinforced	Concrete with steel bars incorporated
Reredos	Decorated structure behind and above an altar
Ridge-board	A horizontal board at the peak of a roof to which the rafters are attached
Rocaille	An outdoor artificial grotto decorated with stones or shells
Rood loft	Gallery provided for singers above the rood screen
Rood screen	Partition, usually of wood, between the nave and chancel of a church
Rood stairs	Stairs for reaching a rood loft
Sarking	Boarding or other covering under a slate roof
Shingles	Wooden tiles used to clad roofs, walls and spires

Skews	Large flat stones laid on the exposed top edges of a gable to finish the junction between wallhead and roof
Soffit	The underside of any architectural feature; the horizontal board under the eaves; the under surface of an arch
Spandrel	The courses of masonry over an arch ring, which extend up to the parapet and out to the abutments
Springing	The lowest point on an arch
Strapping	Timber framing on the inside face of a masonry wall, carrying the internal lining such as plasterboard
Stringcourse	A continuous projecting band in the surface of a wall
Strutting	Timber nailed between joists to prevent twisting
Tie-beam	A horizontal transverse beam connecting the ends of the rafters
Tilting fillet	A small triangular-sectioned timber running horizontally along on top of the sarking boards, just above the eaves, used to tilt up the bottom coarse of slates
Torching	Rough plasterwork, often incorporating horsehair, on the underside of slates or tiles
Transept	Transverse part of cross-shaped church
Truss	A number of timbers framed together to bridge a gap; modern roofs are often built with a trussed rafter construction
Tympanum	Space between the lintel over a door and the arch above it
Undercroft	Vaulted room, often underground beneath a church or chapel
Valley	The horizontal gutter at the base of the slopes of two parallel ridges or the gutter running from the ridge to the eaves at the internal angle formed when two ridges meet at right-angles
Vault	The roof curve of an arch
Verge	The exposed side edge of a roof, e.g. at a gable
Voussoir	The half circle of stones forming the outer edge of an arch
Wall-plate	A beam laid along the top of a wall to which the ends of the rafters are fixed
Weather-boarding	Horizontal boards overlapped to cover a timber-framed wall
Wind-braces	Short braces of timber, sometimes arched, fixed across the slope of the roof to strengthen it against wind
Wingwall	A continuation of the abutment side walls of a bridge

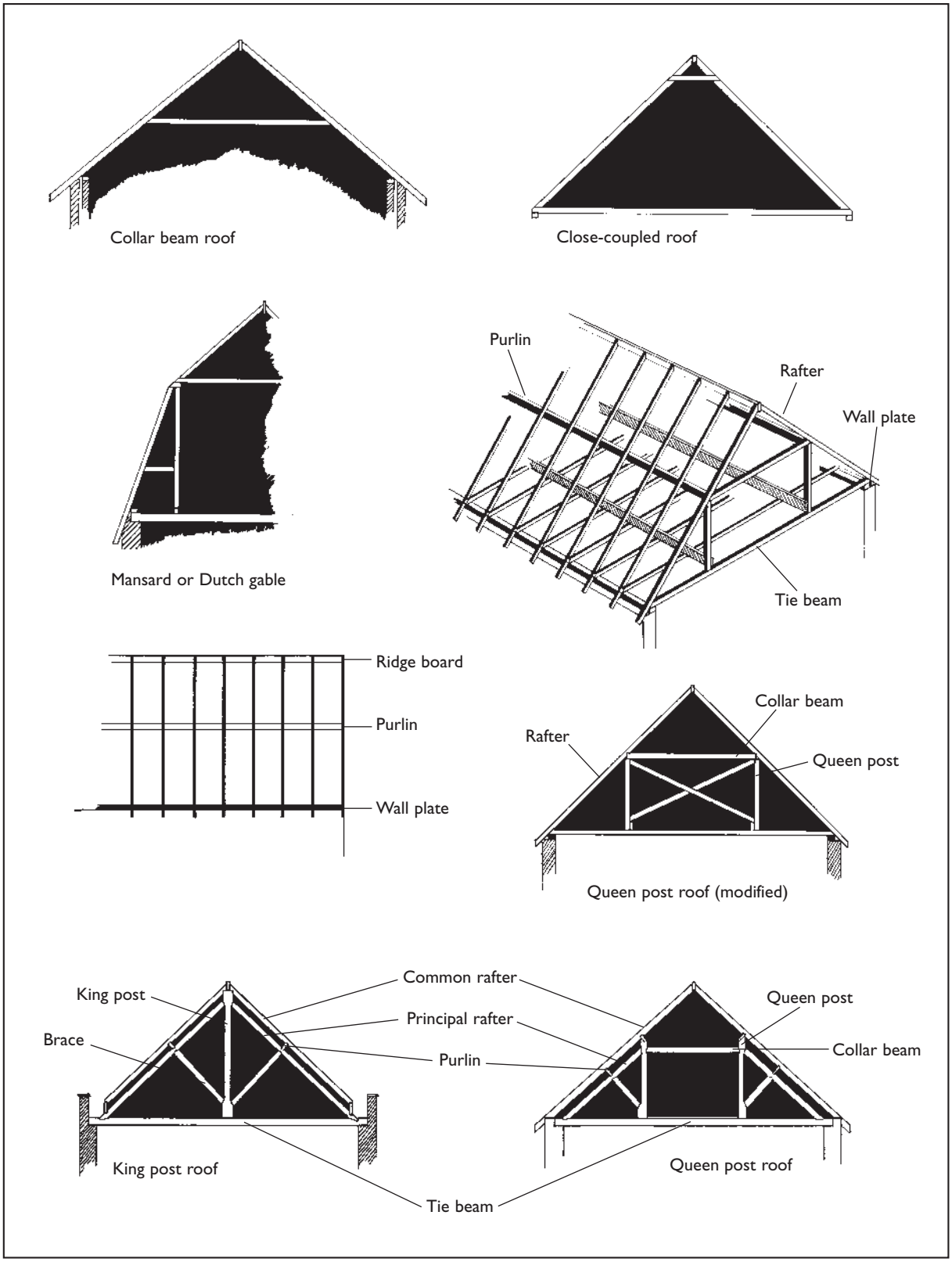
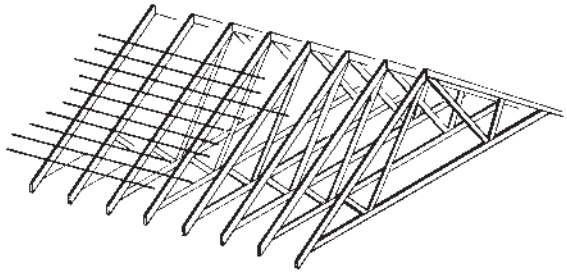
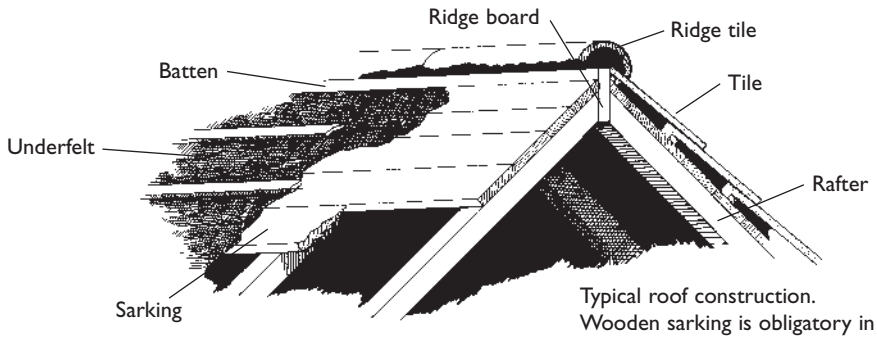


Figure A1.1
Roof types. Many variations are possible, but the basic components, such as rafters and purlins, can usually be identified.

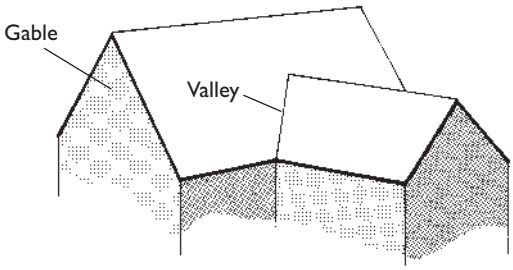


Trussed rafter construction, used in many modern houses

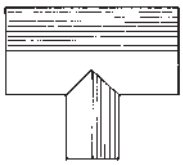
Trusses are prefabricated with metal plates at the joints



Typical roof construction.
Wooden sarking is obligatory in Scotland, common in Wales and uncommon in England, except in churches.
Underfelt is sometimes referred to as sarking.



Junction of two pitched roofs, showing valley.
Leaks here can be a problem.



Types of dormer window.
Gaps around junctions are often used by bats.

Figure A1.1
(continued)

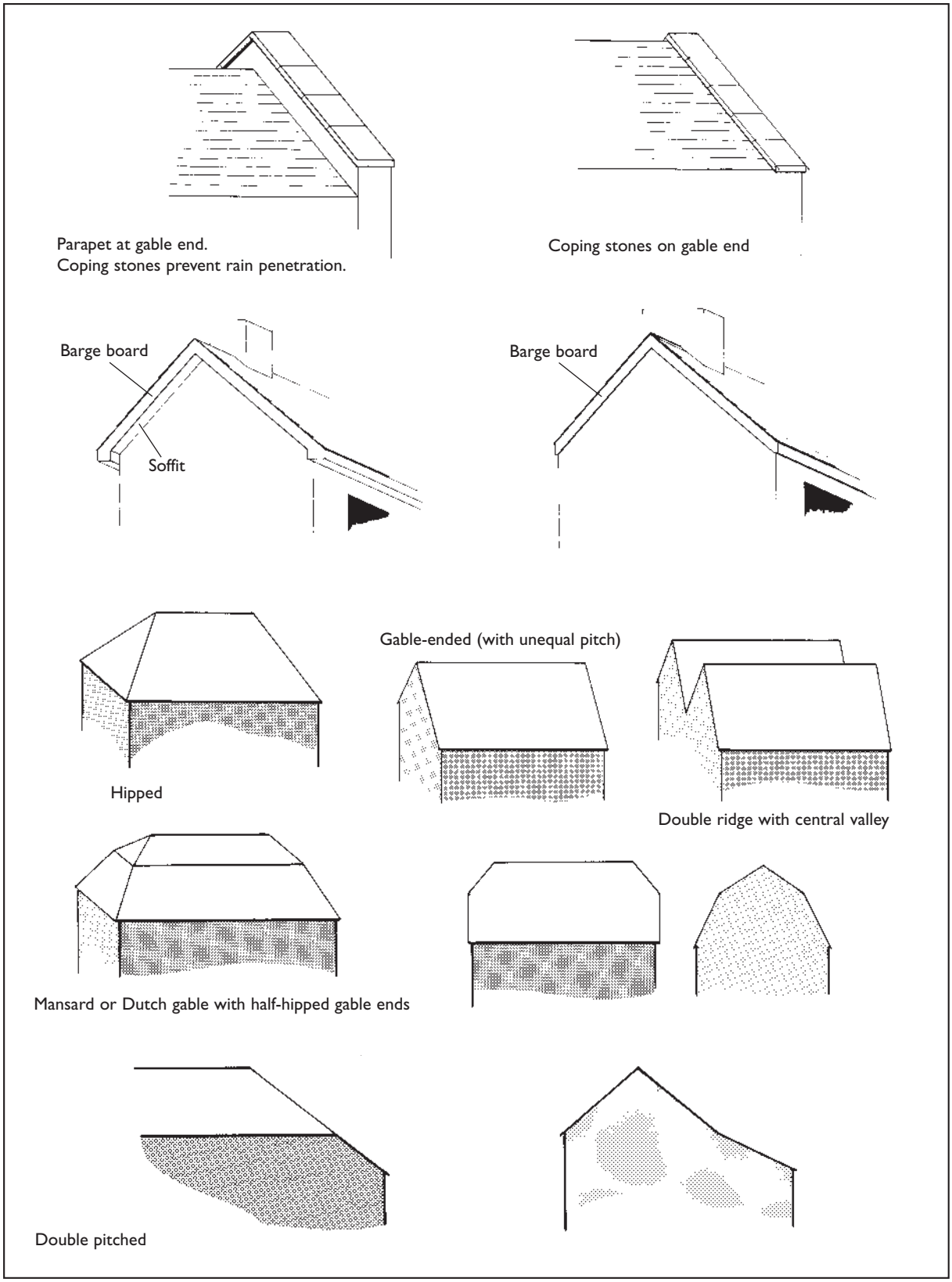
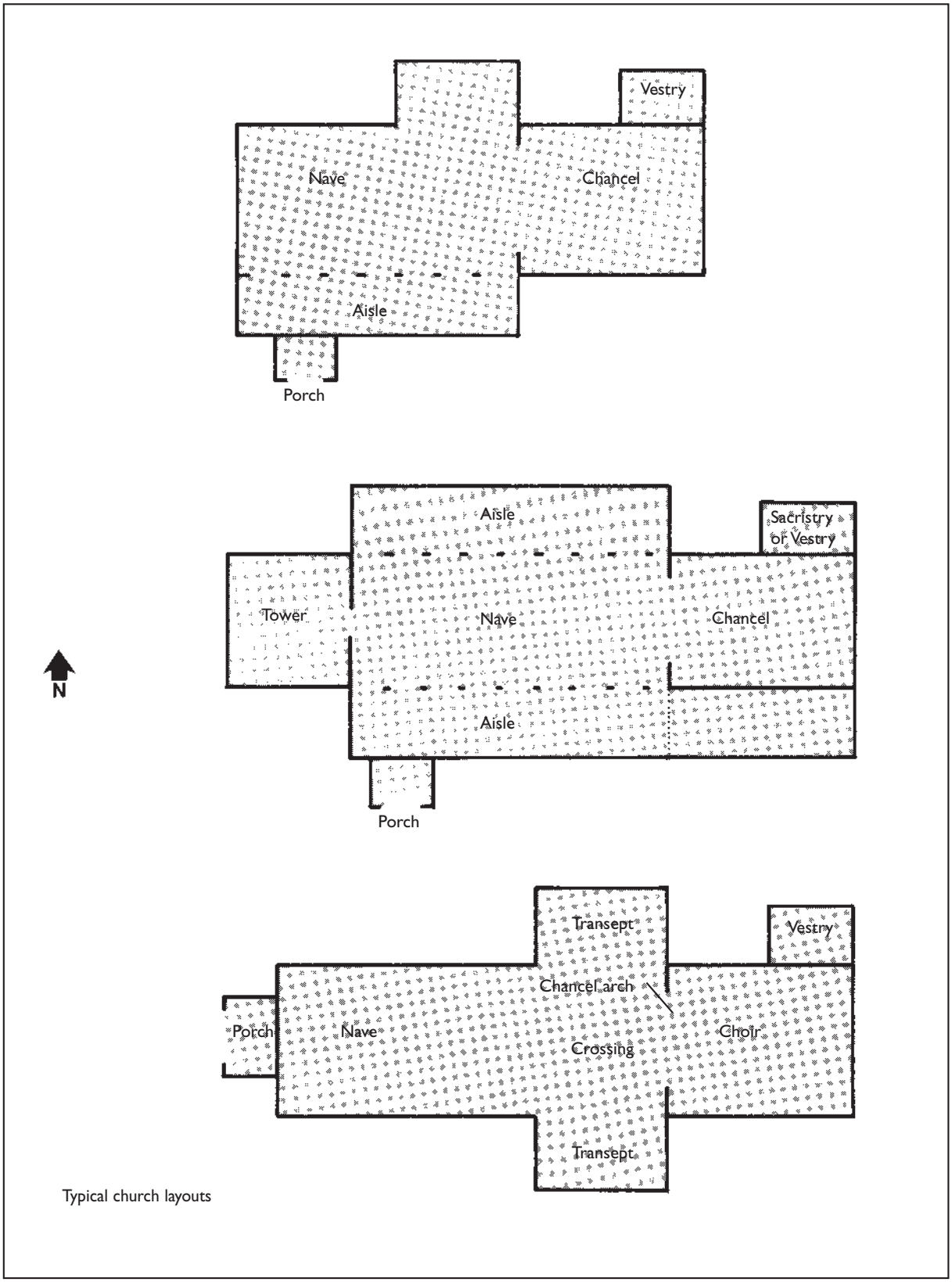


Figure A1.1
(continued)



Typical church layouts

Figure A1.1
(continued)

Appendix 2

Glossary of caving and mining terms

Abseiling	Technique of sliding down a fixed rope in a controlled manner, usually using a special friction device (descender)
Adit	Horizontal or near horizontal tunnel in a mine with one end at the surface
Belay	Natural or artificial anchorage point for ropes or ladders
To belay	To attach to an anchorage point/to safeguard a person in transit by means of a lifeline
Belay belt	Waist belt suitable for attaching belaying rope to
Bolt	Device fitted into a drilled hole in the rock to make a belay point; may be an expansion device (spit or possibly Rawlbolt) or fixed with epoxy resin (ECO bolt)
Bridging	The situation where there is a void beneath an apparently solid floor within a mine (see false floor)
Carbide lamp	An acetylene gas lamp (unsuitable for use where bats are present or expected)
To cap	To seal off a shaft access
Cross cut	A level driven in barren rock, at an angle to a vein, for access or exploration
Day level	See adit
Deads	Waste rock associated with a mining operation, left inside a mine
Descender	Mechanical device used for abseiling
Dip	The angle of tilt of rock strata
Electron ladder	Modern form of flexible caving ladder with alloy rungs and steel wire sides; can be coiled
False floor	Usually of timber, often covered by deads and/or mud to give the impression of being solid
Fathom	Distance equivalent to six feet, often in old mine measurements
Fault	Fracture line in rock
Galena	Lead ore
Ginging	Stone or brick walling supporting loose ground around the top of a shaft; often unstable
Grille	Used to restrict access to a mine opening by humans, but not bats
Hanger	Re-usable attachments for bolts
Hanging wall	Wall or side overhanging a stope
Karabiner	Metal snap-link, usually oval, used for fastening ropes, ladders etc.
Krab	See karabiner
Level	Horizontal or near horizontal tunnel in a mine, usually driven from a shaft
Lifelining	Technique of securing the safety of a person in transit by means of a secure rope, kept taut by the lifeliner
Lode	A vein containing mineral ore
Mine	Place where mineral ore successfully extracted by use of tunnelling methods

Oldham lamp	Popular make of lead-acid powered cap lamp
Ore	Rock containing extractable mineral content
Pitch	Vertical ascent/descent
Prusiking	Technique used to climb up a fixed rope using mechanical gripping devices or special gripping knots
Rise	Underground shaft excavated upwards into the roof of a level or chamber
Run-in	A shaft or adit, which has been filled by fallen material but not systematically, hence there may be danger of bridging beneath apparently firm surface
Seam	See vein
Shaft	A vertical or near vertical penetration from the surface
Single rope techniques (SRT)	Those applied in the descent (abseil) or ascent (prusik) of a fixed rope on a pitch
Slide	A traverse fault
Sling	Webbing loop for main belay or improvised sit-harness
Sough	Drainage tunnel from a mine
Stalactite	Underground formation hanging from the roof
Stalagmite	Underground formation growing up from the floor
Static rope	A relatively inelastic rope, used for underground exploration purposes (not the same as climbing rope)
Stope	Cavity made by removal of ore; often a near vertical slit; if near horizontal may be called a flat
Sump (1)	A passage completely filled with water
Sump (2)	An underground shaft designed to collect water (for subsequent pumping)
Swl	Safe working load as stamped on underground equipment or specified for rope
Trial	Tunnel into the ground with the intention of extracting mineral ore but without success
Vein	A relatively narrow zone of rock geologically younger than its surroundings, often in a fissure or fault
Winze	A shaft dropping from the floor of a level

Appendix 3

Special forms

Bat Roost Visit Report Form

This was designed as a report form for volunteers or staff to complete after visiting a bat roost but can also be used as a record or survey card by Bat Groups.

Side 1: Roost details

1 Name and address.
The main entry here should be the address or location of the roost. This is usually straightforward for roosts in buildings, but for other roosts, such as mines, caves, ice-houses or trees, try to give a name (if appropriate) and a locality. Locality is usually the nearest place name on the Ordnance Survey map. If others are involved, for example builders or roofers, give addresses as appropriate and indicate who is the main contact.

2 Grid reference.
This is particularly important for non-building roosts but is required for all. Always try to give a reference with two letters and six figures (a six-figure reference - accurate to 100 m) but a four-figure reference is better than nothing.

3 Roost type.
The checklist will cover the majority of roosts, but use the space provided to add details if necessary or to describe unusual roosts.

4 Age.
For most buildings it should be possible to give some idea of age, even if it is to the nearest century. The newer a building is, the easier it should be to age it accurately.

5&6 Wall construction/roof covering.
These questions cover the most obvious physical characteristics of buildings that are likely to affect their use by bats. The checklists should cover most situations, but expand if necessary.

7 Position of bat access point(s).
This can be difficult to determine unless bats are seen emerging or droppings are found stuck to a wall. The checklist gives the most common possibilities but it will frequently be necessary to describe the access in more detail. The height above ground and facing direction (aspect) are important in characterising the sorts of places that bats prefer.

8 Bats' roosting site(s).
In roof voids or similar open areas, the roosting position can be determined by the presence of bats, by the position of accumulations of droppings or by staining or polishing on the woodwork. Bats roosting in enclosed areas, such as under gables, in caves, between felt and tiles, or in wall cavities, are more difficult to locate, but noise, droppings or proximity to entrance holes may give clues.

9 Number of bats.
Counts at emergence or possibly in the roost are most valuable, but even an estimate will give some idea of the size of the colony.

10 Species.
A specimen seen in the hand or at close quarters by an experienced observer is preferred, but identifications from droppings or bat detectors are worth recording, though these are not accepted by all recording schemes.

11 Droppings.
These can give information about the location and possibly the size of the colony, though the latter must be interpreted with caution.

12 Other information.
Any other relevant information should be given, perhaps from the owner of the building.

13 Other visits.
This is a space for surveyors to record other counts.

Side 2: Details of problems

14 Description of problem.
A brief description should be given of why advice about bats was sought and what the problems appear to be.

15 Is there any threat to roost?
This will follow on from 14. If the householder has been persuaded to take no action that would affect bats, note this here; otherwise make the nature of the threat clear.

16 Attitude of owners.
The conservation of bat roosts depends largely on the goodwill of owners and their attitude can be very important where maintenance or reinstatement of the roost may be suggested.

17 Recommendations.
Experienced volunteers will be able to suggest what advice should be given. This is very helpful to SNCO staff who have no first-hand knowledge of the situation. If there are special difficulties or complications, please note these here.

18 Sketch.
Even the most rudimentary sketch can be more helpful than a written description. Plan views of properties, with an indication of north, are probably easiest, but elevations can illustrate some problems better. Identify buildings clearly on large or complex properties.

19 Names and dates.
Please ensure that this section is always completed. The first part is useful in tracing the history of an enquiry; the second gives a contact if further information is required.

Bat roost visit report form

1 Name and address of roost and owner.
Give contact address if different.
If timber treatment firm or builder is involved, give address.

For caves, mines etc, give name and/ or locality.

2 Grid reference: (2letters, 6 figures)

Phone number(s):

3 Roost type: House/Church/Institution/Barn/Stables/Farm building/Ruin/Mine/Cave/Tunnel/Tree/Other(specify)

(Give further details)

4 Age:

5 Wall construction: Brick/Stone/Block/Wood/Other

Solid/cavity wall

Cladding: Wood/Tile/Slate/Other(specify)

Hanging tiles: Yes/No

6 Roof covering: Tile/Slate/Shingle/Stone/Thatch/Corrugated iron/Asbestos/Other(specify)

Lined with underfelt/Boards/Nothing/Other(specify)

Loft insulation: Present/Absent

7 Position of bat access point(s): Gable apex/Under soffit/Between tiles/Under flashing/Other(specify)

Height above ground:

Facing direction (aspect):

8 Bats' roosting site(s): Under eaves/In roof apex/Under slates/Behind cladding/Other(specify)

9 Number if bats at date and time of visit:
Count or estimate?

10 Species: Indicate how identified and by whom

11 Droppings: If present, indicate quantity and distribution (depth and area)
(also on sketch overleaf)

Are droppings fresh or old?

12 Other Information: History of the colony/problem. Is use seasonal? etc.

13 Other visits: (dates and counts)

Circle choices: give further details if appropriate.

Summary and recommendations

14 Description of problem: Dropping/Intolerance/Fear/Smell/Noise/Bats in living area/Other

15 Is there any threat to roost: Exclusion/Timber treatment/Building work/Development/Destruction?

BCT survey?

16 Attitude of owners:

17 Recommendations for action by the SNCO:

18 Sketch:

19 Request to visit received from: on:

Initial visit made by: on:

Biological Records Centre Single species card

The Biological Records Centre at the Centre for Ecology and Hydrology is the largest species recording centre in Britain. For bats, records should be submitted on the single species card illustrated.

Completion of the form is straightforward. Although the space for grid reference is ruled for four-figure references, six figures are preferred if possible. Locality should refer to the nearest place name on the Ordnance Survey map.

Nature of record should describe briefly how the identification was made so that the mammal recorder can judge whether the record is acceptable. Records based on droppings or bat detectors are not normally accepted.

Supplies of the cards are available free from Mr H. R. Arnold at BRC, CEH Monks Wood, Abbots Ripton, Huntingdon, Cambs PE28 2LS.
Website: http://www.brc.ac.uk/

MAMMALS

Species Pipistrellus pipistrellus

Year(s) 1998

Species no.

Recorder's name B. Wayne

Code no.

Address 'Horseshoes'
Hollotree Lane
Batsford, Gloucestershire

Grid reference			Vice county	Locality	Nature of record
100 Km	East	North			
SU	271	332		Horseshoe Hill, Hants	Seen in roost
SE	23	24		Batley, W. Yorks	In hand
SX	666	860		Batworthy, Devon	In hand
TA	31	28		Batty's Corner, Lincs.	In hand
SD	700	077		Duabhill, Greater Manchester	In hand
SJ	19	47		Horseshoe Pass, Clwyd	In hand

Please return to: **Biological Records Centre**
Monks Wood Experimental Station
Abbots Ripton, Huntingdon
PE17 2LS

RA 12

Appendix 4

The National Bat Monitoring Programme (NBMP)

The Bat Conservation Trust

Background

Measuring changes in bat populations is an important task for bat conservation. Only when we have precise information about the magnitude and direction of changes can we gain warning of threats to species, identify conservation priorities and advise on effective conservation action.

The National Bat Monitoring Programme began in 1996 and is run by The Bat Conservation Trust. The broad aim of the programme is to develop and implement long-term monitoring schemes for all species of bat resident in the UK. The programme, initially funded by DETR (now Defra) until 2000, now receives core funding from the JNCC and helps to fulfil the government's commitment to the Agreement on the Conservation of Populations of European Bats.

The programme relies on volunteer surveyors to collect data throughout the UK. Projects are designed to deliver population trend data, within defined confidence limits, using simple methods. Bat-detector training workshops are run throughout the summer to increase the skill's base of surveyors.

Monitoring Methods

Three main monitoring strategies are employed. with a number of projects run within each strategy. Some species are monitored on two projects.

- Summer colony counts
- Hibernation counts
- Bat-detector-based field projects

Bat species	SC	WH	F
Greater horseshoe		✓	
Lesser horseshoe	✓	✓	
Daubenton's		✓	✓
Natterer's	✓	✓	
Serotine	✓		✓
Noctule	✓		✓
Common pipistrelle	✓		✓
Soprano pipistrelle	✓		✓
Brown long-eared	✓	✓	

SC = summer colony counts WH = winter hibernation counts
F = field counts using bat detectors

In addition, the Sunrise Survey project is a multi-species survey designed to find bat roosts.

Colony counts

Relevant species: lesser horseshoe, Natterer's, common pipistrelle, soprano pipistrelle, serotine and brown long-eared.

Two counts are needed in mid June. Complete counting packs, which contain protocols and recording sheets, are sent to volunteers. Householders playing host to colonies are an important source of potential counters. Involvement of roost owners is a positive conservation action because it highlights the importance of the colony as part of a national monitoring scheme.

For more difficult species, such as horseshoes and Natterer's, more experienced counters are needed. These species tend to emerge late in low light levels, often make repeated short flights before emerging and can use multiple exits. Groups of volunteers are needed to cover all potential exit points and bat detectors are recommended to help gauge activity and behaviour. Roosts of Natterer's bat are often found in trees, bridges, barns and churches, and successful counts require more effort than house-dwelling species.

Standardised instruction and recording sheets are produced for each survey.

Hibernation counts

Relevant species: Greater & lesser horseshoe, Daubenton's, Natterer's and brown long-eared bat.

Many hibernation sites have been visited regularly since the 1960s. Surveyors require a licence from the relevant SNCO before entering sites in winter. For the monitoring programme surveyors are asked to make two visits – one in the middle of January and the other in the middle of February. Standard recording sheets together with guidelines are sent to all hibernation licensees. Although the monitoring strategy is aimed at the five species named above, all bats encountered in sites are recorded. Surveyors can choose which sites to survey but it is important to stress for monitoring purposes that sites with few bats (or even sites of potential usage with no bats) are of equal importance to sites with large numbers of bats and should be visited where possible. The

majority of hibernation sites in the UK contain few bats but if hundreds of these sites are monitored conclusions on population trends can be made.

Standardised instruction and recording sheets are produced and sent to all licensees.

Field counts

Relevant species: Daubenton's, common pipistrelle, soprano pipistrelle, serotine and noctule.

Monitoring bats at night in the field with bat detectors provides important information on the relative abundance and distribution of each species. A bat detector is required and some previous experience is necessary because surveyors are asked to distinguish species. No licence is required. Surveyors are assigned a 1-km square or 1-km waterway stretch, selected randomly (in proportion to different landscape types) and asked to walk a route on two evenings during July or August. They are requested to record bats while walking or to stop at points for a fixed period to record bat activity. Surveyors are asked to visit the square during the day to record some habitat details and to plan their route.

Standardised instruction and recording sheets are produced for each survey.

Sunrise Survey

Relevant species: All.

This survey is primarily aimed at new surveyors because no equipment or previous bat experience is required for participation. The objective of the survey is to identify roosts that can then be incorporated into the colony count project. Participants are asked to identify a potential bat structure (building, tree, bridge etc) or walk a 1-km transect in July, starting at 45 minutes before sunrise. Surveyors look for bats 'swarming' outside roost entrances to identify a site as a roost.

Feedback

All participants in the monitoring programme receive free copies of the programme's newsletter *Bat Monitoring Post*. This provides results from surveys once data has been collected and analysed, gives advance warnings of future surveys, and contains tips and feedback from the office and field surveyors.

Participation and experience required

The UK is fortunate in having over 90 local Bat Groups throughout the UK. Groups vary in size and activities, but all have a broad commitment to bat conservation and the majority of contributors to the monitoring programme are local Bat Group members. Some individual projects require little or no previous bat experience while others are restricted to experienced bat workers. The NBMP runs a number of training sessions in the use of bat detectors.

If you would like to participate in the National Bat Monitoring Programme please visit our website www.bats.org.uk or if you would like some more information please contact:

NBMP
The Bat Conservation Trust
15 Cloisters House
8 Battersea Park Road
London
SW8 4BG

Tel: 0207 627 2629
Fax: 0207 627 2628
E-mail: nbmp@bats.org.uk

Appendix 5

A selected bibliography

The following is a classified list of publications, which will enable anyone quickly to find their way around the world of bats. Nearly all have bibliographies or reference lists amounting to many hundreds of publications about bats.

Most of the books on this list are readily obtainable through libraries, and many are in print and may be purchased. A few may be difficult to obtain or out of print, in which case contact with university libraries or other specialist institutions will help.

Readers who are looking for recent titles or who wish for a comprehensive listing of books should review the Natural History Book Service website. The Bat Conservation Trust maintains a list of British books and leaflets on bats. For a longer listing of educational resources Bat Conservation International maintains a comprehensive list on its web site.

A European bats – identification, biology, distribution and conservation

AHLEN, I. 1990. *Identification of bats in flight*. Swedish Society for Conservation of Nature and The Swedish Youth Association for Environmental Studies and Conservation. 50 pp. ISBN 91 558 50421.

ALLEN, P., FORSYTH, I., HALE, P. & ROGERS, S. 2000. Bats in Northern Ireland. *The Irish Naturalist's Journal*, Special Zoological Supplement. 33 pp. ISSN 0021 1311.

ALTRINGHAM, J.D. 1996. *Bats– Biology and Behaviour*. Oxford University Press, Oxford. 262 pp. ISBN 0 19 854075 2.

ALTRINGHAM, J.D. 2003. *British Bats*. New Naturalist Series 93, Harper Collins, London. 218 pp. ISBN 0 00 2201 40 2 (hb), 0 00 2201 47 X (pb).

BAAGØE, H.J. 2001. Danish Bats (Mammalia: Chiroptera): Atlas and analysis of distribution, occurrence and abundance. *Steenstrupia*, **26**(1), 1–117. ISSN 0375 2909.

BARATAUD, M. 1996 *Ballades dans l'inaudible - the inaudible world*. Sitelle, Mens. (Double CD, ref no 11706, plus 47-page booklet *The World of Bats*.)

BARRETT-HAMILTON, G.E.H. & HINTON, M.A.C. 1910–21. *A History of British Mammals*. Gurney and Jackson, London.

BRIGGS, B. & KING, D. 1998. *The Bat Detective*. Stag Electronics, Shoreham-by-Sea. ISBN 0 953242 60 9. (Field guide for bat detectors plus a CD of British bat calls).

CATTO, C. 1994. *Bat detector manual*. The Bat Conservation Trust, London. 34pp .

CORBET, G.B. 1978. *The Mammals of the Palaearctic Region: a taxonomic review*. British Museum (Natural History), London. 314 pp. ISBN 0 8014 1171 8. (& supplement 1984.)

CORBET, G.B. & HARRIS, S. 1991. *The Handbook of British Mammals*. Published for the Mammal Society by Blackwell Scientific Publications, Oxford. 588 pp. ISBN 0 632 01691 4.

ENTWISTLE, A.C., HARRIS, S., HUTSON, A.M., RACEY, P.A., WALSH, A., GIBSON, S.D., HEPBURN, I. & JOHNSTON, J. 2002. *Habitat Management for Bats*. JNCC, Peterborough. 47 pp. ISBN 1 86107 528 6.

GREENAWAY, F. & HUTSON, A.M. 1990. *A Field Guide to British Bats*. Bruce Coleman, London. 52 pp. (Available only from The Bat Conservation Trust.) ISBN 1 872842 003.

HARBUSCH, C., ENGEL, E. & PIR, J.B. 2002. Die Fledermause Luxemburgs. *Ferrantia, Travaux Scientifiques du Musee National d'Histoire Naturelle Luxembourg*, **33**, 1–149. ISSN 1682 5519.

HARRIS, S., MORRIS, P.A., WRAY, S. & YALDEN, D. 1995. *A review of British mammals: population estimates and conservation status of British mammals other than cetaceans*. JNCC, Peterborough. 168 pp. ISBN 1 873701 68 3.

HOWARD, R.W.1995. *Auritus - a natural history of the brown long-eared bat*. William Sessions Ltd, York. 154 pp. ISBN 1 85072 168 8.

HUTSON, A.M. 1987. *Bats in Houses*. The Bat Conservation Trust, London. 32 pp. ISBN 1 872745 10 5.

HUTSON, A.M. 1993. *Action Plan for Conservation of Bats in the United Kingdom*. The Bat Conservation Trust, London. 49 pp. ISBN 1 872745 16 4.

JONES, K. & WALSH, A. 2001. *A Guide to British Bats*. AIDGAP, Field Studies Council & Mammal Society, Shrewsbury & London. 8 pp.

KAPTEYN, K. (ed.). 1993. *Proceedings of the First European Bat Detector Workshop*. Netherlands Bat Research Foundation, Wageningen. 128 pp. ISBN 90 9006435 4.

KRAPP, F. (ed.). 2001. *Handbuch der Saugetiere Europas*, Band 4: Fledertiere, Tiel I: Chiroptera 1: Rhinolophidae, Vespertilionidae I. AULA-Verlag, Wiesbaden. 603 pp. ISBN 3 89104 638 3. [In German.] First of two volumes with detailed species accounts of the bat fauna of Europe.

LIMPENS, H., MOSTERT, K. & BONGERS, W. (eds). 1997. *Atlas van de Nederlandse vleermiuzen*. KNNV Uitgeverij, Utrecht. 260 pp. ISBN 90 5011 091 6.

MCDONALD, D.W. & TATTERSALL, F. 2001. *Britain's Mammals: the Challenge for Conservation*. People's Trust for Endangered Species, London. 295 pp. ISBN 0 9540043 1 0. (With annual supplements.)

MITCHELL-JONES, A.J., AMORI, G., BOGDANOWICZ, W., KRYSTUFEK, B., REIJNDERS, P.J.H., SPITZENBERGER, F., STUBBE, M., THISSEN, J.B.M., VOHRALIK, V. & ZIMA, J. 1999. *The Atlas of European Mammals*. Poyser Natural History/Academic Press, London. 484 pp. ISBN 0 85661 1301.

OHLENDORF, B. (compiler). 1997. *On the Situation of the Rhinolophidae in Europe*. Arbeitskreis Fledermause Sachsen-Anhalt e.v., Stecklenberg. 182 pp. ISBN 3 89689 999 6.

O'SULLIVAN, P. 1994. Bats in Ireland. *Irish Naturalists' Journal* (Special Zoological Supplement). 21 pp. ISBN 0021 1311.

PAVLINOV, I.Ia., KRUSKOP, S.V., VARSHAVSKII, A.A. & BORISENKO, A.V. 2002. *Mammals of Russia: keys-distribution*. Zoologicheskii Musei M.G.U., Moscow IZD-VO KMK. 298 pp. [in Russian.] ISBN 5 87317 094 0.

RAMSEY, D. (ed.). 1994. *Nature conservation in environmental assessment*. English Nature, Peterborough. 50 pp. ISBN 1 85716 135 1.

RANSOME, R. 1980. *The Greater Horseshoe Bat*. Blandford Press, Poole. ISBN 0 7137 0986 3.

RANSOME, R. 1990. *The Natural History of Hibernating Bats*. Christopher Helm, Kent. 235 pp. ISBN 0 7470 2802 8.

RANSOME, R.D. 1996. The management of feeding areas for greater horseshoe bats. *English Nature Research Report No.174. 74 pp*. ISSN 0967 876X.

RANSOME, R.D. & HUTSON, A.M. 2000. *Action Plan for the Conservation of the Greater Horseshoe Bat in Europe* (Rhinolophus ferrumequinum). Council of Europe, Nature and Environment 109. 53 pp. ISBN 92 871 4359 5.

RICHARDSON, P.W. 1985. *Bats*. Whittet Books, London. ISBN 0 905483 41 3.

RICHARDSON, P.W. (compiler). 2000. *Distribution Atlas of Bats in Britain and Ireland*. London, The Bat Conservation Trust, 43 pp.

ROBERTSON, J. 1990. *The Complete Bat*. Chatto & Windus, London. 165 pp. ISBN 0 7011 3500 X.

RUSS, J. 1999. *The Bats of Britain and Ireland; echolocation calls, sound analysis, and species identification*. Bishops Castle, Alana Ecology Ltd. 103 pp. ISBN 0 9536049 0 X.

SARGENT, G. 1995. *The bats in churches project*. The Bat Conservation Trust, London. 122 pp. ISBN 1 872745 19 9.

SCHOBER, W. & GRIMMBERGER, E. 1998. *Die Fledermause Europas*. 2nd edn. Kosmos Verlag, Stuttgart, 267 pp. ISBN 3 440 07597 4. [In German.] Other editions in English, e.g. *Bats of Britain and Europe*. 1993. Hamlyn, London. 224 pp. ISBN 0 600 57965 4.

SCHOFIELD, H.W. & MITCHELL-JONES, A.J. 2003. *The Bats of Britain and Ireland*. 2nd edn. The Vincent Wildlife Trust, Ledbury. 32 pp. ISBN 0 946081 48 4.

SHIEL, C., MCANEY, C., SULLIVAN, C & FAIRLEY, J. 1997. *Identification of Arthropod Fragments in Bat Droppings*. Occasional Publications No.17. Mammal Society, London. 56 pp . ISBN 0 906282 33 0.

SIMPSON & BROWN ARCHITECTS. 1996. *The Design and Construction of Bat Boxes in Houses*. Scottish Natural Heritage, Perth. 32 pp. ISBN 1 853972061.

STEBBINGS, R.E. 2003. *Which Bat is it?* Mammal Society, London. ISBN 0 906282 19 5. 3nd edn.

STEBBINGS, R.E & GRIFFITH, F. 1986. *Distribution and Status of Bats in Europe*. NERC. 133 pp. ISBN 0 904282 94 5.

STEBBINGS, R.E. 1988. *Conservation of European Bats.* Christopher Helm, London. 246pp. ISBN 0 7470 3013 8.

STEBBINGS, R.E. 1992. *Bats*. Mammal Society, London. 32 pp. ISBN 0 906282 18 7.

STEBBINGS, R.E. 1992. *The Greywell Tunnel*. English Nature. 32 pp. ISBN 1 85716 103 3.

STEBBINGS, R.E. & WALSH, S.T. 1991. *Bat Boxes, 3rd edn*. The Bat Conservation Trust, London. 24 pp. ISBN 1 872745 02 4.

SWIFT, S. M. 1998. *Long-eared Bats*. T & A. D. Poyser, London. 182 pp. ISBN 0 85661 108 5.

TUPINIER, Y. 1997. *European Bats: Their World of Sound*. Editions Sitelle, Mens.

VAUGHAN, N. 1997. The diets of British bats. *Mammal Review*, **27**(2), 77–94. ISSN 0305 1838.
WALSH, A., CATTO, C., HUTSON, A., RACEY, P., RICHARDSON, P. & LANGTON, S. 2001. *The UK's National Bat Monitoring Programme, Final Report 2001*. London, Department for Environment, Food and Rural Affairs. 155 pp.
YALDEN, D.W. 1985. *The Identification of British Bats*. Occasional Publication No.5. Mammal Society, London. ISBN 0906 282 25 X.

B Bats worldwide – general accounts of biology and natural history

ALLEN, G.M. 1939. *Bats*. Harvard University Press, Cambridge, Mass. Reprinted 1962 by Dover Publications Inc, New York, and Constable & Co Ltd, London.
BARNARD, S.M. 1997. *Bats in Captivity*. Wild Ones Animal Books, Springville, CA. 194 pp. ISBN 1 886013 02 0.
BAILLIE, J. & GROOMBRIDGE, B. 1996. *1996 IUCN Red List of Threatened Animals*. IUCN, Gland. 368 pp. ISBN 2 8317 0335 2. (see www.redlist.org for updates.)
BARLOW, K. 1999. *Expedition Field Techniques – Bats*. Expedition Advisory Centre/Royal Geographical Society, London. 69 pp. ISBN 0 907649 82 3.
BRASS, D.A. 1984. *Rabies in Bats: Natural History and Public Health Implications*. Livia Press, Connecticut. 335 pp. ISBN 0 9637045 1 6.
CORBET, G.B. & HILL, J.E. 1991. *A World List of Mammalian Species*. British Museum (Natural History), London. 254 pp. ISBN 0 565 00988 5.
COUFFER, J. 1992. *Bat Bombs – World War II's Other Secret Weapon*. University of Texan Press, Texas. 252 pp.
CRIGHTON, E.G. & KRUTZSCH P.H. (eds). 2000. *Reproductive Biology of Bats*. Academic Press, London/San Diego. 510 pp. ISBN 0 12 195670 9.
FENTON, M.B. 1992. *Bats*. Facts on File, New York/Oxford. 207 pp. ISBN 1098 7654 321.
FINDLEY, J.S. 1993. *Bats: A Community Perspective*. Cambridge Studies in Ecology, Cambridge University Press. 167 pp. ISBN 0 521 380054 5.
GREENHALL, A.M. & SCHMIDT, U. 1988. *Natural History of Vampire Bats*. CRC Press, Florida. 246 pp.
GRIFFIN, D.R. 1986 (reprint). *Listening in the Dark*. Cornell University Press, Ithaca/London. 415 pp.
HILL, J.E. & SMITH, J.D. 1984. *Bats: A Natural History*. British Museum (Natural History), London. ISBN 0 565 00877 3.
HUTSON, A.M. 2000. *Bats*. Colin Baxter Photography Ltd, World Life Library, Granton-on-Spey. 72 pp. ISBN 1 900455 67 6.
HUTSON, A.M., MICKLEBURGH, S.P. & RACEY, P.A. (compilers). 2001. *Microchiropteran Bats: Global Status Survey and Conservation Action Plan*. IUCN/SSC Chiroptera Specialist Group, IUCN, Gland/Cambridge. 258 pp. ISBN 2 8317 0595 9.
KUNZ, T.H. (ed.). 1982. *Ecology of Bats*. Plenum Press, New York & London. ISBN 0 306 40950X.
KUNZ, T.H. (ed.). 1988. *Ecological and Behavioral Methods for the Study of Bats*. Smithsonian Institution Press, Washington DC/London. 533 pp. ISBN 0 87474 411 3.
KUNZ, T.H. & FENTON, M.B. 2003. *Bat Ecology*. University of Chicago Press. 784 pp. ISBN 0226462064.
LOLLAR, A. & SCHMIDT-FRENCH, B. 2002. *Captive Care and Medical Reference for the Rehabilitation of Insectivorous Bats*. Bat World Publications, Texas. 340 pp. ISBN 0 9638248 3 X.
MICKLEBURGH, S.P., HUTSON, A.M. & RACEY, P.A.1992. *Old World Fruit Bats - An Action Plan for their Conservation*.International Union for Conservation of Nature and Natural Resources, Gland, Switzerland. 252 pp. ISBN 2 8317 0055 8.
NEUWEILER, G. 2000. *The Biology of Bats*. Oxford University Press, New York/Oxford. 310 pp. ISBN 0 19 509951 6.
NOWACK, R.M. 1994. *Walker's Bats of the World*. John Hopkins University, Baltimore & London. 287 pp. ISBN 0 8018 4986 1.
POPPER, A.N. & FAY, R.R. 1995. *Hearing by Bats*. Springer Handbook of Auditory Research, Springer-Verlag, New York/Berlin/Heidelberg. 515 pp. ISBN 0 387 97844 5.
RICHARDSON, P. 2002. *Bats*. London, The Natural History Museum. 111 pp. ISBN 0 565 09167 0.
RICHARZ, K. & LIMBRUNNER, A. 1993. *The World of Bats*. TFH Publications, Waterlooville. 192 pp. ISBN 0 86622 540 4.
SCHOBER, W. 1984. *The Lives of Bats*. Croom Helm, London. 200 pp. ISBN 0 7099 2389 9.
TUTTLE, M.D & HENSLEY, D.L. 1993. *Bat House Builder's Handbook*. Bat Conservation International. 32 pp. ISBN 0 9638248 0 5.

WILSON, D.E. 1997. *Bats in Question – the Smithsonian Answer Book*. Smithsonian Institution Press, Washington. 168 pp. ISBN 1 56098 783 3 (hbk), 1 56098 739 1 (pbk).
WILSON, D.E. & REEDER, D.M. 1993. *Mammal Species of the World; a Taxonomic and Geographic Reference*. Smithsonian Institution Press, Washington. [revised edition in press 2004.]
WIMSATT, W.A. (ed.). 1970. (vol 1 & 2); 1971 (vol 3). *Biology of Bats*. Academic Press, London. Vol 1: ISBN 0 12 758001 8, Vol 2: ISBN 0 12 758002 6, Vol 3: ISBN 0 12 758003 4.
YALDEN, D.W. & MORRIS, P.A. 1975. *The Lives of Bats*. David and Charles, Newton Abbott. ISBN 0 7153 6799 4. [Out of print.]

C Children's Books

CANNON, J. 1995. *Stellaluna*. David Bennett Books. ISBN 1 85602 156 4.
DAVIES, N. 2001. *Bat Loves the Night*. Walker Books. ISBN 0 7445 2887 9 hb (pb published 2002, ISBN 0 7445 9402 2).
GREENAWAY, F. 1991. *Amazing Bats*. Dorling Kindersley, London. 29 pp. ISBN 0 86318 649 1. [Out of print.]
HAFFNER, M. & STUTZ H.P.B. 1989. *A Family of Bats*. Adams & Charles Black, London. 31 pp. ISBN 0 7136 3127 9. [Out of print.]
JULIVERT, M.A. 1996. *The Fascinating World of Bats*. Ward Lock. 31 pp. ISBN 0 7063 7551 3.
SOWLER, S. 1993. *A Fruit Bat called Angelica*. Adelphi Press, London. 21 pp. ISBN 1 85654 135 5.
THOMPSON, S. 1989. *Bats in the Garden*. School Garden Company, Lincs. 35 pp. ISBN 1 85116 803 6.
THOMPSON, S. 1995. *Starfile on Bats*. SGC Books, Lincs. 18 pp. ISBN 1 85116 840 0.
THOMPSON, S. 1997. *Bats in Scotland (Investigations for 5-14 year olds)*. The Bat Conservation Trust, London. ISBN 1 872745 23 7. [Resource pack, available only from The BCT office.]
THOMPSON, S. 1998. *Exploring the World of Bats*. The Bat Conservation Trust, London. [Incorporating Bats in Scotland and additional material related to the rest of the UK, with National Curriculum notes. Resource pack. Available only from The BCT office.]
THOMPSON, S. & RICHARDSON, P. 1993. *Bat Conservation Project Book*. Hodder & Stoughton, Kent. 32 pp. ISBN 0 340 57256 6. (Now only available from The Bat Conservation Trust).

D Journals, magazines and newsletters

In addition to those listed many county bat groups produce regular or annual reports and newsletters.

Acta Chiropterologica (ISSN 1508 1109)
Museum and Institute of Zoology PAS
Wilcza 64
00-679 Warsawa
Poland
E-mail: wieslawb@miiz.waw.pl
Twice-yearly international journal of papers in English

Bats
Bat Conservation International
PO Box 162603
Austin
Texas 78716
USA
E-mail: pubs@batcon.org
Quarterly newsletter of BCI.

Bat Care News
Bryan and Maggie Brown
West Yorkshire Bat Hospital
10 North Avenue
Otley
West Yorkshire
LS21 1AJ
Tel: 01943 466101
E-mail: kbg91@dial.pipex.com
A quarterly magazine on bat care.

Bat News ISSN 0269 8501
The Young Bat Worker
The Bat Conservation Trust
15 Cloisters House
8 Battersea Park Road
London
SW8 4BG
The official publications of the Bat Conservation Trust

Bat Research News
G. Roy Horst, Publisher
Bat Research News
P.O. Box 5068
Potsdam, NY 13676-5068
E-mail: horstgr@potsdam.edu

Eurobat Chat
UNEP/Eurobats Secretariat
United Nations Premises
Martin-Luther-King-Str. 8
53175 Bonn
Germany
E-mail: chat@eurobats.org
Newsletter of the Agreement on the Conservation of Populations of European Bats

Myotis ISSN 0580 3896
Dr R Hutterer
Zoologisches Forschungsinstitut & Museum
Alexander Koenig
Adenaueralle 150-164
D-5300 Bonn1
Germany
An annual journal with papers in English and German

Nyctalus ISSN 0138 2276
Dr Joachim Haensal
Nyctalus
Brascheweg 7
D-10318 Berlin – Karlshorst
Germany
A twice-yearly journal with papers mainly in German with English summaries

Plecotus et al.
E.I. Kozhurina
A.N.Severtsov Institute of Ecology and Evolution
Leninsky Prospect 33
Moscow 119071
Russia
E-mail: kefa@orc.ru
Annual journal with papers in Russian with English summary

Scottish Bats
South East Scotland Bat Groups
9 Brunswick Street
Edinburgh
EH7 5JB
A journal with papers on bats in Scotland. See http://www.scotbats.org.uk/

Vespertilio ISSN 1213 6123
Czech Bat Conservation Trust
c/o Petr Benda
Department of Zoology
National Museum Praha
Vaclavska nam. 68
CZ-115 79 Praha 1
Czech Republic
E-mail: petr.benda@nm.cz

Bat Protection Group of Slovakia,
c/o Marcel Uhrin,
Administration of National Park Muranska planina,
J. Kral'a 12,
SK – 05001 Revuca,
Slovakia.
E-mail: uhrin@sopsr.sk

Annual journal of papers in Czech/Slovak

Barbastelle bat. © Frank Greenaway

Appendix 6

Useful names and addresses

Statutory nature conservation organisations

SNCO responsibilities include licensing for activities identified in Chapter 1.

Countryside Council for Wales
Maes-y-ffynnon
Ffordd Penrhos
Bangor
Gwynedd LL57 2DW
Tel: 01248 385500
Fax: 01248 355782
E-mail: enquiries@ccw.gov.uk
Web site: http://www.ccw.gov.uk

The statutory nature conservation organisation for Wales. CCW has five area offices and a number of local offices.

English Nature
Northminster House
Peterborough PE1 1UA
Tel: 01733 455000
Fax: 01733 568834
E-mail: enquiries@english-nature.org.uk
Web site: http://www.english-nature.org.uk

Statutory nature conservation organisation for England. Administrative headquarters, including specialist support teams. English Nature also has 21 local offices. Consult your local telephone directory for details.

The Environment and Heritage Service
Commonwealth House
35 Castle Street
Belfast BT1 1 GU, Northern Ireland
Tel: 028 9025 1477
Fax: 028 9054 6660
E-mail: ehs@nics.gov.uk
Web site: http://www.doeni.gov.uk

An agency of the Department of Environment (Northern Ireland), which takes the lead in the implementation of the government's environmental strategies and policies in Northern Ireland. Its responsibilities include all relevant licensing.

Scottish Natural Heritage
12 Hope Terrace
Edinburgh EH9 2AS
Tel: 0131 447 4784
Fax: 0131 446 2277
Web site: www.snh.org.uk

Scottish Natural Heritage
17 Rubislaw Terrace
Aberdeen AB10 1XE
Tel: 01224 642863
Fax: 01224 643347

Statutory nature conservation organisation for Scotland. In addition to the above, SNH has 35 local offices. Headquarters will move to Inverness in 2005.

Other Government bodies

For the following bodies, responsibilities include licensing for certain activities identified in Chapter 1. For Northern Ireland, see under SNCOs.

Department for Environment, Food and Rural Affairs
European Wildlife Division
Temple Quay House
2 The Square
Temple Quay
Bristol BS1 6EB
Tel: 0117 372 8291
Fax: 0117 372 8182
E-mail: species@defra.gsi.gov.uk
Web site: http://www.defra.gov.uk/wildlife-countryside/ewd/

Scottish Executive
Species Team
Countryside and Natural Heritage Unit
Environment and Rural Affairs Department
Victoria Quay
Edinburgh EH6 6QQ
Tel: 0131 244 7140
Fax: 0131 244 4071
Web site: www.scotland.gov.uk

Welsh Assembly
Nature Conservation Branch
Countryside Division
Welsh Assembly Government
Cathays Park Cardiff CF10 3NQ
Tel: 02920 823363
Fax: 02920 801353
E-mail: countryside.licensing@wales.gsi.gov.uk
Web site: http://www.wales.gov.uk

Non Governmental Organisations

The Bat Conservation Trust
15 Cloisters House
8 Battersea Park Road
London SW8 4BG
Tel: 08451 300228
Fax: 020 7627 2628
E-mail: enquiries@bats.org.uk
Web site: http://www.bats.org.uk

The national organisation for bat conservation, which provides guidance and support for all local bat groups.

Bat Conservation International
PO Box 162603
Austin, Texas
78716-2603
United States of America
Tel: (512) 327 9721
Fax: (512) 327 9724
E-mail: batinfo@batcon.org
Web site: http://www.batcon.org/

Fauna and Flora International
Great Eastern House
Tenison Road
Cambridge CB1 2TT
Tel: 01223 571000
Fax: 01223 461481
E-mail: info@fauna-flora.org
Web site: www.fauna-flora.org

A charitable organisation whose mission is to safeguard the future of endangered species of animals and plants world-wide.

The Mammal Society
2b Inworth Street
London SW11 3EP
Tel: 020 7350 2200
Fax: 020 7350 2211
E-mail: enquiries@mammal.org.uk
Web site: http://www.mammal.org.uk

The national society for all amateurs and professionals with an interest in the study of mammals.

National Association of Mining History Organisations
c/o Peak District Mining Museum
The Pavilion
South Parade
Matlock Bath
Derbyshire DE4 3NR
Tel: 01629 583834
E-mail: wes@wtaylor44.fsnet.co.uk
Web site: http://www.namho.org/

The umbrella organisation for mine research groups. The Association publishes a useful code of conduct and can provide lists of local groups.

National Caving Association
Monomark House
27 Old Gloucester Street
London WC1N 3XX
E-mail: nca@nca.org.uk
Web site: http://www.nca.org.uk/

The umbrella organisation for caving and cave research groups and clubs. The NCA can provide guidance about underground surveys and lists of local clubs and interest groups.

The National Trust
Estates Department
33 Sheep Street
Cirencester
Gloucestershire GL7 1RQ
Tel: 01285 651818
Fax: 01285 657935
Web site: http://www.nationaltrust.org.uk/

The department dealing with advice on nature conservation on National Trust properties.

People's Trust for Endangered Species
15 Cloisters House
8 Battersea Park Road
London SW8 4BG
Tel: 020 7498 4533
Fax: 020 7498 4459
Web site: http://www.ptes.org/

A charitable trust funding scientific research and practical work in the field with the aim to protect creatures in the wild that are threatened with extinction, including bats. Administers Mammals Trust UK.

Subterranea Britannica
c/o Highcroft Cottages
London Road
Swanley

Kent BR8 8DB
Tel: 01322 408081
E-mail: nick@swanley1.freeserve.co.uk
Web site: www.subbrit.org.uk

National organisation with a specialist interest in artificial underground sites. Has a range of local member interest groups.

The Vincent Wildlife Trust
3 & 4 Bronsil Courtyard
Eastnor
Ledbury
Herefordshire HR8 1EP
Tel: 01531 636441
Fax: 01531 636442
E-mail: vwt@vwt.org.uk
Web site: www.vwt.org.uk

A private charitable trust, which provides assistance to a wide range of conservation organisations as well as employing its own field staff who carry out research, monitoring and wardening work (including bats).

The Wildlife Trusts
The Kiln
Waterside
Mather Road
Newark
Notts NG24 1WT
Tel: 01636 677711
Fax: 01636 670001
E-mail: info@wild-trusts.cix.co.uk
Web site: http://www.wildlifetrusts.org/

The national association of the local Wildlife Trusts.

Equipment suppliers

General
Alana Ecology Ltd
The Old Primary School
Church Street. Bishop's Castle
Shropshire SY9 5AE
Tel: 01588 630173
Fax: 01588 630176
E-mail: sales@alanaecology.com
Web site: www.alanaecology.com

Supplies a wide range of field and lab equipment, including items in most of the following categories.

Envisage
The Old Brickyard
Kiln Lane
Swindon SN2 2NP
Tel: 01793 538822

Supplies a wide range of field and lab equipment, including items in most of the following categories.

Bat detectors

Alana Ecology Ltd
(see opposite)

David J. Bale
3 Suffolk Street
Cheltenham
Gloucestershire GL50 2DH
Tel: 01242 570123
Fax: 01242 570123
E-mail: courtpan@gxn.co.uk

Supplies the Tranquility and ECO Tranquility bat detectors with a time expansion facility.

Envisage
(see above)

Supplied Duet and Batbox detectors

Magenta Electronics Ltd
135 Hunter Street
Burton-on-Trent
Staffordshire DE14 2ST
Tel: 01283 565435
Fax: 01283 546932
E-mail: Magenta_Electronics@compuserve.com
Web site: http://ourworld.compuserve.com/home-pages/Magenta_Electronics

Supply a bat detector as a kit or assembled.

Pettersson Elektronik AB
Tallbackswagen 51
S -756 45 Uppsala
Sweden
Tel: +46 1830 3880
Fax: +46 1830 3840
E-mail: info@batsound.com
Web site: http://www.batsound.com/

Suppliers of professional bat detectors and sound analysis software. Sole agent for UK & Ireland:

Alana Ecology Ltd (see p.158).

Skye Instruments Ltd
Unit 21
Ddole Enterprise Park
Llandrindod Wells
Powys LD1 6DF
Tel: 01597 824811
Fax: 01597 824812
E-mail: skyemail@skyeinstruments.com
Web site: http://www.skyeinstruments.com/

Stag Electronics
120 High Street
Steyning
West Sussex BN44 3RD
Tel: 01903 816298 / 07000 228269
Fax: 01903 816298
E-mail: info@batbox.com
Web site:www.batbox.com

Ultrasound Advice
23 Aberdeen Road
London N5 2UG
Tel: 020 7359 1718
Fax: 020 7359 3650
E-mail: sales@ultrasoundadvice.co.uk
Web site: http://www.ultrasoundadvice.co.uk/

Caving equipment

Bat Products
6 Tucker Street
Wells
Somerset BA5 2DZ
Tel: 01749 676771
Fax: 01749 676771

Bernies Cafe and Caving Supplies
4 Main Street
Ingleton
Carnforth LA6 3EB
Tel: 01524 241802
Fax: 01524 242439
Web site: www.berniescafe.co.uk

Caving Supplies Ltd
19 London Road
Buxton
Derbyshire SK17 9PA
Tel: 01298 71707
Fax: 01298 72463
E-mail: sales@caving-supplies.co.uk
Web site: http://www.caving-supplies.co.uk/

Inglesport
The Square
Ingleton
via Carnforth LA 6 3EB
Tel: 01524 241146
Fax: 01524 242035
E-mail: info@inglesport.co.uk
Web site: www.inglesport.co.uk

The above supply a full range of underground exploration equipment associated with caving including the Oldham T3 head torch, which is powered by a rechargeable lead-acid battery.

Hand nets

Alana Ecology Ltd
(see p.158)

Marris House Nets
54 Richmond Park Avenue
Bournemouth
Dorset BH8 9DR
Tel: 01202 515238
Fax: 01202 511252

Ian Forsyth
24 Malone Park
Belfast BT9 6NJ
Tel: 02890 665534
Fax: 02890 668442
E-mail: forsyth.i@btopenworld.com

Supplier of hand net and frame for catching bats emerging from roosts in buildings.

Watkins and Doncaster
Conghurst Lane
Four Throws
Hawkhurst
Kent TN18 5DZ
Tel: 01580 753133
Fax: 01580 754054
E-mail: sales@watdon.com
Web site: www.watdon.com

Supply a range of hand nets and other equipment for naturalists.

Optical equipment (including night vision)

Alana Ecology Ltd (see p.158)

Gadgets.co.uk
6 Greenhill Crescent
Watford Business Park
Watford
Herts WD18 8RF
Tel: 0870 0806666
Fax: 0870 0805555
E-mail: sales@gadgets.co.uk
Web site: www.gadgets.co.uk
Supplies include a few cheaper night-vision scopes.

In Focus
The Wildfowl and Wetland Trust
London Wetland Centre
Queen Elizabeth Walk
Barnes
London SW13 9WT
Tel: 020 8409 4433
Fax: 020 8409 4441
Web site: www.at-infocus.co.uk

Good range of binoculars, etc. Eight shops nationally. Will discuss night-vision equipment.

Ringing and marking

Alana Ecology Ltd (see p.158)

Biotrack Ltd
52 Furzebrook Road
Wareham
Dorset BH20 5AX
Tel: 01929 552992
Fax: 01929 554948
E-mail: info@biotrack.co.uk
Web site: www.biotrack.co.uk

Supplies radio tags.

Holohil Systems Ltd
112 John Cavanagh Road
Carp. Ontario
Canada K0A 1L0
Tel: +613 839 0676
Fax: +613 839 0675
E-mail: info@holohil.com
Web site: www.holohil.com

Supplies radio tags.

Labtrac Ltd
PO Box 19. Uckfield
East Sussex TN22 3TF
Tel: 01825 791069
Fax: 01825 791006
E-mail: sales@avidplc.com
Web site: www.avidplc.com

Supplies AVID microchip equipment (PIT tags).

Mariner Radar
Bridleway
Wood Lane
Campsheath
Oulton
Lowestoft
Suffolk NR32 5DN
Tel: 01502 567195
Email: sales@mariner-radar.com

Supplies receivers and antennae.

Porzana Limited
Elms Farm
Pett Lane
Icklesham
East Sussex TN36 4AH
Tel: 01797 226374
Fax: 01797 226374
E-mail: porzana@wetlandtrust.org

Supplies bat rings in alloy and incoloy metal. UK batrings also available from

The Mammal Society
28 Inworth Street
London SW11 3EP
Tel: 020 7350 2200
Fax: 020 7350 2211
E-mail: enquiries@mammal.org.uk
Web site: www.mammal.org.uk

Telonics
932 Impala Avenue
Mesa. Arizona 85204-6699
USA
Tel: +480 892 4444
Fax: + 480 892 9139
E-mail: info@telonics.com
Web Site: www.telonics.com

Supplies receivers and antennae.

Titley Electronics
PO Box 19
Ballina
New South Wales 2478
Australia
Tel/Fax: +61 2 66866617
E-mail: titley@nor.com.au
Web site: www.titley.com.au

Supplies radio tags.

Other field equipment

Alana Ecology Ltd
(see p.158)

British Trust for Ornithology
Ringing Office
The Nunnery
Thetford
Norfolk IP24 2PU
Tel: 01842 750050
Fax: 01842 750030
E-mail: ringing.sales@bto.org
Web site: www.bto.org

Suppliers of bird ringing equipment, including aluminium section poles, spring balances, calipers, end-stop rulers, 'bird' bags and mist nets.

Electromail
PO Box 33
Corby
Northants NN17 9EL
Tel: 01536 204555
Fax: 01536 405555
Web site: http://rswww.com

A sister company of RS components, which deals with small orders and non-account customers. Suppliers of dial calipers, tally counters and digital thermometers.

Bat boxes and bat bricks

Alana Ecology Ltd
(see p.158)

Supply a range of Schwegler woodcrete bat boxes and traditional wooden bat boxes.

Envisage
(see p.158)

Supply a range of Schwegler woodcrete bat boxes and traditional wooden bat boxes.

Jacobi Jayne & Co
Wealden Forest Park
Herne Common
Canterbury
Kent CT6 7LQ
Tel: 01227 714314
Fax: 01227 719235
E-mail: enquiries@jacobijayne.com
Web site: www.jacobijayne.com

Supplies the full range of Schwegler woodcrete boxes.

C. J. Wild Bird Foods Ltd
The Rea
Upton Magna
Shrewsbury. Shropshire SY4 4UR
Tel: 0800 731 2820
Fax: 01743 709504
E-mail: orders@birdfood.co.uk
Web site: www.birdfood.co.uk

Supplies some bat boxes and other items relevant to bats.

Marshalls Clay Products
Howley Park
Quarry Lane
Woodkirk. Dewsbury
West Yorkshire WF12 7JJ
Tel: 01132 203535
Fax: 01132 203555
Web site: http://www.marshalls.co.uk

Manufacture and supply a bat access brick and bat roost unit.

Norfolk Bat Group
The Barn Cottage
Wheelers Lane
Seething
Norfolk NR15 1EJ
Tel: 01508 550784
Fax: 01508 550850
E-mail: john.golds@paston.co.uk
Web site: http://www.norfolk-bat-group.org.uk

Supplies the BAT-zzz-BRICK for hibernation sites.

Mealworms

Live Foods Direct Ltd
Houghton Road
North Anston Trading Estate
Sheffield S25 4JJ
Tel: 01909 518888
Fax: 01909 568666
E-mail: sales@livefoodsdirect.co.uk
Web site: www.livefoodsdirect.co.uk

Books, videos, stickers, novelties

Bat Bazaar
c/o Alana Ecology (see p.158)
Web site: www.batsnet.org/acatalog
Bat books, tapes, slides, jewellery, novelties, etc. for sale to individuals and to bat groups for resale.

The Bat Conservation Trust
15 Cloisters House
8 Battersea Park Road
London SW8 4BG
Tel: 020 7627 2629
Fax: 020 7627 2628
Web site: www.bats.org.uk

The Mammal Society
(see p.157)

Natural History Book Service
2-3 Wills Road
Totnes. Devon TQ9 5XN
Tel: 01803 865913
Fax: 01803 865280
E-mail: nhbs@nhbs.co.uk
Web site: http://www.nhbs.com

A leading supplier of British and foreign books on natural history.

Speleobooks
PO Box 10
Schoharie
New York 12157-0010
USA
Tel: +518 295 7978
Fax: +518 295 7981
E-mail: speleobooks@speleobooks.com
Web site: www.speleobooks.com

Wide range of bat and cave books, videos, posters, stickers, novelties, etc.

Whiskered bat in flight. © Frank Greenaway

Appendix 7

Bat workers' training syllabus

This syllabus is to be used as a checklist for both the trainee bat worker (conservation and scientific licences) and the trainer.

Legal protection: Wildlife and Countryside Act 1981 & Conservation (Natural Habitats &c.) Regulations 1994 or equivalent

Basic protection

Bats are protected against intentional killing, injuring or taking. Their roosts are protected against damage, destruction or obstruction, and it is also an offence to deliberately disturb bats. There are variations in protection across the UK.

Limits to protection

Protection of both bats and their roosts is not absolute and in some situations is very weak.

Dwelling houses

In all parts of a dwelling house it remains illegal to kill, injure or take bats but their roosts may be obstructed, damaged or destroyed provided that the SNCO has been notified and allowed time to advise on how this may best be done. This requirement for consultation does not apply in the living area of the house. The existence of this defence means that householders do not have to have bats roosting in their house if they clearly do not want them, but they are not allowed to kill or injure them and they should consult the SNCO about the best way of getting rid of them.

Lawful operations

Bats may be killed or injured or their roosts damaged or destroyed provided that this is the 'incidental result of a lawful operation and could not reasonably have been avoided'. However, the SNCO should be consulted about the interpretation of this defence before any action is taken and will provide advice on how any adverse effects on the bats may reasonably be avoided.

Circumstances requiring consultation

It is important that this is clearly understood. The SNCO should be consulted about any proposed deliberate action against bats or their roosts in dwelling houses or about any operation that will incidentally but foreseeably affect bats or their roosts wherever these may be.

Limitations of advice by volunteers

The law requires that the SNCO is notified and allowed time to provide advice. Volunteers can assist the SNCO in providing the best possible advice but they must either refrain from giving advice themselves or explain that action should not be taken until the advice has been confirmed by the SNCO.

Licensing

Licensable activities

Most activities that are prohibited in the Act or Regulations are licensable in one way or another. The SNCO is the licensing authority for activities carried out for scientific, conservation or educational purposes (including marking and photography). The appropriate government department (see Appendix 6) is the licensing authority for preventing the spread of disease, preventing serious damage, preserving public health or public safety or other imperative reasons of overriding public interest.

Licences are not required for the exclusion of bats from dwelling houses or for anything which is covered by the 'lawful operation' defence. The only requirement is that the SNCO is notified and allowed a reasonable time to advise.

SNCO licences

The SNCOs provide a number of general types of licence, the most important of which are conservation (roost visitor), scientific (survey and monitoring), research and marking, and training. Endorsements can be added to any of these licences to permit a wide range of other activities.

Licence applications should normally be on the standard forms provided and the application should be endorsed by a licensed trainer once the trainee has reached the required standard. If a trainer is not available, the names of two referees will be acceptable as a second choice.

Licences normally restrict the licensee to work in a limited area, usually one or more counties. This is intended to prevent any friction between neighbouring bat workers and to cut down on the possibility of a number of people visiting the same roosts independently. However, even within a county, it is important that local bat workers liaise informally with each other in order to avoid misunderstandings and repeat visits to sites.

Other licences
Government departments issue licences under the Habitats Regulations for preventing the spread of disease, preventing serious damage, preserving public health or public safety or other imperative reasons of overriding public interest. The latter reason is the most common and these are often referred to as 'development licences' because they are most frequently issued to permit damage or destruction of bat roosts or disturbance of bats during development works. Applications must fit the purpose of 'overriding public interest' and also pass tests of 'no satisfactory alternative' and 'no adverse impact of favourable conservation status'.

Bat biology and ecology

Basic biology

Taxonomy
Relationships with other mammals
Characteristics of families
Trainees should be aware that bats form a very distinctive zoological order and that the two families represented in Britain are quite distinctive.

Physical adaptations for flight
Physiological specialisations
The ability of bats to enter and arouse from daily torpor and seasonal hibernation is an extremely important feature of the order, and an understanding of this is vital when considering their life histories, sensitivity to disturbance, etc.

Senses

Trainees should be aware of the importance of sight and hearing to bats and should be able to give a simple account of the way in which their echolocation system operates.

Basic ecology

Importance in ecosystems
Life histories
Lifespan
Breeding
Food and feeding
Seasonality

Social behaviour

Colony formation and composition
Mating systems and behaviour
Maternal behaviour
Juvenile behaviour

Habitat selection

Roosting
Range of roost sites
Seasonal changes in site selection

Feeding

Range of feeding habits
Diurnal rhythms in feeding behaviour
It is important that trainees have a good understanding of the lives of bats so that they are able to deal convincingly with questions put to them by householders. The level of competence will obviously improve with experience, but everyone should at the very least have read one or two of the currently available books on bats and have discussed all the headings listed with his or her trainer.

Bat conservation

Threats to bats

It is very important that bat workers should be able to answer convincingly the very common question, 'Why are bats protected?'.

Historical evidence

Some of our best evidence about the declines in bat numbers over the last century comes from studies of former and current distributions. The greater horseshoe bat is the best-studied example. Other evidence comes from the works of Victorian naturalists who recorded bats as apparently being much more common than today.

Current threats

Habitat change/loss
This is probably the single most important factor that has affected bat populations in the last 100 years. The intensification of agriculture, loss of woodlands and draining of wetlands have all had their effect, both in reducing the number of insects available to bats and in reducing the availability of roost sites.

Loss of hibernacula
Loss of summer roost sites

Effects of modern farming
Loss of insects

Pesticides

Remedial timber treatment
This has probably been implicated in population declines, because many of the treatment fluids in use until recently could kill bats, even some time after treatment. Modern treatments are much less toxic, but roosts should not be treated when bats are present.

Agricultural pesticides
These can affect bats either directly, by accumulation through the food chain, or indirectly, by reducing the numbers of insects available to the bats at critical times of the year.

Persecution and intolerance
Many colonies have been, and probably continue to be, lost through direct persecution.

Sensitivity of bats to disturbance
Training for all levels of licence should cover this section, because the guidelines are applicable to a wide range of circumstances.

In winter
Every time a bat hibernaculum is entered by a party of surveyors a proportion of the bats will invariably be disturbed and begin to arouse. If the survey is by a single careful person, the proportion arousing may be very low, and conversely a large careless party may arouse many of the bats. Repeated disturbance of individuals can reduce their survival by forcing them to use food reserves, which they may not replace easily.

Hibernating bats should, therefore, not be disturbed unnecessarily and should not be handled without a good reason for doing so. Areas known to be used by hibernating bats should not be repeatedly visited unless as part of an intensive survey or research project (which would need a survey or research licence). Further guidance on the frequency of visits is given in the section on survey work.

In summer
Excessive disturbance of breeding colonies can cause mothers to abandon their young or young to become separated from their mothers and so should be avoided. Some species seem more sensitive to disturbance than others. Horseshoe bats are alert most of the time and will normally fly when approached to within 3 or 4 metres. Other species are more approachable and some, such as pipistrelles, can normally be picked up quite easily because they are most reluctant to fly.

Public relations

Site visits

Site visits are probably the major area of interest of all Bat Groups. Training for such visits is largely a matter of experience and trainees should accompany their trainer on at least half a dozen visits before being considered for their own licence. Training under the following headings should consist of both discussions and practical experience and the trainer should be confident that the trainee will be able to deal competently and sympathetically with householders before endorsing a roost visitor licence application.

Safety

Ensuring that visits are carried out safely is an important aspect of training and time must be spent ensuring that the trainee is aware of the main safety issues. These are: personal safety on the visit; safe working practices when using ladders or other access equipment; potential hazards in buildings, particularly in roofs; and safety when handling bats. Trainees should be encouraged to undertake risk assessment as a matter of course when arranging visits. The SNCOs will have their own safety requirements for visits carried out at their request and these should always be adhered to.

Visits to householders who have discovered bats
Arranging the visit
Analysing the situation
Persuasion and education
Sensitivity to fears and phobias
Practical help and limits to advice
Follow-up action
Further visits
Recording and reporting
Consultation/liaison with the SNCO

Visits to buildings requiring works that may affect bats
Arranging the visit
Analysing the situation

Inspecting the site
Collecting relevant information
Follow-up action
Completion of report
Suggestions for advice
Liaison with the SNCO

Presenting bats to the public

Giving talks
Trainers should check that those who are prepared to give talks about bats have a good understanding of bat biology and are not going to spread 'misinformation' about bats.

Dealing with the media
Not all Bat Group members will need to deal with the media but all should be told of the basic rules.

Practical methods

Health and safety in bat work

Health and first aid
Trainees should be aware of necessary disease precautions, especially against rabies.

Travel, and night or lone working
Trainees should be aware of simple precautions to minimise any personal risk.

Safety in and around buildings
Visits to locate or inspect bat roosts may involve access to parts of buildings that present particular safety hazards. Trainees must understand the importance of being properly equipped for such work and with the concept of risk assessment.

Safety underground
Visits to caves and mines require particular attention to equipment and safe methods of working. Trainees should be familiar with the safety code in Chapter 2.

Safety at tree roosts
Safety at public events

Handling and examining bats

Handling
All trainees for a handling licence (who should have received pre-exposure rabies vaccination) must be able to handle bats safely and comfortably. This will necessarily involve practical experience, which could, perhaps, start with captive animals but must also include handling wild bats. Points to emphasise are that bats should be handled only for a good reason and when this can be done safely, that handlers should avoid being bitten and take appropriate action if they are, that bats should not be kept for longer than necessary and that bats should always be released close to the point of capture. Trainees will vary in their ability to handle bats, but, as a guideline, they should have handled wild bats on at least five occasions and should preferably have handled more than one species.

Identification
For roost visitor licences, trainees should be confident about identifying the common species in their area and should be familiar in theory, if not in practice, with the features that identify all British species. It is important to emphasise that all bats must be examined carefully before reaching a conclusion, because otherwise mistakes will be made. All trainees should be familiar with one of the published keys on British bats.

Trainees for survey licences should be able readily to identify a wider range of bats in a variety of situations.

Examining
Trainees should be able to handle bats for examination and should be able to sex bats and measure the forearm length. It is advantageous if trainees can distinguish juveniles, but this is not a requirement of the training scheme. It is neither necessary nor desirable that trainees are able to take a wide range of measurements, because these are required only for specialist projects.

Catching bats
Trainees for roost visitor licences need to be trained how to catch bats safely in roosts and at roost entrances. Trainees for survey licences who wish to carry out specialist research projects may need training in techniques of catching bats in the open or in large numbers at roosts, but this should not be generally encouraged.

Inside roosts
In some circumstances bats may simply be picked up carefully within roosts (assuming that there is a need to catch one) or, if likely to fly, they may be caught by placing a hand-net gently over them.

Bats should not be caught in flight or swiped at with a hand-net.

At roost entrances
The approved technique is to hold a hand-net directly below the roost entrance so that an emerging bat falls straight into it as it drops from the roost entrance. The bat can then be carefully extracted from the net. Emphasis should be placed on the need to keep the net still and the undesirability of disturbing the colony so that emergence is disrupted. This is a straightforward technique and trainees should be competent after perhaps five attempts. Cone-trapping is a specialised research technique and should not be used to catch small numbers of bats for identification.

In the open
All methods of catching bats in the open have the potential to harm bats if used carelessly. The most common methods are harp-trapping or mist-netting and licences for this will only be given to applicants who have received appropriate training and agree to follow SNCO guidelines.

Survey work
The majority of applicants for licences require a conservation (roost visitor) licence so that they can visit householders and disturb or handle bats associated with buildings. A small proportion of applicants will wish to extend their interest to survey work for bats and bat roosts and may require a licence to disturb or handle bats in hibernacula or to catch bats in the open.

Hibernacula

Safety
Working safely in underground sites such as caves, mines, ice-houses or tunnels requires a good understanding of the potential hazards and the basic safety rules that must always be observed. Good safety advice is provided by the various caving and mine history organisations.

Frequency of survey
The dangers of excessive disturbance have already been covered in a previous section because of their general applicability.

The acceptable frequency of survey will vary with the configuration of the site, the number of bats involved and the purpose of the survey. It is impossible to give hard and fast rules but the following paragraphs give some guidance.

For intensive short-term (a few years) surveys to establish patterns of usage, a visit every 3 or 4 weeks by a careful individual or small party would probably be acceptable. Maximum party size should be related to the size of the hibernaculum and the density of bats.

Long-term surveys should normally require only one or two visits per winter, preferably at a time when the maximum number of bats is present. Again, party size should be related to the size of the hibernaculum and the density of bats.

Casual unplanned visits 'to see the bats' should be avoided, however strong the temptation. If you do wish to take trainees to see hibernating bats, try to arrange that they accompany you on planned survey trips and assist with counting the bats.

It should rarely be necessary to handle hibernating bats, because the great majority can be identified by close inspection. Horseshoe bats need be handled only as part of a research project.

Liaison
Although one individual or group may limit their visits to a site in a sensible way, it is clearly essential that there is not some other individual or group also visiting the same site and thus doubling the number of visits. Liaison between workers within an area is extremely important and should be given emphasis during training.

Summer roosts

Frequency of survey
Most of the remarks about winter surveys apply equally to summer surveys if visits inside the roost are necessary. However, most summer surveys should involve counting the bats as they emerge from the roost at dusk, with, perhaps, a few inspections inside to check on the agreement between internal counts and emergence counts. Provided that common-sense precautions are taken, there need be no limit placed on the number of emergence counts that are made.

If the species cannot be identified by careful inspection within the roost (horseshoe bats can normally be identified in this way), it will be acceptable to hand-net a bat as it emerges. Do not net more than a few bats, because this is unnecessary.

Training checklist	*Tick*
Legal protection: Wildlife and Countryside Act 1981 & Conservation (Natural Habitats &c.) Regulations 1994 or equivalent.	
Basic protection	
Limits to protection	
Dwelling houses	
Lawful operations	
Circumstances requiring consultation	
Limitations of advice by volunteers	
Licensing	
Licensable activities	
SNCO licences	
Other licences	
Bat biology and ecology	
Basic biology	
Taxonomy	
Relationships with other mammals	
Characteristics of families	
Physical adaptations for flight	
Physiological specialisations	
Senses	
Basic ecology	
Importance in ecosystems	
Life histories	
Lifespan	
Breeding	
Food and feeding	
Seasonality	
Social behaviour	
Colony formation and composition	
Mating systems and behaviour	
Maternal behaviour	
Juvenile behaviour	
Habitat selection	
Roosting	
Range of roost sites	
Seasonal changes in site selection	
Feeding	
Range of feeding habits	

Training checklist (continued)	*Tick*
Diurnal rhythms in feeding behaviour	
Bat conservation	
Threats to bats	
Historical evidence	
Current threats	
Habitat change/loss	
Loss of hibernacula	
Loss of summer roost sites	
Effects of modern farming	
Loss of insects	
Pesticides	
Remedial timber treatment	
Agricultural pesticides	
Persecution and intolerance	
Sensitivity of bats to disturbance	
In winter	
In summer	
Public relations	
Site visits	
Safety	
Visits to householders who have discovered bats	
Arranging the visit	
Analysing the situation	
Persuasion and education	
Sensitivity to fears and phobias	
Practical help and limits to advice	
Follow-up action	
Further visits	
Recording and reporting	
Consultation/liaison with the SNCO	
Visits to buildings requiring works which may affect bats	
Arranging the visit	
Analysing the situation	
Inspecting the site	
Collecting relevant information	
Follow-up action	
Completion of report	
Suggestions for advice	

Training checklist (continued)	*Tick*
Liaison with the SNCO	
Presenting bats to the public	
Giving talks	
Dealing with the media	
Practical methods	
Health and safety in bat work	
Health and first aid	
Travel and night or lone working	
Safety in and around building	
Safety underground	
Safety at tree roosts	
Safety at public events	
Handling and examining bats	
Handling	
Identification	
Examining	
Catching bats	
Inside roosts	
At roost entrances	
In the open	
Survey work	
Hibernacula	
Safety	
Frequency of survey	
Liaison	
Summer roosts	
Frequency of survey	

Appendix 8

Model risk assessments relevant to bat survey work

Chapter 2 provides advice on safety preparations. These model risk assessments provide a standard means for assessing the risks in three situations:

- entry into disused mines;
- initial entry into derelict and dilapidated buildings and structures;
- entry into and work in confined spaces.

These models have been developed for use within the National Trust. They form a basis for specific local site assessments, carried out by managers at individual properties. The National Trust cannot accept any responsibility for any errors or omissions, where these models are used by other organisations.

Specific legal requirements may change and readers should make the necessary enquiries to ensure that they are aware of the latest legislation.

Model risk assessment for entry into disused mines

Work Activity	Entry into disused mines
Other relevant model risk assessments	Entry into confined spaces.
Physical hazards arising	Being struck by falling rock; Contact with rock and other obstructions (head injury); Asphyxiation from build-up of dangerous gases or lack of oxygen; Explosion from ignition of flammable gases; Falls from height from collapse of floor, or openings in floor; Drowning; Trips and falls on same level; Hypothermia, arising from long periods underground, or following trapping underground by flooding or rock falls.
Health hazards arising	Exposure to radon (only significant where extensive work underground is carried out).
Persons at risk	Countryside staff and others engaged in bat surveys, industrial archaeology, geological surveys. Visitors.
Principal organisational precautions	No person should go underground alone. Planning: Obtain plans of the mine workings in advance; Note weather conditions for at least 24 hours before going underground, particularly into caves or mine systems prone to flooding after heavy rain; The minimum size of party entering mine four persons (in the event of injury, one person should remain with the injured person, while two persons go for assistance). A minimum of two persons are required as back-up at the mine entrance; At least one person in the party should be experienced in the work; At least one person in the party underground should be a qualified first-aider; Hazards should be identified in advance; The capabilities of the members of the party should be taken into account; Monitoring for dangerous gases/lack of oxygen should take place where these are identified as potential hazards; Expert geological advice should be sought on the stability of strata in abandoned mines; Entry should only take place under a written permit-to-work system; Extra time should be allowed for the exit from the mine; Written emergency procedures should be prepared.

Model risk assessment for entry into disused mines (cont)

Principal physical precautions	Equipment: Gas monitoring equipment should be used to warn of the presence of dangerous gases; Vapour sealed electric headlamp units should be worn, and a spare lamp of different type carried by each person going underground; Lifelines (where required by the nature of the mine and length of the expedition); Ropes and harnesses may be required for access to parts of the mine; Survival bags (when a long period underground is contemplated) should be taken; Spare food and drink should be carried; Waterproof watches should be worn; First aid kits should be carried. Protective clothing: Safety helmets to BS EN 397 (formerly BS 5240) should be worn; Eye protection to BS 2092 should be worn if hammers and chisels are used for rock samples; Safety boots; The need for wet suits and/or waders should be considered; Adequate clothing should be worn for a cold, wet environment. Exposure: Exposure can occur very rapidly underground in the cold, wet conditions. If exposure is suspected, take the following action: find a dry location away from draughts; huddle together for warmth and cover the head and hands; place the exposed or injured person in the survival bag, ideally with another person; cover the head and hands; use ropes and other equipment for insulation from the floor; give some of the spare food; two persons should go for assistance, leaving the exposed person and one other together.
Specific legal requirements	Mines and Quarries Act 1954; Wildlife and Countryside Act 1981; Management and Administration of Safety and Health at Mines Regulations 1993.
Further guidance	HSE Approved Code of Practice L44 - "*The management and administration of safety and health at mines*"; Institute of Biology - "*Safety in biological fieldwork - guidance notes for codes of practice*"; Conservation Safety Manual (contained within NT Health and Safety Manual) – Section 3 - "*Safety in field work*". National Trust Bat Pack – "The conservation of bats and their legal status" (1996)

Date/NT Ref.5 February 1997.WRK 013

Model risk assessment for initial entry into derelict and dilapidated buildings and structures

Work activity	Initial entry into derelict and dilapidated buildings and structures
Explanatory note	This Model Risk Assessment (MRA) covers initial appraisal of and entry into a derelict or dilapidated building, to establish its general integrity, its structural stability, and the nature and extent of other hazards created by its current and former uses. A separate MRA covers detailed survey and initial work on such buildings.
Physical hazards arising	Falls from height, due to rot or damage to floors and structural members, and concealed and unprotected edges and openings; Fall of materials, due to the instability of the structure; Electric shock or burns from faulty electrical installations; Fire/explosion from ignition of gas leaking from cylinders or faulty/damaged installations; Oxygen deficiency or accumulations of poisonous gas in confined spaces; Injury from loose or projecting objects; Trips and slips; Unexploded ordnance; Waterlogged or flooded basements, pits or cellars; Assault in remote locations.
Health hazards arising	Exposure to chemical or similar contamination, arising from: - abandoned chemicals (spillage or in containers); - asbestos materials; - PCB's (polychlorinated biphenyls) in old oil-filled electrical equipment. Exposure to radioactive contamination. Biological hazards, e.g. leptospirosis (Weil's Disease), pathogens from leaking sewers, disease from decaying animals or accumulations of bird/bat droppings, contact with hypodermic syringes. Dust, e.g. from lead, arsenic in old paint.
Persons at risk	Batworkers, owners, tenants, consultants, contractors and unauthorised visitors.
Principal organisational precautions	Information should be collected from plans and other documents prior to the initial site appraisal; An initial appraisal should be carried out to identify structural defects and hazardous areas; Relevant information should be given to consultants and contractors before entry is allowed; At least 2 persons should be involved in the initial entry - notification should be given to another person of their whereabouts, and the duration of their visit.
Principal physical precautions	Barriers and signs: Unauthorised persons should be excluded from the site by physical barriers, at a sufficient distance from the building to allow for falling debris; Signs should be posted to warn of hazards to visitors and unauthorised persons. Equipment and protective clothing: Hard hats and steel toe-capped protective footwear should be worn at all times; Dust masks, eye protection, gloves and disposable suits may be required; A first-aid kit should be available; Other useful equipment might include: - flashlight or miner's-type headlight; - portable radio communication; - access inspection ladder; - rope or tape to mark the route; - stick (for exploration); - binoculars.
Specific legal requirements	Control of Lead at Work Regulations 1980; Ionising Radiations Regulations 1985; Asbestos at Work Regulations 1987; Control of Substances Hazardous to Health Regulations 1994.

Model risk assessment for initial entry into derelict and dilapidated buildings and structures (cont)

Further guidance	HSE booklet HS(G)58 - "Evaluation and inspection of buildings and structures" (1990); HSE booklet HS(G)66 - "Protection of workers and the general public during the development of contaminated land" (1991); HSE Guidance Note GS 5 (revised) - "Entry into confined spaces" (1995); HSE Approved Code of Practice L28 - "Work with asbestos insulation, asbestos coating and asbestos insulating board"; Department of the Environment booklet - "Asbestos materials in buildings"; HSE leaflet MS(A)19 - "PCBs and you "; NT Health Hazard Information Sheet No. 2 - "Weil's Disease": NT Bat Pack - "The conservation of bats and their legal status "; Suzy Lamplugh Trust pocket guide - "Personal Safety at work for you".

Date/NT Ref. 12 March 1996 WRK 006

Model risk assessment for entry into confined spaces

Work activity	Entry into and work in confined spaces
Explanatory note	The term "confined space" includes closed tanks, sewers, tunnels, caves, open manholes, trenches, pipes, pits, vats, flues, furnaces, silos, ducts, as well as other enclosed rooms and spaces, e.g. basements, ceiling voids, where there is inadequate natural ventilation.
Physical hazards arising	There are three principal hazards associated with confined spaces: 1. Flammable gases. Fire and explosion hazards can exist in confined spaces where gases such as LPG have accidentally leaked into the space, or where decaying matter and sewage have produced flammable gases such as methane. 2. Toxic gases. Toxic, harmful or corrosive fumes and vapours can exist in, or be generated by the work in a confined space - for example, some painting work, application of certain adhesives (e.g. when laying floor tiles), cleaning areas or objects using solvents, welding, fumes emitted when sludge and other residues are disturbed during cleaning tanks or pits, the use of LPG appliances, and petrol and diesel engine fumes. 3. Oxygen deficiency. Oxygen deficiency can occur naturally in confined spaces, for example where manholes, tunnels and trenches in chalk soil fill with carbon dioxide forcing out breathable air, or where rotting vegetation and rusting of metal in tanks can consume much of the oxygen and hence make the air unbreathable. Work activities in confined spaces can also reduce the oxygen level by replacing it with inert gas such as in pipe freezing operations in trenches or inert gas welding. Other hazards include: Drowning; Falls from height, and slips and trips; Falling objects; Contact with moving machinery; Oxygen enrichment.
Health hazards arising	Contact with biological hazards, such as leptospirosis (Weil's disease), tetanus and legionella; Heat stress; High levels of noise; Dust.
Persons at risk	Batworkers, owners, tenants, consultants, contractors and others having to enter confined spaces.

Model risk assessment for entry into confined spaces (cont)

Principal organisational precautions	Is it essential to enter the confined space? Can the work be carried out from outside? If not, the following system must be followed: 1. Recognition - all batworkers should be able to recognise a situation or work location which is a confined space. 2. Assessment - a full and comprehensive site risk assessment is essential before any work starts, for all confined space operations. 3. Preparation - consider the previous use of the space. Prevent ingress of liquids, gases and vapours from outside the confined space. Locking off and blanking off of supplies or services may be necessary. The confined space may need to be purged, cleaned or steamed before safe entry is possible. Forced ventilation may be required. 4. Test - if the condition of the atmosphere is unknown, it will usually be necessary to sample the atmosphere for flammable and toxic fumes, and oxygen level. This will be necessary to establish whether the space can be entered safely without breathing apparatus, or only entered with it. 5. Safeguards - rescue harnesses must be worn by all persons entering the confined space. A lifeline should be attached to the harness and the free end kept outside with the safety observer. The lifeline need not be attached if it presents a greater risk from entanglement, although it should be kept close by. 6. Permit-to-work certificate - the person in charge must complete a permit-to-work certificate, specifying what safety measures have been taken. The permit should specify any limitations to the work, and set the time by which the work must be completed and the confined space vacated. The should be properly cancelled on completion of the work. A sample layout of a permit is contained in HSE Guidance Note GS5. 7. Safety observer – no-one shall enter a confined space unless there is someone outside to keep watch throughout, and to communicate with those inside. In an emergency they must be able to summon help, hut under no circumstances enter the confined space. One person alone will not be able to pull out an unconscious person on a line and harness, unless a lifting device is available. 8. Rescue – emergency procedures should be established in advance. Is there a means of contacting the emergency services close at hand? Is there a trained first-aider close by? 9. Training - those persons overseeing the work, entering and working in the confined space and acting as a safety observer will need to be adequately trained. Training should cover rescue and emergency procedures and the use of emergency breathing apparatus and harnesses.
Principal physical precautions	Do not use petrol or diesel engines inside, or close to confined spaces; Avoid using substances that give off hazardous fumes or vapours; Do not carry out hot work in confined spaces; Do not use tools which can produce sparks; Never attempt to clear fumes or gases with pure oxygen; Do not rely on canister respirators in confined spaces (they can filter out contaminants in the atmosphere but will not replace deficient oxygen).
Specific legal requirements	Factories Act 1961 (Section 30); Construction (Health, Safety and Welfare) Regulations 1996.
Further guidance	HSE Guidance Note GS5 - "Entry into confined spaces" (1995); HSE Guidance Note GS15 - 'Cleaning and gas freeing of tanks containing flammable residues" (1985); HSE Construction Information Sheet No.15 - "Confined spaces"; HSE leaflet IND(G)198L – "Working with sewage "; HSC Consultation Document CD105 - "Proposals for replacement of the law for work in confined spaces".

Date/NT Ref. 5 February 1997.WRK 012

HEALTH AND SAFETY LEGISLATION

Some of the key requirements of the health and safety legislation, which are appropriate for work with bats, are given below.

Health and Safety at Work etc Act 1974 requires:

- employers and self-employed workers to ensure they provide and maintain workplaces, equipment and systems of work that are, so far as is reasonably practicable, safe to workers and the public;
- employees to take care of their own and others' health and safety, and to co-operate with their employer or any other person to enable them to comply with health and safety duties;
- *A guide to the Health and Safety at Work etc Act 1974 (L1)* gives further information.

Control of Substances Hazardous to Health (COSHH) Regulations 2002 provide a framework of actions designed to control the risk from a range of hazardous substances including biological agents. These actions include:

- assess the risk;
- prevent the risk by substitution if possible;
- control the risks using appropriate measures, e.g. *work process, systems and engineering controls;*
- control exposure at source, e.g. *adequate ventilation systems and appropriate organisational measures;*
- control the working environment including general ventilation;
- maintain, examine and test control measures;
- provide suitable personal protective equipment (PPE) when adequate control of exposure cannot be achieved by other means;
- monitor exposure at the workplace;
- provide information, instruction and training for workers;
- make arrangements for health surveillance of workers where necessary;
- *COSHH: a brief guide to the regulations (INDG131 rev1); Control of Substances Hazardous to Health (4th edn). The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and Guidance (L5); Health Surveillance under COSHH: guidance for employers; The management, design and operation of microbiological containment laboratories*; and *5 steps to risk assessment (INDG163 rev1)* give further information.

Management of Health and Safety at Work Regulations (MHSWR) 1999 require employers and self-employed workers to:

- identify the measures they need to take by carrying out risk assessments;
- institute safety management systems;
- appoint persons to assist in health and safety management;
- ensure co-ordination and co-operation where two or more employers or self-employer persons share a workplace;
- make emergency arrangements;
- provide information and relevant training for employees;
- *Successful health and safety management (HSG 65)* gives further information.

The Carriage of Dangerous Goods (Classification, Packaging and Labelling) Regulations 1996 require consigners to:

- classify the biological agent or substance containing the biological agent for transport according to the criteria laid down in the 'Approved Requirements';
- determine the packing group and package in accordance with the appropriate packing instruction;
- appoint a Dangerous Goods Safety Adviser if necessary;
- *Are you involved in the carriage of dangerous goods by road or rail?; Approved Carriage List: Information approved for the carriage of dangerous goods by road and rail other than explosives and radioactive material (ACL); European Agreement concerning the international carriage of dangerous goods by road (ADR); Approved Vehicle Requirements. Carriage of Dangerous Goods by Road Regulations 1996 (AVR)*; and *Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) give further information.*

Other legal requirements also exist under a range of other specific health and safety legislation. These duties include reporting of Injuries, Diseases and Dangerous Occurrences Regulations and assessing other specific risks to workers (e.g. from manual handling and stress).

References

Legislation

Health and Safety at Work etc Act 1974. SI1974/1439. The Stationery Office 1974. ISBN 0 11 141439 X.

Management of Health and Safety at Work Regulations (MHSWR) 1999. SI1999/3242. The Stationery Office 1999. ISBN 0 11 0856252 2.

Control of Substances Hazardous to Health (COSHH) Regulations 2002. SI2002/2677. The Stationery Office 2002. ISBN 0 11 042919 2.

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995. SI1995/3163. The Stationery Office 1995. ISBN 01 1053 7523.

The Carriage of Dangerous Goods (Classification, Packaging and Labelling) Regulations 1994. SI1994/669. The Stationery Office 1994. ISBN 01 1043 6695.

The Data Protection Act 1998. The Stationery Office 1998. ISBN 0 10 542998 8.

2000/54/EC. Protection of workers from risks related to exposure of biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC). OJ L262. 17.10.2000.

Guidance

A Guide to the Health and Safety at Work etc Act 1974. (L1). HSE Books 1990. ISBN 0 7176 0441 1. (A priced publication.)

Successful health and safety management (HSG 65) 2nd edn. HSE Books 1997. ISBN 0 7176 2034 4. (A priced publication.)

COSHH: a brief guide to the regulations (INDG131 rev1). HSE Books 2002. (Free as single copies.)

Control of Substances Hazardous to Health. 4th edn. The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and Guidance (L5). HSE Books 2002. ISBN 0 7176 2534 6. (A priced publication.)

Health Surveillance under COSHH: guidance for employers. HSE Books 1990. ISBN 0 717604918. (A priced publication.)

5 steps to risk assessment. (INDG163 rev1). HSE Books 1998. (Free as single copies.)

Guide to the reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (L73). HSE Books 1998. ISBN 0 7176 1012 8.

Are you involved in the carriage of dangerous goods by road or rail? (INDG234) HSE Books 2000. ISBN 0 7176 1676 2. (A free leaflet.)

Approved Carriage List: Information approved for the carriage of dangerous goods by road and rail other than explosives and radioactive material (ACL) (L90). HSE Books, 3rd edn. ISBN 0 7176 1681 9. (A priced publication.)

European Agreement concerning the international carriage of dangerous goods by road (ADR). The Stationery Office. ISBN 0 11 941712 X.

Approved Vehicle Requirements. Carriage of Dangerous Goods by Road Regulations 1996 (AVR) (L89). HSE Books, 2nd edn. ISBN 0 7176 1680 0.

Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID). The Stationery Office 1998. ISBN 0 11 552032 5.

Second supplement to 'Categorisation of biological agents according to hazard and categories of containment' (MISC 208). HSE Books 2000.

Consulting employees on health and safety: A guide to the law. (INDG 232). HSE Books 1999. ISBN 0 71761650. (Available in priced packs or can be downloaded for free from www.hsebooks.co.uk)

Appendix 9

Department for Environment, Food and Rural Affairs
Scottish Executive Environment and Rural Affairs Department
Welsh Assembly Government

Bat Samples for Rabies Screening

Please complete a **seperate** form for each species submitted.

Name and address of person submitting the specimen

Postcode

Telephone No. (including national dialling code)

Name and address of FINDER (if different to person submitting the specimen)

Postcode

Telephone No. (including national dialling code)

Specimen detail

Species	Sex	Age

Date and time found | Ref. No.

Date and time of death

Cause of death

Location

Map reference

Cicumstances of finding:

For Laboratory Use Only

Letter No.

Sample No.

Date received:

RESULT

Symptoms:

General condition:

Give details of any biting or scratching incidents involving humans or animals:

it is not normal to send a result; in the event of a positive result the finder would be contacted immediately.

If there are special reasons for requiring a result to be sent, tick this box .....

Signature

Date

Please send completed form and specimen(s) to:
Graham Parsons
Rabies Diagnostic Unit,
Veterinary Laboratories Agency
Woodham Lane, Addlestone, Surrey KT15 3NB
Telephone No. 01932 357645

Further enquiries please contact:
Dr A R Fooks,
Head of Rabies Research
and Diagnostic Unit
Telephone No. 01932 341111

Internal Use Only

Copies to:
(1) SVO Page Street
(2) Dr A R Fooks

BAT 1 (Rev. 10/01)

JOINT NATURE CONSERVATION COMMITTEE

The Joint Nature Conservation Committee (JNCC) is the forum through which the three country nature conservation agencies – English Nature, Scottish Natural Heritage (SNH), and the Countryside Council for Wales (CCW) deliver their statutory responsibilities for Great Britain as a whole - and internationally. The Committee consists of representatives of these agencies, as well as the Countryside Agency, independent members, and non-voting members appointed by the Department of the Environment, Northern Ireland.

The JNCC's statutory responsibilities, known as the special functions, contribute to maintaining and enriching biological diversity, enhancing geological features, and sustaining natural systems.

The special functions are principally:

- to advise Ministers on the development and implementation of policies for, or affecting, nature conservation in Great Britain and internationally;
- to provide advice and disseminate knowledge to anyone on nature conservation issues affecting Great Britain and internationally;
- to establish common standards throughout Great Britain for the monitoring of nature conservation and for research into nature conservation and the analysis of results;
- to commission or support research which the Committee deems relevant to the special functions.

The JNCC was established under statute by the Environmental Protection Act 1990 and commenced its work in April 1991.

Details of publications produced by JNCC are available from:
Communications Team, JNCC, Monkstone House, City Road, Peterborough PE1 1JY.
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Bottom centre: Serotine bat. © S.C. Bisserot/Nature Photographers.
Bottom right: Whiskered bat. © Tony Mitchell-Jones/English Nature.

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