NATURE IN AVON

PROCEEDINGS OF THE BRISTOL NATURALISTS' SOCIETY, 1997

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THE PROCEEDINGS OF THE BRISTOL NATURALISTS' SOCIETY

VOLUME 57 (for 1997)

EDITED BY A. F. HOLLOWELL

ASSISTED BY A COMMITTEE

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COUNCIL, 1997

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Invertebrate Group	Leader	Mr A. G. Smith
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Past presidents:	Miss M. H. Rogers. Mr S. M. Taylor, Mr D. A. Wilson. Mr R. J. Barnett	

REPORT OF COUNCIL, 1997

The Charity Commission required a report in a new format. There was an introductory section, which it is not necessary to print here, outlining the objectives and organisation of the Society. The next section described the ways in which the society achieved its aims in 1997, and is reproduced below.

1 Education

The Society held 29 indoor meetings, and 55 field meetings, dealing with a huge range of topics. Members helped with the Wildlife Trust's educational work at Willsbridge Mill, and assisted in classes and workshops run by, among others, the Exmoor Natural History Society, the Conchological Society, and the Somerset Wildlife Trust. The Society's Library, housed in the City Museum, was used by both members and Museum staff. Work continued on reorganising part of the Society's collection and creating more space for archive material.

2 Research

a) Botany. Members continued to be involved in the BSBI Flora 2000 project and the Avon Flora project. Members continued to add to the detailed record of the trees of the region.

b) Ornithology. Members were involved in all the major surveys of the British Trust for Ornithology and the Wildfowl and Wetlands Trust, as well as surveys organised by the Society, and submitted records to Bristol Regional Environmental Record Centre (BRERC).

c) Geology. Members supported the Avon Regionally Important Geological-geomorphological Sites (RIGS) initiative which involved both site recording and clearance, and liaised with the geology staff of the Bristol City Museum.

d) Invertebrates. Members were involved in recording Butterflies, Moths, and with a new Dragonfly recording scheme and the District Hoverfly Group, all in co-operation with BRERC. Other genera are also being mapped in surveys for both the Somerset and Gloucester Invertebrate groups, and work was done searching for Plant Galls and for the Mollusc Atlas.

e) Mammals. Members were involved in the regular small mammal survey of the Gordano Valley NNR, checking and maintaining bat boxes at Chew Valley and Blagdon Reservoirs in association with the Avon Bat Group, and working with both BRERC and the national Mammal Society.

The results of the work of the sections are published in the Society's publications.

3 Publications.

a) The *Avon Bird Report* for 1996 was published in September. It was 140 pages long, with several new features and came third in the national competition run by *British Birds*.

b) The Mendip Special Issue of the *Proceedings* was published in December in association with the Mendip Society, and dedicated to the memory of the late V. D.

Dennison, who had originally inspired it. It included articles on Mendip plants, ponds, plant galls, invertebrates, reptiles, mammals, birds, agriculture, geology, geomorphology, the vegetation history of Black Down, and the biological implications of heavy metals.

c) The monthly newsletter was further improved by the new editor to ensure that all members were kept in close touch with the activities of the Society.

4 Conservation

The Society participated in the Peregrine Watch, the Wildlife Trust Fair, helped with a plant, insect, and bird survey of the Old Sneyd Park Nature Reserve, helped the Ramblers Association with a walk for children in Bradley Stoke, made suggestions to the City Council for its plans for improvements at Blaise Castle, and Ashton Court Estate, and was represented at the annual meeting of the Leigh Woods Management Committee, and at meetings of the Severn Estuary Management Group. The Society's Conservation Officer, W. E. Dixon, represented the Society on the Wildlife Trust conservation committee, was involved in discussions about the feasibility of translocating the herb-rich turf of the area in Ashton Park to be taken over by Durnford Quarry, and proposals for the redevelopment of Weston Airfield. Members of the Geological Section installed geological information boards at two sites in Bristol, and exhibited at the Geologists' Association's Annual Reunion in London. Members of the Invertebrate Section were involved in a survey of the effects of summer flooding on the Somerset Levels on aquatic invertebrates, creating baseline species lists for the Gordano Valley, and Avon levels, and mapping invertebrates in hedgerows and tufa springs as part of Somerset's Agenda 21 work.

5 Organisational Changes

In the course of the year a statement of the Procedures of Council was drawn up and approved, and it was agreed that Council should create a new office of Archivist to ensure that material relevant to the history of the Society since 1862 should be properly cared for.

Council approved a grant from the Hector Hockey fund for a study of bird ringing in the region throughout the century. Council is grateful for legacies received during the year from Miss I. F. Gravestock, and Miss T. Martin.

Council records with regret the deaths during the year of Mr R. S. Carlile, who had reached his centenary, Mrs V. G. Cogzell, Miss J. C. Dickinson, Mr T. R. Fry, a self-taught geologist, Miss Martin, Mrs N. McDonald, Captain G. B. Roe, who wrote the last Flora of Somerset, Mr. W. Sydenham, and Mr G. Sweet, a member of the Ornithological Section's Publications committee.

Sylvia P Kelly, *Hon Secretary*

GENERAL MEETINGS, 1997

The programme of General lectures for 1997

25 Jan.	AGM and Presidential address, "The urban entomologist".	Ray Barnett
15 Feb.	"A naturalist's impression of Spitsbergen".	Nigel Webb
8 Mar.	"What Cabot found in Newfoundland".	Tony Titchen
2 Oct.	"Countryside Stewardship in Wessex".	David Whelon
6 Nov.	"Earth Science from the driving seat".	Derek Briggs
2 Dec.	"One hundred and fifty years of Gorillas under fire".	Ian Redmond

GENERAL FIELD MEETINGS, 1997

These meetings were organised by the Field Committee, whose members were:
Chairman – Miss S. M. Garden. Hon. Secretary – Miss R. C. Lee.
Committee members – Miss S. M. McCarthy and Miss M. B. Morris

The following meetings were held under the leadership of those indicated:

28 Mar. Miss R. C. Lee. Wild daffodil country near Newent, Glos. On a glorious sunny day, the warden of Betty Dawes Wood led our walk. We saw daffodils and Wood Anemones in profusion and many other spring flowers and we heard some woodland birds.

18 Apr. Miss M. B. Morris. The Painswick area. There was a morning walk to visit a boggy area in a valley north of Painswick. In the afternoon, we went to Pope's Wood, which is a Site of Special Scientific Interest and a reserve of the Gloucestershire Wildlife Trust.

17 May Miss S. M. Garden. The Forest of Dean. On a damp foggy day, we followed a circular route from Christchurch. The birds were singing well and there were many spring flowers.

7 Jun. Miss S. M. McCarthy. Neroche Forest, near Ilminster. This was an interesting walk through woodland and along farm tracks and we noted many birds, plants and invertebrates in the various habitats

28 Jun. Dr N. R. Webb. Hartland Moor, Dorset. This was a dry day in the wettest June for 30 years. We managed to see a Smooth Snake, Dartford Warblers and several male Silver-studded Blue butterflies as well as other heathland plants and birds and some bog plants.

19 Jul. Dr. N. Malcolm and Mr B. Storer. Priddy Pools and Westhay. In the morning, Dr Malcolm explained the geology and botany of the Priddy Pools area. In the afternoon, Mr Storer explained the development of the Somerset Wildlife Trust's Westhay reserve and showed us its many interesting features.

6 Sep. Mr D. A. C. Cullen. Portland Bill and Radipole Lake, Weymouth. We had glorious weather but there was not much to be seen of migrating birds. At Portland, we had good views of some land birds on the hill and cliff top and at Radipole, we saw a Cetti's Warbler.

11 Oct. Miss R. C. Lee. The Forest of Dean. We had continuous light rain all day and very few birds were singing. On the morning walk through Nags Head Plantation, we had a fleeting glimpse of a deer and we saw many fine clumps of fungi. We then went on to Cannop Pond. In the afternoon, we walked along forest paths, from the Speech House to the New Fancy Car Park.

8 Nov. Miss S. M. McCarthy. Wentwood Forest, Gwent. The Forest Ranger took us on a walk through the forest, where the autumn colours were magnificent. We saw many fungi and managed to identify some of them and we also heard woodland birds.

RACHEL C. LEE, *General Field Secretary*

REPORT OF THE BOTANICAL SECTION, 1997

At the Annual General Meeting held on 27 January, the officers and committee were elected as follows: President: Mr A. C. Titchen, Hon. Secretary/Treasurer: Mr C. W. Hurfurt, Committee members: Mrs C. Kitchen, Mr M. A. R. Kitchen, Mrs P. M. Millman, Mr A. G. Smith, Mr L. Taylor, Mrs H. E. Titchen and Mrs M. A. Webster. Members stepping down this year from the Committee were Ms S. Hallett, Mrs L. Houston and Dr N. Malcolm. This left some vacancies on the Committee.

The attendance at indoor meetings this year averaged 40 people. "Tree Watch" the brain-child of our Sectional President, has developed into a regular and important paragraph in the Society's *Bulletin*, which through members' responses, is building up a valuable body of knowledge on local trees.

Finally, we have to note with regret, the death in November of Captain R. B. G. Roe, who had been a member of our Society for forty years and produced his major publication, *A Flora of Somerset,* in 1981.

The indoor meetings held during the year were:

27 Jan.	Annual General Meeting with Presidential Address on "Botany in Tenerife"
25 Feb.	Members' evening with slides and exhibits
25 Mar.	"Botany in Gloucestershire" by Mr M. A. R. Kitchen
27 Oct.	"The South African Karoo in spring" by Mr N. J. Wray
24 Nov.	Members' Evening with slides and exhibits
29 Dec.	"A botanist in Western Australia" by Mrs P. M. Millman

The following outdoor meetings were held, led by those indicated:

13 Apr.	Avon Gorge towpath, Ms L. Houston, Ms S. Hallett
26 Apr.	Crickley Hill Fort, Mr M. Kitchen, Mrs C. Kitchen
18May	Wetmoor, Gloucestershire Trust Reserve, Dr M. Martin (arranged by Mrs M. Webster)
24 May	Bath University Campus, Mr A. C. Titchen
31 May	Keynsham Humpy Tumps, & Stockwood Vale, Mr C. W. Hurfurt
22 June	West Sedgemoor, Mr A. G. Smith
5 Jul.	Braunton Burrows, Mr A. G. Smith
8 Jul.	Portishead Seafront & Cliff path, Mrs P. Millman, Mrs H. Titchen
31 Aug.	Tortworth Chestnut, churchyard and arboretum, Mr A. C. Titchen
7 Sep.	Sand Bay, Mrs M. Webster

CHRISTOPHER HURFURT, *Hon. Secretary*

REPORT OF THE GEOLOGICAL SECTION, 1997

At the Annual General Meeting, held on 22 January, Mr D. W. Cope was re-elected as President, Mr J. Radley as Hon. Secretary, Mr P. C. Stevenson as Hon. Treasurer and Mr S. C. Carpenter as Hon. Field Secretary. Members elected to the Committee were: Mrs M. E. Poolman, Mr D. W. Strawford and Mr D. A. Wilson.

The Section enjoyed a successful year. In February the lecture, by Dr Hollingworth generated a lot of lively debate about the mystery of the mudspring at Wootton Bassett, which produces large volumes of Lower Kimmeridge mud and abundant fossils. At the Geologists' Association reunion in London there was an exhibition of fossils from Stowey Hill Quarry collected by Simon Carpenter and Richard Wilkins and a small display promoting our society.

The excellent field season included three joint meetings with Bath Geological Society, including the one to Stowey and Dundry Hill quarries which was exceptional in that the total number of members attending from both societies was over thirty.

The new geological information boards describing the Pennant Sandstone, were installed along the Railway Path and the Avon Ring Road Cycle Path. This project was generously supported by the Hector Hockey Fund (administered by the Bristol Naturalists' Society) the Curry fund (of the Geologists' Association) South Gloucestershire Council, Bath and N E Somerset Council and Sustrans.

Leaders of excursions and members attending meetings are thanked for their support of the Section throughout the year.

The following indoor meetings were held:

22 Jan.	Annual General Meeting, followed by the Presidential Address, "Acid sediments and soils on limestone and chalk plateaux" by Mr D. W. Cope.
12 Feb.	"Mud Springs Eternal: The Wooton Bassett Mud Bog Mystery" by Mr Neville Hollingworth

12 Mar.	"Geology, past mining and quarrying in the Soudley Valley, Forest of Dean", by Dr N. Chidlaw
15 Oct.	"The Geology of Clevedon" by Mr C. J. T. Copp
8 Nov.	Annual Reunion of the Geologists' Association, in London (Joint Meeting with Bath Geological Society)
10 Dec.	Members' evening with geology quiz

The following field meetings were held under the leadership of those shown:

13 Apr.	"Rocks and building stones at Hestercombe, near Taunton", by Mr H. Prudden (Joint meeting with Bath Geological Society)
18 May	"Tetbury Camp Quarry, Great Elm, near Frome" by Mr G. Green
24 Aug.	"Westbury Clay Pit, Wiltshire" by Mr S. C. Carpenter
13 Sep.	"Stowey and Dundry Hill Quarries" by Mr A. Bentley

Jon Radley, *Hon. Secretary*

REPORT OF THE ORNITHOLOGICAL SECTION 1997

At the Annual General Meeting, held on 17 January, Mr R. L. Bland was re-elected as President for the second year of his three year term of office. Dr. M. J. Hill was elected as Hon. Secretary/Treasurer, in succession to Mr R. G. L. Holmes who resigned last year on moving to Sussex. Members newly elected to the Committee were Mr B. J. Gray, Mr M. J. Haines, Miss S. McCarthy and Dr. H. E. Rose, who joined the re-elected Committee members, Mr P. J. Chadwick, Mrs J. Fowles, Mrs J. Lance, Mr J. G. Prince and Mrs S. E. Prince.

Members of the Section have been as active as ever in a range of national and local field surveys. They were involved in the national British Trust for Ornithology's Breeding Birds Survey, Common Bird Census, Garden Bird Census, Garden Bird Survey, Heronry counts, Nest Record Card Scheme and Breeding and Wintering Skylark Scheme. They also participated in the Wildlife and Wetlands Trust's survey of wildfowl and waders. Local surveys with which members helped included the recording of over-wintering warblers, a separate survey of birds in gardens in winter, a winter bird count scheme, a count of the rookeries of our area, a breeding season tetrad survey and a House Martin survey.

During the year, the following indoor meetings were held:

17 Jan.	Annual General Meeting and talk by Mr P. J. Chadwick on "Birding in the Caribbean"
7 Mar.	"The alternative Mallorca" by Dr A. B. Hawkins
3 Oct.	"Birds of the Russian Tundra" by Mr J. Bowler
7 Nov.	"Nightjars" by Mr R. Khan
5 Dec.	"Costa Rica" by Mr P. J. Chadwick

The following twenty field meetings were held under the leadership of those shown:

18 Jan.	Slimbridge, Mr D. Paynter
16 Feb.	Poole Harbour Boat Trip
29 Mar.	Brean Down, Mr B. J. Gray
27 Apr.	Sand Point, Mr P. J. Chadwick
30 Apr.	Compton Dando, Mr J. G.Prince and Mrs S. E. Prince
8 May	Snuff Mills, Mr R. L. Bland
11 May	Highnam Woods, Mr J. G. Prince and Mrs S. E. Prince
22 May	Weston Moor, Mr D. A. C. Cullen and Mr L. Roberts
28 May	Blaise Woods, Mr J. Tully
31 May	Greater Westhay, Mr R. L. Bland
5 Jun.	Crooks Peak, Mr B. J. Gray
11 Jun.	Folly Farm, Avon Wildlife Trust reserve, Mr D. Warden
14 June	Stock Hill plantation, Mr R. L. Bland
19 Jun.	Hawkesbury, Mr R. L. Bland
25 Jun.	Eastwood Farm, Brislington, Mr B. J. Gray
23 Aug.	Wader Safari to Slimbridge, Mr T. G. Evans
18 Oct.	Sand Point, Mr R. L. Bland
9 Nov.	Blagdon Lake, Mr S. M. Taylor
22 Nov	Clevedon Sea Wall, Dr. H..E. Rose
26 Dec.	Chew Valley Lake, Mr P. G. Farmer

MARY HILL *Hon. Secretary*

REPORT OF THE INVERTEBRATE GROUP, 1997

The Group continued to test the water, to see whether it is possible to re-establish a full invertebrate section. Tony Smith acting as Convener for meetings. The Society' A.G.M. on 25 January included the retiring Presidential address, "The Urban Entomologist" by Ray Barnett.

The following indoor meetings were held:

4 Feb.	Members evening
6 Mar.	"Moths and other invertebrates" by Bill Dixon
24 Oct.	"The Bug Club" by Kieren Pitts and Simon Bell
13 Dec.	Visit to the collections at the City Museum & Art Gallery, Ray Barnett

The following field meetings were held, led by those indicated:

18 May	Wetmoor, Ray Barnett
8 Jun.	Priddy, John Boyd
15 Jun.	Dolebury Warren, Jerry Board
9 Aug.	Collard Hill, near Street, Robert Cropper
16 Aug.	Callow Rock Quarry, Shipham, Janet Boyd

A. G. SMITH, *Leader, Invertebrate Group*

REPORT OF THE MAMMAL GROUP, 1997

During the year, the Group arranged a series of talks, workshops and field meetings in association with the Avon Bat Group (ABG), the Bristol Regional Environmental Records Centre (BRERC) and the Mammal Society. Mammal records continued to be collected and are summarised in The Avon Mammal Report in this issue.

The following indoor meetings were held:

17 Feb.	Members' Evening with slides and specimens.
18 Mar.	"Daubenton's Bat" - a joint workshop with the ABG.
23 Apr.	"The work of BRERC" by Miss Philippa Burrell - a joint meeting with the ABG.
2 Dec.	"One hundred and fifty years of gorillas under fire" by Mr Ian Redmond - a joint Mammal Group/General Lecture.

The following outdoor meetings were held:

13-20Apr.	Small Mammal Trapping in the Gordano Valley National Nature Reserve (part of the Mammal Society's Short-tailed Field Vole Survey).
1 Jun.	Bat Box Survey at Chew Valley and Blagdon Lakes - a joint meeting with the ABG.
6 Sep.	As 1 June.
9-16 Nov	As 13-20 April.

DAVID TRUMP, *Leader, Mammal Group*

REPORT OF THE PUBLICATIONS COMMITTEE 1997

The Committee met four times during the year. The principal concern was the completion of work on the production of the *Proceedings* for 1995 (Vol. 55) and its companion publication, Special Issue No. 4 – *The Mendips*. These were finally published at the end of November. The Special Issue contains only the original papers and is designed for sale to non-members. It was largely due to the insight of V. D. Dennison that the idea of a Special Issue on *The Mendips* was originally conceived. Although, sadly, Mr Dennison did not live to see it published, the volume has been dedicated to his memory. The thanks of our Society are due to the Mendip Society for its co-operation in the planning of the Special Issue and for generous financial support for its publication.

During the year, the Publications Committee continued its work on the cumulative index for the *Proceedings*, to cover the period 1971–1995. It is intended that this should be published in the issue for 1996. Most of the rest of the material for that issue has been received.

The Honorary Editor would like to thank the Chairman and members of the Publications Committee for their support during the year. She would particularly like

to thank Mr Taylor for his work in producing the camera-ready copy for yet another issue. However, the considerable delay between the conception and publication of the issue for 1995 is to be laid, entirely, at the door of the present Honorary Editor, who offers her apologies to all concerned.

ANNE HOLLOWELL *Hon. Editor, Proceedings*

REPORT OF THE LIBRARY COMMITTEE

The Library Committee is pleased to report another successful year. Mrs. A. F. Hollowell was re-elected as Honorary Librarian. The Library Committee was chaired for 1997 by Roger Symes and met on five occasions during the year. Members of the Committee continued to staff the Library from 12.30 to 1.30 pm on Wednesdays, and from 10.15 am to 12.00 noon on Saturdays. During the year 44 (42 in 1996) members made 269 (274) visits and borrowed 260 (261) items. In addition there were 9 (44) visits by Museum staff. These figures show that the previous year's increases were sustained.

Six books and monographs were purchased and five books, three videos and over 50 issues of journals, which had been donated, were accepted into the library stock, together with offprints, and newspaper cuttings of local interest. For all these we are indebted to:-
Dr. R. Bradshaw, Mrs. A. F. Hollowell, Mr. P. J. M. Nethercott, Mr. R. G. Symes, Mr. D. P. C. Trump, Mr. C. J. Wilson (per Mr. D. P. C. Trump) and Mr. D. A. Wilson. Special name plates are added to books given to the collection by members. Twenty eight journals were purchased by subscription, 41 were received by exchange and six were received as gifts or were free.

Whilst it is normal practice that most books and journals received as gifts are retained in the Library collection, some little-used library books and journals were sold in 1997 and the proceeds will be used for library purposes. We also sold to one member as complete a run of our Proceedings from 1876 as we could muster.

The Society thanks Mr. Stephen Price, Head of Museum and Leisure Services, Bristol City Council, for the continued use of the Library room and for the assistance given to members during the year by Museum staff, and welcomes the continued use made of the Library by Museum staff.

Roger Symes *Chairman, Library Committee*

ADVICE TO CONTRIBUTORS

The editor welcomes original papers on the natural history of Avon and surrounding areas for consideration for publication in the *Proceedings*. Inexperienced authors may obtain advice from members of the Publications Committee. Authors should bear in mind that their readers will not usually be specialists in the particular subject, and that unnecessarily technical language can be a barrier to understanding.

1 All PAPERS for consideration should reach the editor by the end of August in each year. If there is likely to be a problem with this target date please contact the editor in advance. All SOCIETY REPORTS etc should reach the editor by the end of February in the next year.

2 Manuscripts should be double-spaced with wide margins and on one side of the paper only. The author should retain a copy

3 The wording should follow the style and format of the *Proceedings*. Abbreviations should not normally be used, especially in the abstract. An abstract should be supplied, and the text should be broken up by appropriate headings and sub-headings, accompanied by relevant illustrations. Captions to illustrations should be given separately at the end of the text.

4 Originals, not copies of photographs, slides, line drawings, diagrams and maps should be submitted - returnable on request. Drawings and other diagrams should not be more than twice final size and made in black medium. Photographs and slides may be submitted as prints, positives or negatives, preferably in monochrome. Graphs, charts and simple diagrams may most readily be produced by computer graphics: advice and help with this are available.

5 References should be listed at the end of the text in alphabetical order of the first author's name, and should take the following form.

Book: AUTHOR (DATE) *Title*. Place of publication: Publisher. E.g.
RACKHAM, O. (1986) *The history of the countryside*. London: J.M.Dent.

Paper: AUTHOR (DATE) Title. *Journal name*, **volume** (part),page nos. E.g.
ROSS, S. M. & HEATHWAITE, A. L. (1986) West Sedgemoor: its peat stratigraphy and peat chemistry. *Proceedings of the Bristol Naturalists' Society*, **44,** 19-25.

6 It is very helpful if the text can also be submitted on a disk either as an ASCII file or as a formatted file produced by any well-known software. This is especially valuable where many scientific names are involved.

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T. R. Fry

George Sweet with Paul Chadwick and Steve Hammacott

Captain R. G. B. Roe

OBITUARIES

CAPTAIN R. G. B. ROE, OBE, RN (1912-1997)

Robert (Rupert) Gordon Brabazon O'Neill Roe was born in Ludiana, India, on 15 December 1912, where he spoke fluent Ghurkhali. When he was eight he was sent to his aunt and uncle at Lympstone Devon to continue his education. There by the River Exe and close to the sea his love of flowers developed as well as his interest in the Navy. Although seemingly destined for an academic career, he chose to go to the Royal Naval College at Dartmouth, where he had an excellent record and independently derived the 'Epicyclic Curve Formula' for calculating any point on a circle. His distinguished naval career included escorting the Duke of Windsor to France at the time of the abdication, keeping watch on German ships during the war, picking up survivors at the time of Dunkirk, and taking part in the Russian convoys. After the war he moved to Bath, mainly doing secret development work, and retired from the Navy in 1962, when he was awarded the OBE.

On retirement Captain Roe devoted much of his time to studying, together with his wife Isabel, the flora of Bath and its surroundings. Indeed as early as 1959 he and his wife discovered the Cut-grass (*Leersia oryzoides*) in the Bridgewater and Taunton Canal near North Newton, new to Somerset. He joined the Botanical Society of the British Isles (BSBI) in 1956, the Bristol Naturalists' Society in 1958, and was later the President of the Bath Natural History Society (subsequently an Honorary Member). Realising that there was a need for an up-to-date Flora to cover Somerset, and prompted by the BSBI Distribution Maps Scheme, he initiated serious work to collect the information needed in the mid 1960s. He kept meticulous records by hand on a card index, giving the location and other details of every taxon, so building up a body of data which led to the publication of his *Flora of Somerset* in 1981.

Captain Roe served as the BSBI Recorder for North Somerset from 1965 to 1993, and South Somerset from 1978 to 1993. In collecting details of plant distribution in Somerset he was assisted by many local botanists, the county being covered on 2x2 km square basis. Records were plotted on map cards, so new reports could be instantly seen and queries about distribution quickly answered. During the preparation of the county *Flora* he presented to the Annual General Meeting of the Botanical section of the B.N.S. a 'Progress Report on the Somerset Flora' every year from 1968 to 1973, lastly in 1975 giving 'A final summary of findings on the Somerset Flora'.

The Flora of Somerset was favourably received, summarising useful detail and including photographs of some of Somerset's rarer species, e.g. *Carex depauperata*, *Koeleria vallesiana* and *Trinia glauca*. Reviews of the *Flora* are given by J.F. Hope-simpson (*Proceedings of the Somerset Archaeological and Natural History Society* 1981, Vol. 125 pp 141-141) and by P.F. Hunt (*Watsonia*, 1982, Vol. 14 Pt 2, pp 210-211). Captain Roe regularly contributed records (some 70) to the 'Bristol Botany' articles on the BNS Proceedings, covering a period from 1957 to 1988. Among these

reports are the Frog Orchid (*Coeloglossum viride*) from Binegar Bottom, Mendip, and the usually coastal plants *Poa Bulbosa* and *Vicia laythyroides* found some considerable distance inland.

Robert Roe's short paper entitled '*Veronica crista-galli* Ster. in the British Isles (*Watsonia*, 1978, Vol. 12, Pt 2, pp129-132) referred to this naturalised Speedwell particularly in the Bathford-Bathampton area. In another important paper 'Losses and threatened losses from the Somerset Flora' (Proc. Somt. Arch. & Nat. Hist. Soc. 1986, Vol 130, pp 193-199), he notes that since the 1790s some 72 species seem to have become extinct, the rate of extinction increasing this century. However, he was very pleased on occasions when he found plants in sites from which they were believed lost. He had a healthy scepticism about unexpected records, initially reacting to the report of the Lady Orchid from Leigh Woods as either planted or a misidentification.

Captain Roe's card index files were passed on to IP and PR Green and provided much information for their *Atlas Flora of Somerset*, 1997, the authors acknowledging his help. His death on 30 October 1997 leaves Somerset the poorer by the loss of a self-effacing person of great integrity who contributed so much to its botany.

P. J. M. NETHERCOTT, A. J. WILLIS

CLIFFORD HASTINGS CUMMINS (1902-1997) AND WINIFRED MARGARET CUMMINS (1903-1987)

Partners in field and garden.

In 1948, Clifford Hastings Cummins and his wife Winifred Margaret Cummins, their home being in Westbury-on-Trym, Bristol, joined the Society. Only in ill-health did they both resign at the end of 1985. Mrs Cummins died on Christmas Day, 1987 and her husband died, aged 94, on 10 May 1997, after a long debilitating illness. Both she and her husband died in Bristol.

Clifford Cummins was born in Bristol in 1902 and was educated at Clifton College. He joined the family firm of Cashmore & Co. (Glass Merchants) and retired in the mid-sixties. Winifred Cummins was born in Croydon in 1903 and was educated at Croydon High School. She was married first to Kenneth Barratt but was widowed after five years of marriage.

Mr and Mrs Cummins were both active in the Society for a long period. It was in 1952 that, with Dr A. F. Devonshire, they led a meeting of the Society from Charterhouse through Long Wood and across to Cheddar Cliffs. Two coaches were hired and the cost per member, including tea at Cheddar, was eight shillings (equivalent to 40p today)! The last meeting the Cummins led was in 1978 to the Mounton Valley, Chepstow. This, by coach, cost £1.20 but tea was not included.

Mr and Mrs Cummins led twenty meetings, ten by coach and ten using the bus or on foot. All their meetings were carefully prepared. In the Society's literature, the leadership of the meetings was usually ascribed to Mr Cummins. This was misleading as both were competent botanists and she especially so at finding plants; note her observation in 1953, between Avonmouth and Chittening, of *Salicornia ramosissima*, Woods. Mr Cummins was the communicator. Mrs Cummins was a member of the Botanical Section Committee from 1964 to 1978.

The field meetings which the Cummins led were nearly all in the Bristol area or just into Wiltshire or Gwent. Two of these, 'The Course of the Trym' and 'Around Westbury-on-Trym Valley', were remarkable for the botanical interest which they found to be surviving on their home ground.

Both Mr and Mrs Cummins contributed plant records to the annual 'Bristol Botany' paper of the Society's *Proceedings*, in most years between 1953 and 1978. They made no great discoveries yet mention should be made of three interesting records. These were of *Dianthus gratianopolitanus* Villars, the Cheddar Pink, at its locality some distance east of Cheddar, in 1966, of *Althaea officinalis* L., the Marsh Mallow, on a beach west of Redcliffe Bay in 1970 and of *Hippocrepis comosa* L., the Horseshoe Vetch at Potter's Point, Blaise Castle Estate, in 1974.

Mr Cummins was named by Captain R. G. B. Roe in the preface to his '*The Flora of Somerset*', 1981, as among the small band of people who volunteered, year after year,

to search tetrads and so were deserving of particular thanks. Mrs Cummins may be included in that category.

In the 'fifties, from April to September, the Botanical Section of the Society held up to five or six monthly indoor meetings at the University of Bristol. Members brought in plants for identification and discussion, especially those which had been collected on field trips. To close a meeting, a visit was often made to the Hiatt Baker memorial garden (on which the University Senate House was later built), to the Royal Fort Gardens or to Brandon Hill. This practice ceased after 1960. However, on the occasion of the Society's Centenary Celebrations in 1962, the Botanical Section illustrated the flora of the limestone areas near Bristol by exhibiting, at the City Museum, live plants collected by Mr I. W. Evans, and Mr and Mrs Cummins.

At the Botanical Section's winter indoor meetings, Mr Cummins gave several accounts, illustrated by fine transparencies, of holidays in England, where he and his wife visited the Lake District and Cornwall and on the Continent, where they travelled in south-west Spain, the eastern Dolomites and Andorra. Mr Cummins also regularly contributed to the Botanical Section's "members' evenings" of short talks and the showing of transparencies.

The Bristol City Museum, from pre-war years, maintained a Wild Plant Table. The plants for the Table were mostly brought in by volunteers and were changed weekly. Our member, Ivor Evans, was a principal contributor for many years (see the Society's *Proceedings*, for 1969 vol. XXXI, Pt VI, p572). In the sixties and up to 1972, the Cummins increasingly participated in this provision and display of local wild flowers. The Plant Table was an educative and pleasurable feature amongst the Museum's exhibits and many people regularly called to see it. It was finally discontinued when nature conservation became a prominent issue.

Both Mr and Mrs Cummins were keen gardeners. They lived, during their membership of the Society, at 208 Stoke Lane, moving in 1973 to 11 Cote Park, both in Westbury-on-Trym. It was a great pleasure to be invited to visit their garden, so full of interesting plants.

Mr and Mrs Cummins' contribution to the Society belong to the third quarter of the century now approaching its close. At this time, it seems appropriate to gather together, within this obituary, those fragments of the botanical scene known to them in their active years. Those times recede beyond recall. The Cummins were also long-time supporters of the South Western Naturalists' Union and attended many of its conferences, which were held in the spring of each year. Mr Cummins included amongst his other interests both tennis and badminton. He was a founder member of the Redland Park Lawn Tennis Club and he served on the Committee of the Bristol Badminton Club. I am grateful to Mrs Jean Hammonds, of Horsham, daughter of Mrs Cummins by her first marriage, for much personal information of her mother and step-father.

P. J. M. NETHERCOTT

THOMAS ROBERT FRY 1902-1997

Tom Fry will be best remembered for his work as an outstanding field geologist and fossil collector. His geological collections, amassed over a lifetime, are shared by the University of Bristol and Bristol City Museum. With his field notebooks and sketches, they provide a resource of immense scientific importance.

Tom was born in Bristol on 5 January 1902, one of six children in a working class family. He grew up and lived all his life in St George. At the age of 13 he left school and there followed a period of employment in local factories, interspersed with periods of unemployment in the hard days of the 1920s. Tom was a self-taught geologist whose interest was first stimulated after reading an article on 'How to begin the study of Geology' in Cassell's Family Magazine in 1917. In 1919 at the age of 17 he became associated with the Geology section of the Bristol Naturalists' Society, but came into the Society as an Associate Member in 1925. He regularly took members on field excursions for the Geology section. He became a Full Member of the Society in 1959

Tom collected rocks and fossils at a time when there were many still active quarries, brickyards and collieries. During the Second World War, Tom took advantage of exposures of rocks in bomb craters; an occupation that got him arrested by the Home Guard on one occasion. Tom realised how important it was to record and document geological sites especially temporary ones. During a period of house building in Keynsham near Bristol in the late 1940s, his field notes and collections were used in the preparation of several important papers by Desmond Donovan (see list below). Between 1948 and 1962, Professor W. F. Whittard, of Bristol University, realising his knowledge and skills as a collector, employed Tom from time to time to collect material for his Palaeontological Society Monograph on the Ordivician trilobites of west Shropshire. He was rewarded by twice having a trilobite named after him. They are *Piltonia fryi* Goldring and *Amphilichas fryi* Whittard.

Tom's strength was his unrivalled knowledge of the rocks and fossils of the Bristol area. During his life he made important collections from the rocks of Dundry Hill, Bitton, Radstock and Keynsham. His interests extended to archaeology, with important discoveries of paleoliths from the gravel terraces of the Bristol Avon. Travelling to localities beyond Bristol, Tom would frequently cycle, thinking nothing of camping out in fields, quarries or under hayricks in pursuit of his hobby, often setting off in the early hours of the morning to get a good few hours in the field before returning for Sunday lunch.

Over a period of more than sixty years he amassed vast collections of mainly local fossils which would eventually be sold to the University of Bristol and the Bristol City Museum. Accompanying these collections were his field notes and drawings, documenting the places where fossils were found and the thicknesses of rock layers. They also provide a glimpse of the person behind the collector, a man devoted and dedicated to geology, willing always to share his knowledge with others, amateur and

professional, young and old. In 1947 he joined the Bristol University's Geology Department (now Earth Sciences) to bring some order to their geology collections and later in 1968 went to work for the City Museum and Art Gallery, as a part-time curator in the Geology Department. In 1968 Bristol University awarded Tom an honorary degree of Master of Science in recognition of his work and achievements.

Tom Robert Fry died on April 2 1997 and is buried in Avon View Cemetery, St George. Tom's wife, Gladys, predeceased him in 1994, and he is survived by a daughter and two sons.

Selected publications list.
Tom Fry's collections from the Avon gravels were used in the preparation of the following publications;
DAVIES J.A. & FRY T. R, 1929 Notes on the gravel terraces of the Bristol Avon, *Proceedings of the University of Bristol Spelaeological Society*, **3** : 162-172.
LACAILLE, A. D. 1954. Palaeoliths from the lower reaches of the Bristol Avon. *Antiquaries Journal*, **34**: 1-27

Tom Fry's field notes and collections from Keynsham (acquired by the Bristol City Museum in 1952) were used in the preparation of the following papers:
DONOVAN, D. T. 1952. The ammonites of the Blue Lias of the Bristol District. Part 2. Arietitidae. *Annals and magazine of Natural History*, (12) 5; 717-752
DONOVAN, D. T. 1956. The zonal stratigraphy of the Blue Lias around Keynsham. *Proceedings of the Geologists' Association*. **66**: 182-212.
DONOVAN, D. T. 1952 The ammonites of the Blue Lias of the Bristol district. Part 1 Psiloceratidae and Schlotheimidae. *Annals and Magazine of Natural History*, (12) 5 : 629-655
Some fossils collected from bomb craters were cited by ARKELL, W. J. 1951-59. *English Bathonian ammonites*. Palaeontographical Society Monograph.

Tom contributed short papers to the Proceedings of our Society in 1950, 1951, 1952, 1969 and 1970, mostly dealing with temporary exposures and boreholes.

SIMON CARPENTER, friend and fellow field geologist.

GEORGE SWEET, 1909-1997

George Ernest Sweet was born in London on 20 November 1909 and died in Bristol on 29 June 1997. He early showed interest in both ornithology and art as well as ability at languages, and he was a good classical scholar. While a medical student at London University he heard that the great Henry Tonks, the Slade Professor of Art, was to retire in two years' time. He changed careers and enrolled at the Slade School, so fulfilling an ambition to become a painter, but his father stipulated that he complete his botany and zoology studies at Birkbeck College in his spare time. George told me years later that he had often been grateful for this proviso. After his time at the Slade he travelled in France and Spain, painting, studying birdlife and becoming fluent in French, Spanish and Catalan. He returned to England in 1936, on the outbreak of the Spanish Civil War, and in 1938 became head of the Fine Art department at the West of England College of Art in Bristol where he remained until he took early retirement in the 1960s.

A keen ornithologist with a lifelong passion for raptors, he often made interesting observations while quietly engaged in painting landscapes in secluded spots, in Britain and overseas. After the war, as British delegate to the International Association of Plastic Art, his linguistic abilities were much in demand at conferences in exotic locations; organisers, offering him an outing to express their gratitude, would be asked to drive him at dawn to a lonely vantage point and collect him at dusk. He became an accepted authority on Honey Buzzards, Ospreys and Hobbies, on which he contributed to the *Handbook of the Birds of the Western Palaearctic* and advised the English Nature New Forest team.

He joined our Society in 1956, and was President of the Ornithological Section from 1960 to 1962. Later he organized detailed studies of birds of prey in our area. With his wide experience he was a valued member of the Section's (and later of the Avon Ornithology Group's) Editorial and Recorder's Committees from 1963 until his death. He also served on the Society's Publications Committee.

He had known the New Forest from boyhood, and in 1965 he proposed to me and the late H. R. Hammacott a visit there. Lacking adequate transport, we asked Alec Forrest if he (and his Daimler) would be interested, and so began over thirty annual weekends, ended only by infirmity. George taught us much about the Forest, its history, secret places and birdlife. He at last revealed, under oath of secrecy, that his goal was the one or two Honey Buzzard pairs then breeding there. At last we found an occupied nest, but not until David Warden had joined us after Forrest's untimely death in 1977. For me the memory is of much good talk among artist, headmaster, engineer and lawyer (later vet), all with a strong common interest.

He was a private man, whose talents were appreciated by inner circles of painters and of ornithologists. We send our sympathy to his daughter Stephanie and his grandson Lucian.

S. M. Taylor.

BRISTOL BOTANY IN 1997

by A.J. WILLIS
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The year 1997 was warmer and a little wetter than average. The mean maximum temperature was 14.5°C and the mean minimum temperature 7.4°C, overall about 1.0°C above normal. January and October were cold months, and mean maximum temperature in a sunless June was below average, but in all other months, and notably February, March and August, warmer than average temperatures were recorded. Of a total of 36 ground frosts for the year, 15 were in January, March being entirely frost-free. Rainfall totalled 893 mm, 16 mm above the 30-year average (1961-1990), at Long Ashton, to which all meteorological data relate. The wettest months were August and February, whereas January was exceptionally dry, with only 10 mm rainfall. Other drier than normal months included September, March and April.

The cold January may have led to the rather late flowering of vernal species, as in 1996, when compared with the years 1993 to 1995. Snowdrops at Stoke Lane Valley were flowering well by mid February but can be much earlier than this, as also *Helleborus viridis* at Nettlebridge which at this time was still in bud. At Churchill Batch *Helleborus foetidus* was in flower by 23 February, and also *Ranunculus ficaria*. At Stoke St Michael *Gagea lutea*, as in 1995 and 1996, flowered very well (more than 250) at the end of March, despite its reputation as a sparse flowerer. *Orchis morio* too had a good flowering season at the end of April, with numerous spikes in a field on Worle Hill and also at Uphill. *Ranunculus ophioglossifolius* flowered moderately well at Inglestone Common, but not many plants were seen of the later flowering *Cyperus fuscus* on Walton Moor (all records RSC).

As in previous years, new sites have been recorded for a number of native and introduced species. The rare Four-leaved Allseed, *Polycarpon tetraphyllum*, native near the sea in south-west England, is a welcome find (at Weston-super-Mare), as also is the rare Broad-fruited Cornsalad, *Valerianella rimosa*, at Pucklechurch. Notable first records were made of the ferns *Trichomanes speciosum* and *Adiantum capillus-veneris* for the Gloucestershire part of the Bristol region, both being second records for v.c. 34, West Gloucester. The tiny *Lemna minuta* was noted for two new sites, and the French Oat-grass, *Gaudinia fragilis*, was found to be well established at Uphill.

An important addition to the botanical literature in 1997 is *The Atlas Flora of Somerset*, compiled, edited and published by Paul R. Green, Ian P. Green and Geraldine A. Crouch. This *Flora* covers the county of Somerset as delimited in 1974; this excludes the more southerly parts of the former county of Avon, now the unitary authorities of North Somerset, and of Bath and North-East Somerset. The Watsonian vice-county 5, South Somerset, is fully covered, but only the southern part of vice-county 6, North Somerset. Much recording, on a tetrad basis, has been done by the authors, as well as others, in the last ten years, and a great many gaps in our knowledge of plant distribution in the area have been filled. Full attention has been

paid to the occurrence of hybrids; maps are given, for example, of several *Rumex* and *Mentha* hybrids, as well as details of the occurrences of other members of these genera. An attractive feature is a substantial set of high quality photographs which include a number of the less common species for which Somerset is known, such as the Cheddar Pink and the White Rock-Rose. The *Atlas* is a fount of information on plant distribution (the main aim of the work), but gives very little about habitat or ecology. Notes on some 'favourite sites for botanising in Somerset' are, however, included. The *Atlas Flora* can be obtained (£20, incl. p. & p.) from Mr I. P. Green, Farwells, Wayford, Crewkerne, Somerset, TA18 8QG.

Useful information about the major habitats and their flora is given by K. C. Allen in Botanical walks and wanderings in the Mendip Hills (*B.N.S. Proceedings* for 1995, **55**, 3-18), with handsome colour photographs of six of the notable plants. Changes in the vegetation over the last 400 years on Mendip are described by K. Crabtree in the paper Recent vegetation history of Black Down, Mendip (Ibid. **55**, 87-94). The former vegetation, which indicates a phase of bog conditions, has progressed to the present type richer in grasses (Purple Moor-grass is now dominant) and with less Heather, Tormentil and Heath Bedstraw. An article by M. H. Martin and K. M. Fawcett entitled The biological implications of heavy metals in the Mendips (Ibid., **55**, 95-112) gives details of metal-tolerant vascular plants, mosses and lichens and discusses food-web relationships in metal-polluted environments. Surprisingly, none of the papers in the wide-ranging sequence of articles in *The Mendip Hills* (Ibid., **55**, 1-158) mentions the book *Mendip: a new study*, ed. R. Atthill, 1976, David & Charles, Newton Abbot, which also covers many topics, including the physical environment, natural history and ecology, the two publications being good complements.

Mr C. H. Cummins, well known as a long-standing member of the B.N.S., died on 10 May 1997. He took a great interest in the plant life of the Bristol area and was a regular contributor of records in the 1970s. He and his late wife were both active in the Society and organised a number of field visits over the years. An obituary is given in these *Proceedings*, p. 14.

Captain R. G. B. Roe, O.B.E., author of *The Flora of Somerset*, published in 1981, died on 30 October 1997 at the age of 86. After retirement from the Navy and coming to Somerset in the 1960s, he, assisted by his wife, embarked on a study of the flora of the old county of Somerset, (v.c.s 5 and 6), culminating in the publication of the *Flora*. He acted as the Botanical Society of the British Isles recorder of both vice-counties until 1993, and contributed many plant records himself as well as collating those of others on an extensive card index. Re-finding the Nit-grass, *Gastridium ventricosum*, in a number of sites where it was feared extinct, gave him great pleasure. He regularly contributed plant records to the *Proceedings of the Somerset Archaeological and Natural History Society* and a paper on Losses and threatened losses from the Somerset flora (**130**, 193-199, for 1985/86). An obituary is included in these *Proceedings*, p. 13.

Names of contributors associated with several records are abbreviated thus:

RSC	R. S. Cropper	MARK	M. A. R. Kitchen
IPG	I. P. Green	JPM	J. P. Martin
PRG	P. R. Green	PJMN	P. J. M. Nethercott
CK	Mrs C. Kitchen		

The area covered by this report is essentially that defined by J.W. White for his *Flora of Bristol* (1912). The eastern boundary is taken as the old boundary of Wiltshire where it meets the old boundaries of both Gloucestershire and Somerset. The southern limit is taken as approximately the course of the River Brue along some of its length. The area comprises the northern part of the Watsonian vice-county of North Somerset (v.c. 6) and the southern part of West Gloucestershire (v.c. 34). In the following records these parts are designated **S** and **G** respectively.

Plant names are in accordance with C. Stace *New Flora of the British Isles*, 2nd edition, 1997.

Equisetum telmateia Ehrh. Plentiful in earth disturbances associated with the development of the new out-of-town shopping centre, Cribbs Causeway, Bristol, **G**, PJMN; known in this area for many years by MARK & CK. Also scattered along railway embankments between Filton and Ashley Down, **G**, PJMN.

Trichomanes speciosum Willd. Gametophytes in deep, damp crevices in Pennant Sandstone in several places in the River Frome valley, Oldbury Court Estate, **G**, MARK & CK. This is a first record for the Bristol district and the second for v.c. 34.

Adiantum capillus-veneris L. With *Phyllitis scolopendrium* (L.) Newman, in walls of manhole, Glenside Hospital, Fishponds, Bristol, **G**, A.H. Ogden. This is the first record for the Gloucestershire part of the Bristol region and the second for v.c. 34.

Fumaria bastardii Boreau One flowering plant, garden border, Unity Farm, Berrow, **S**, RSC.

F. muralis Sond. ex W.D.J. Koch One plant by track near boatyard, Uphill, **S**, RSC.

Thlaspi arvense L. Several plants, Ashcott Corner, **S**, RSC.

Cochlearia danica L. Abundant in central refuge of A38, Falfield, **G**, MARK. Also in central refuge, Cribbs Causeway, **G**, JPM. This salt-tolerant plant has much increased in recent years in the central reservations of salt-treated roads.

Draba muralis L. One desiccated fruiting plant on rather bare dry stony soil by roadside, Halmore, **G**, N. Lusmore & M.J. Trotman. A first record for this hectad.

Cerastium diffusum Pers. Several plants on rather bare stony slope, Draycott, **S**, RSC.

Polycarpon tetraphyllum (L.) L. Two well-separated populations of this very rare annual, in sparse open grassland, on very sandy soil, in school grounds, Weston-super-Mare, **S**, R. Higgins. Reported as a casual, it may possibly be native in the area, noted for its south-western specialities. Associates included *Aphanes arvensis* L., *A. australis* Rydb., *Arenaria serpyllifolia* L., *Carex*

arenaria L., *Plantago coronopus* L., *Sagina procumbens* L. and *Trifolium micranthum* Viv.

Genista tinctoria L. Plentiful on trackside and in meadow, Holcombe, **S**, RSC. Also *Hypericum pulchrum* L. and *Oenanthe pimpinelloides* L.

Trifolium medium L. Brean Down, **S**, RSC. Also, further east, a large patch of *Geranium pusillum* L.

T. scabrum L. Several plants in limestone turf, Westbury-sub-Mendip, **S**, RSC.

Vicia bithynica (L.) L. A substantial patch and one outlier, roadside bank, Kendleshire, Westerleigh, **G**, MARK, CK & S. Parker.

Lathyrus nissolia L. One flowering plant, in grassland refuge, below motorway interchange, Cribbs Causeway, Bristol, **G**, PJMN.

Rosa obtusifolia Desv. Several bushes, with evidence of hybridization, Kilmersdon, **S**, RSC.

Sorbus eminens E.F. Warb. This species is omitted from *The Atlas Flora of Somerset*, P.R. Green *et al.*, 1997, and also from *The Flora of Somerset*, R.G.B. Roe, 1981. It was collected by PJMN on Cheddar Cliffs in 1957 but Dr E.F. Warburg, who was shown fresh material, expressed doubt on this determination (see *Bristol Botany in 1984*, p. 65). The acceptance of this species as present on Cheddar Cliffs is recorded in *Bristol Botany in 1989*, p. 35. The view that this taxon was confined to the Wye Valley and the Avon Gorge is acknowledged as too restricted. It extends south to the Mendips.

S. porrigentiformis E.F. Warb. The statement in *The Atlas Flora of Somerset*, P.R. Green *et al.*, 1997, p. 99, that this *Sorbus* was 'positively identified from the [Cheddar] gorge in 1966, Miss I.F. Gravestock' is incorrect. The first authentic record for Cheddar is given in the chapter on 'Vegetation' by J.F. Hope-Simpson and A.J. Willis in *Bristol and its adjoining counties*, eds C.M. MacInnes and W.F. Whittard, British Association, Bristol, 1955, p. 107. This information was provided by Dr E.F. Warburg (see footnote, op. cit., p. 105).38 PJMN first saw *S. porrigentiformis* at Cheddar in 1957 (unpublished) and assisted Miss Gravestock over *Sorbi* and *Hieracia* for her paper The Botany of Cheddar Gorge, *Procs B.N.S.*, Vol. XXXI, Pt VI, published 1970 (see p. 646 for list of 'Cheddar specialities' and p. 645 for acknowledgement to PJMN).

S. anglica Hedl. This species was noted for Cheddar rocks and cliffs in *Bristol and its adjoining counties*, op. cit., p. 107 (record omitted from *The Atlas Flora of Somerset*), and was first seen by PJMN at Cheddar in 1957 (unpublished).

Euphorbia platyphyllos L In field gateway, with *Chenopodium ficifolium* Sm., Stony Littleton, **S**, IPG.

Polemonium caeruleum L. Flourishing garden escape in field, Pilning, **G**, JPM.

Hyoscyamus niger L. A single plant on beach, Sand Bay, **S**, Mrs D. Maxwell. Also one plant of *Atriplex laciniata* L.

Legousia hybrida (L.) Delarbre With *Kickxia elatine* (L.) Dumort., one flowering plant in track, edge of Cleaves Wood, Hinton Charterhouse, **S**, IPG.

Valerianella carinata Loisel. With *Veronica polita* Fr., Easter Compton, **G**, JPM.

V. rimosa Bastard Single well-fruiting many-stemmed specimen of this rare plant, field formed from overburden tipped from adjacent quarry many years ago, Shortwood Farm, Pucklechurch, **G**, D. Lawrence, conf. MARK.

Carduus tenuiflorus Curtis In good quantity behind sea walls, West Huntspill, **S**, RSC.

Zannichellia palustris L. With abundant *Chara vulgaris* L., pond, Whitcliff Deer Park, Ham & Stone C.P., **G**, MARK, CK & B.A. Grindey.

Iris foetidissima L. One clump of the yellow-flowered form in small disused quarry, with tree cover, Bourton Combe, **S**, IPG. Nearby was *Impatiens parviflora* DC. and *Saxifraga hirsuta* L.

Himantoglossum hircinum (L.) Spreng. A good flowering population, with *Anacamptis pyramidalis* (L.) Rich. and *Ophrys apifera* Huds. on grassy roadside bank, Westerleigh, **G**, J.L. Jones; also, later, MARK & CK.

Orchis morio L. With *Cerastium semidecandrum* L. and *Lithospermum officinale* L., Stroud Common, near Alveston, **G**, JPM.

Dactylorhiza maculata (L.) Soó With *Pedicularis sylvatica* L., Folly Farm, north-west of Clutton, **S**, RSC.

Carex distans L. Fruiting well in meadow, Aller Moor, south of Wedmore, **S**, RSC.

C. strigosa Huds. Scattered in good quantity through Dowling's Wood, north-west of Clutton, **S**, RSC. Also *Galium odoratum* (L.) Scop. and *Veronica montana* L.

Danthonia decumbens (L.) DC. With *Asperula cynanchica* L. ssp. *cynanchica* and *Vulpia bromoides* (L.) Gray, Westbury-sub-Mendip, **S**, RSC.

Puccinellia rupestris (With.) Fernald & Weath. With *P. distans* (Jacq.) Parl. ssp. *distans*, in bare areas, St. Georges Wharf, north of Sheepway, **S**, IPG. In 1996, on bare areas by path, Steart Point, Steart, S, J. Poingdestre.

ALIENS

Azolla filiculoides Lam. Plentiful along rhine, West Huntspill, **S**, RSC.

Berberis vulgaris L. Two bushes, shady track, Worle Hill, Weston-super-Mare, **S**, RSC.

Pseudofumaria alba (Mill.) Lidén On wall, Tockington, **G**, JPM.

Barbarea intermedia Boreau About a dozen plants flowering and fruiting in gateway, Weston Moor, Gordano, **S**, RSC.

Melilotus indicus (L.) All.One plant, in flower border on sea front, Weston-super-Mare, **S**, IPG.

Colutea arborescens L.Large bush, Avonmouth Sewage Works, **G**, P. Quinn & JPM. Nearby also *Galinsoga quadriradiata* Ruiz & Pav., *Guizotia abyssinica* (L. f.) Cass. and *Sambucus ebulus* L., JPM.

Pyrus communis L. var. *sativa* Lam. et DC. The tree referred to in *Bristol Botany in* 1991, p. 39, was destroyed in early April by a vehicle crashing off the Portway, Bristol, **G**, PJMN.

Fallopia × *bohemica* (Chrtek & Chrtková) J.P. Bailey Large stand at edge of pond, Hunstrete, **S**, IPG.

Datura stramonium L. A single white-flowered plant, waste ground, Peasedown St. John, **S**, IPG. Also present were *Euphorbia exigua* L., *E. platyphyllos* L. (one plant) and *Chaenorhinum minus* (L.) Lange.

Lonicera japonica Thunb. ex Murray Large patch in hedge, Pilning, **G**, JPM. By old ruin of Limekiln Cottages, Wraxall, **S**, IPG.

Conyza sumatrensis (Retz.) E. Walker With *Chenopodium ficifolium* Sm., on verge of motorway, St. Georges, east of Worle, **S**, IPG.

Picris echioides L. Abundant in extensive earth disturbances associated with development of shopping centre, Cribbs Causeway, Bristol, **G**, PJMN.

Helianthus × *laetiflorus* Pers. Pilning, **G**, JPM, det. E.J. Clement. A first record of this garden perennial for v.c. 34.

Scilla bithynica Boiss. Edge of Smallcombe Wood, Bath, **S**, PRG, det. R.D. Meikle.

Lemna minuta Kunth (*L. minuscula* Herter nom. illeg.)In the River Avon, below the Dundas Aqueduct, with *Potamogeton lucens* L., *P. natans* L., *P. pectinatus* L. and *Sagittaria sagittifolia* L., **S**, IPG. Also in large pond, with *Ceratophyllum demersum* L., *Elodea canadensis* Michx., *Lemna minor* L., *L. trisulca* L. and *Spirodela polyrhiza* (L.) Schleid., Hunstrete, **S**, IPG.

Phalaris aquatica L. In 1996, one clump, sea wall at edge of golf course, Clevedon, **S**, JMP.

ACKNOWLEDGEMENTS

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BRISTOL AND DISTRICT MAMMAL REPORT, 1997

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INTRODUCTION

This is the ninth recent mammal report for Bristol and its surrounding districts. Its intention is to be a wide-ranging review of the records and studies of mammals in and around the Bristol area in 1997. The numbers of individual records received for each species and the number of one kilometre squares in which those species were recorded are given in brackets after the scientific name. The bold figures are those indicating the ten kilometre (km) square. Where no figures appear after the species name, no BNS record cards were received (however, there may have been records of that species from another source).

It is hoped to produce a Mammal Atlas for the Bristol area and so all records of mammals are being collected. It is likely that the atlas will be based on 1km square records (i.e. a four figure grid reference) but records with six figure grid references are preferred.

REPORTS ON MAMMALS

INSECTIVORA (hedgehogs, shrews, and moles)

Hedgehog *Erinaceus europaeus*. (50, 37)

There were 50 records from the following one km squares (all ST): **31**60, 3863, **41**70(**), 4273, 4674, 4774, 4875, **50**72, 5271, 5476, 5477, 5677, 5771, 5777(***), 5778, 5876(***), 5877, 5878, 5879, 5978(**), **58**81, **64**69, **60**75, 6374, 6476, 6574, 6674(***), 6767, 6979, **61**85, 6282(***), 7**16**3(****), 7263, 7**07**6, 7373, 7472 and 7573. Only 4 of the 50 records were not road casualties (8%).
(**=2records for the 1 km square, ***=3records, ****=4records)

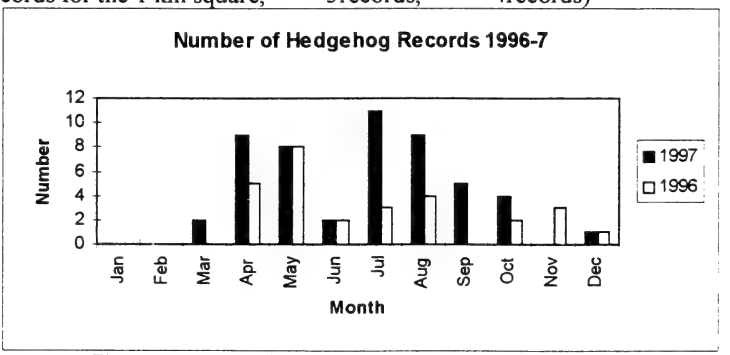

Figure 1. Number of Hedgehog records per month 1996-1997

Figure 1 shows the seasonal variation in hedgehog records. As in 1996 there was a single record for December when it is expected that most hedgehogs are hibernating. June continues to be a 'quiet month' for hedgehogs. The reasons for this are unclear. (Records from RLB, PJC, DC, NL, MJM, RGS, DPCT)

Mole ***Talpa europea*** **(69, 63)**
There were 69 records from all months of the year from the following one km squares (all ST): **43**64, 4461, **40**72, 4073, 4172, 4173, 4373, 4572, 4876, **56**50, **55**68, **50**73, 5276, 5372, 5376, 5377, 5471, 5473, 5475, 5476, 5477, 5571, 5577, 5578, 5678, **57**89, **60**75, 6277, 6376, 6377, 6477, **61**86, 6389, 6485, 6583, **68**90, 6891, 6991, **73**67, 7469, 7568, 7270, 7370, 7373, 7471, 7472, 7474, 7475, 7476, 7572, 7573, 7576, 7577, 7672, 7761, 7774, 7776, 7777, 7876, 7971, 7973, **71**93. All 'sightings' were of mole hills. (Records from AB, RLB, PJC, DC, MJM, DPCT.)

Common Shrew ***Sorex araneus*** **(4, 4)**
Only 4 records for this species, although a common and widespread species. Records from ST**68**60, **71**79, 7576, **80**74. Only one of these records was of a live shrew, the others were either road traffic casualties or found in barn owl pellets. (Records from PJC and DPCT.)

CHIROPTERA (Bats)

Greater Horseshoe Bat ***Rhinolophus ferrumequinum*** **(8, 5)**
Records of hibernating bats from ST4574, 4665, 7069 and 7960 (all DC). Hibernation sites included disused railway tunnels, old quarries, and mine workings. Of particular interest was the finding of a ringed female aged at least 20 years in ST4673 (DC).

Lesser Horeshoe Bat ***Rhinolophus hipposideros*** **(12, 8)**
Records of hibernating bats from ST4171, 4558, 4665, 5275 and 5477 (all DC). Hibernation sites included caves, quarries and old mine workings in woodland and disused buildings. Other hibernation records from Compton Martin ochre mine (42 bats seen on 1 January), Great Dons Hole (16 seen on 18 Jan) and Shute Shelve Cavern (maximum of 33 seen on 26 January). (Records from RSC.)

Daubenton's Bat ***Myotis daubentonii*** **(4, 3)**
A single record of a hibernating bat in a cave at ST4558 (DC). Up to 10 individuals were seen flying over Eastville Lake ST6175 on 29 July and two feeding over Duchess Pond ST6176 on 25 September (both MB). A single active bat seen at Denny's Hole, Compton Bishop on 19 October (RSC).

Noctule ***Nyctalus noctula*** **(7, 3)**
Records of bats hunting over fields (30 May) and gardens (7 July) in Axbridge ST4354. (Records from PF). Only four bats flying over Eastville Lake ST6175 (July

and September) (Mark Brookes comments that 'ten years ago it was not unusual to see 30-40 noctules feeding over Eastville Lake'). Up to four feeding with swifts above new housing development at Emerson's Green ST6677 in June and July. (Records from MB). 'Good numbers' of bats seen hunting over brick pits at Walrow, Highbridge on 9 April and over Chilton Moor on 12 May. (Records from RSC).

Brown Long-eared Bat ***Plecotus auritus***
Single female hibernating in crevice in Cuthbert's Flues, Priddy on 12 January (RSC).

Natterer's Bat ***Myotis nattereri***
Single hibernating males at St Cuthbert's Flues, Priddy on 12 January, Biddlecombe Rift cave, West Horrington on 26 January and Browne's Hole, Stoke St Michael on 26 January. (Records from RSC).

Pipistrelle ***Pipistrellus pipistrellus*** **(12, 9)**
Records of active bats (both phonic types) between April and September from ST**3**9**6**8, **4**0**6**3, **5**7**6**0, **6**1**7**5, 6176, 6276, 6677, **6**0**8**7, 6783. (Records from MB, DC, J and SP, DT)

Bat Boxes at Chew Valley and Blagdon Reservoirs
The bat boxes at Chew and Blagdon lakes were checked twice during the year, in June and September. In June Pipistrelle droppings were found in three of the 67 serviceable boxes and birds nests in a further six. A further box contained a large wasps nest! In September two Pipistrelles (55 kHz phonic type) were found in a box at Chew Valley (ST5760) which had only been put up in June. Fresh bat droppings were found in a further two boxes at Chew and a box at Blagdon. The usual hoards of woodlice, earwigs, slugs and yellow underwing moths were also found.

Bat Studies at Bristol University
Kate Barlow and Gareth Jones of Bristol University whilst studying Pipistrelles at a lake near Bristol found that they emit more 'social calls' (audible squeaks) when there are fewer insects about and bat food is scarce. They also found that foraging bats become less active when they hear recordings of these 'social calls'. Feeding bats, it seems, use these calls to warn off competitors and they become more possessive when food is in short supply. These calls are very similar to the calls that male Pipistrelles use to attract females - inviting comparison with birdsong (*BBC Wildlife* **15**(11) November 1997).

Nancy Vaughan of Bristol University reviewed 61 studies of the diets of the 15 species of bats found in the British Isles (Vaughan 1997). Barbastelle *Barbastella barbastellus* and Long-eared bats *Plecotus* spp. eat mainly Lepidoptera. Serotines *Eptesicus serotinus* take mainly Coleoptera, but feed on a great variety of prey. Greater Horseshoe bats *Rhinolophus ferrumequinum* hunt mainly Coleoptera and Lepidoptera by hawking, gleaning and perch hunting. Bechstein's *Myotis bechsteinii* take mostly woodland families of Diptera and Lepidoptera. The remaining nine

species eat mainly Diptera, using a variety of hunting strategies including hawking, gleaning and trawling.

LAGOMORPHA (Rabbits and Hares)

Brown Hare *Lepus europaeus* (15, 15)
Two seen on the coast at Middle Hope ST3566 (PF); one in improved grassland at Axbridge Moors ST4352 (PF); one in unimproved grassland in the Gordano Valley NNR ST4372 (MJM); one in the main ride through Weston Big Wood ST4575 (DC); two in damp coastal meadows at Portbury Wharf ST4876 (DC); one in grass field at Littleton on Severn ST5991 (J & SP); three in former Set-aside grass fields at Tunley ST6860 (DPCT); one road casualty at Hinton ST7756 (DPCT); one in pasture field at Codington ST7378 (PJC); up to three at Dyrham/Marshfield ST7574 (PJC); one in spring cereals at West Littleton ST7574 (PJC); one at Marshfield (mixed arable/pasture) ST7774 (PJC); three feeding alongside hedgerow adjacent to arable fields at Inglestone Common ST7588 (DC); one at Horton ST 7684 (RLB); one at Charfield ST7392 (RLB).

The **Second National Brown Hare Survey**, co-ordinated by Ruth Temple of Bristol University, was launched in October 1997. Transects were walked in 296 one km squares in 48 counties throughout England, Wales and Scotland. A mean of 1.1 hares per km² were recorded in 'arable' landscapes compared to 0.6 per km² in 'pastoral' landscapes. These figures are very similar to those found in the previous survey undertaken between 1991 and 1993. Hares were present in 28% of the squares walked, again a similar figure to 1991-93. (Ruth Temple pers. comm.)

Rabbit *Oryctolagus cuniculus* (95, 90)
Ninety five records from the following one km squares (all ST): 3968, 4455, 4862, 4962, 4968, 4173, 4372, 4572, 4672, 4876, 5469, 5569, 5276, 5277, 5378, 5379, 5479, 5579, 5771, 5281, 5381, 5486, 5789, 5882, 6469, 6568, 6767, 6867, 6177, 6371, 6778, 6879, 6083, 6284, 6286, 6287, 6384, 6583, 6589, 6790, 6890, 6891, 6892, 6991, 7857, 7165, 7369, 7070, 7071, 7170, 7171, 7172, 7173, 7270, 7271, 7272, 7274, 7279, 7370, 7371, 7372, 7377, 7476, 7470, 7471, 7472, 7474, 7579, 7471, 7472, 7474, 7570, 7572, 7575, 7577, 7671, 7672, 7673, 7677, 7770, 7771, 7773, 7970, 7080, 7580, 7683, 7684, 7787, 7191, 7193. (Records from RLB, PJC, DC, PF, MJM, J and SP, RGS, DPCT.)

Only one report of a rabbit with myxomatosis, seen in ST7274 in June (PJC).

RODENTIA (rats, mice, voles and squirrels)

Brown Rat *Rattus norvegicus* (6, 6)
Six records (four of these were of dead rats) from the following one km squares (all ST): 5575, 5671, 6177, 6275, 6575 and 7777. (Records from MB, PJC, DC, SP.).

The *Bristol Evening Post* reported on the "invasion of the super rats". Complaints to Bristol City Council about rats rose from 750 in 1994/95 to 1100 in 1997. It is estimated that the British rat population has risen to 60 million, a rise of 50% since the 1970s.

Black Rat *Rattus rattus*
Black rats can still be found on the island of Lundy together with brown rats ('Wildlife Reports' in *British Wildlife* **9**(2) December 1997)

Grey Squirrel *Sciurus carolinensis* (80, 57)
There were eighty records of grey squirrels in the following one km squares (all ST): 3160, 3162, 4455, 4868, 4071, 4777, 4572, 4672, 5760, 5763, 5868, 5869, 5073, 5173, 5270, 5377, 5471, 5477, 5575, 5578, 5673, 5675, 5676, 5677, 5678, 5771, 5774, 5775, 5776, 5777, 5778 5779, 5876, 5979, 6457, 6867, 6175, 6177, 6474, 6577, 6579, 6770, 6083, 6583, 7365, 7466, 7469, 7561, 7660, 7071, 7072, 7270, 7476, 7571, 7678, 7770, 7085. (Records from JFB, RLB, DC, PF, MJM, J & SP, DPCT.).

Dormouse *Muscardinus avellanarius*
The monthly dormouse surveys organised by David Clarke continued at Kings Wood, Cleeve. (see previous mammal reports for details.)

Water Vole *Arvicola terrestris* (3, 1)
Water voles were seen on three occasions, in January, May and October, all in the rhynes and ditches next to Avonmouth Rugby Club ST5377 (DC). Surveys by the Wildlife Trust revealed that water voles are "widespread throughout drainage ditches and dykes in Avonmouth" (*Bristol Evening Post,* 5 November 1997). However the population has become fragmented and their future looks uncertain. The Wildlife Trust fears they could be on the verge of extinction by the year 2000.

Harvest Mouse *Micromys minutus* (1, 1)
There was one record of a non-breeding harvest mouse nest in a reed canary grass tussock in the Gordano Valley NNR, ST4372 (DC).

The recent *Look Out for Mammals* (Mammal Society) studies have shown a dramatic reduction in harvest mouse numbers since the 1970s. Sites where harvest mouse nests were found in the 1970s were re-visited but only 29% of these had nests present. "24% of the sites no longer had any habitat suitable for harvest mice at all"

(*Endangered British Mammals,* **4** Autumn-Winter 1997). The worst affected areas were in the south of England where 85% of habitat suitable for harvest mice has been lost. It is thought one of the main reasons for the drop in numbers is due to the loss of field margins and wetland. Harvest mice favour tall tussocky grasses (*New Scientist,* 6 September 1997) and the decline in this habitat is due to farmers ploughing close to the edges of fields and spraying the margins with pesticides.

Bank Vole *Clethrionomys glareolus* (2, 2)
One record of a Bank Vole in Avonmouth, ST5280 (DC). Longworth trap records from the Gordano Valley NNR, ST4373, see below.

Short-tailed Field Vole *Microtus agrestis* (4, 4)
Two seen in Avonmouth, ST5383 (DC), four seen in Long Ashton, ST5569 (DC) and one record from a barn owl pellet from Tunley, ST6860 (DPCT). Longworth trap records from the Gordano Valley NNR, ST4373, see below.

Woodmouse *Apodemus sylvaticus* (2, 2)
One record (a road traffic casualty!) from Gloucester Road in Bristol, ST5974 (MJM). Longworth trap records from the Gordano Valley NNR, ST4373, see below.

The National Field Vole Survey ceased in 1997 but the small mammal survey was continued in the Gordano Valley National Nature Reserve, ST4373. The survey took place in April and November using *Longworth* live-capture traps. The results for 1997 are summarised in Table 1 along with the results since 1994.

Species	**Field Vole** *Microtus agrestis*		**Bank Vole** *Clethrionomys glareolus*		**Woodmouse** *Apodemus sylvaticus*		**Common Shrew** *Sorex araneus*
Season	Male	Female	Male	Female	Male	Female	
Autumn 1994	3	3	26	8	11	6	5
Spring 1995	1	0	0	0	0	0	1
Autumn 1995	3	7	2	2	16	24	0
Spring 1996	0	0	3	0	21	7	0
Autumn 1996	2	2	14	8	19	25	0
Spring 1997	1	1	1	0	13	2	0
Autumn 1997	3	3	24	15	12	13	0

Table 1. Summary of small mammal trapping in the Gordano Valley NNR.

Autumn woodmouse numbers were well down on 1996 and 1995 but bank vole numbers are the highest they have been since the survey began. Field vole numbers remain low and common shrews are notable by their complete absence.

The reasons for the changes in small mammal populations are complex and are likely to be related to changes in predation rates and vegetation structure (the site is becoming 'scrubbed over' as birch, willow and alder buckthorn take over).

CETACEA (whales, dolphins and porpoises) and PINNIPEDIA (seals)

Grey Seal *Halichoerus grypus (1, 1)*
There was one sighting in November 1997 of a grey seal close in shore (less than 10m) at high tide, at Severn Beach ST5384 (JM).

CARNIVORA (carnivores)

American Mink *Mustela vison* (1, 1)
A single sighting of one at Clapton Moor in May, ST4573 (JM).

Stoat *Mustela ermina* (2, 2)
Two records of stoats in 1997 one at Blagdon Lake ST5059 in November (JM) and one seen dragging a dead rabbit in Leigh Woods ST5475 in August (AB).

Weasel *Mustela nivalis* (6, 6)
Records were received from the following one km squares (all ST): 3156, 3958, 5674, 5678, 5381, 6484 and 7880. All sightings were between August and December (records from JFB, PJC, DC, RC, JM).

European Polecat *Mustela putorius*
A review of the diets of 18 different populations of the European Polecat throughout Europe revealed major differences between populations and between countries (Lodé 1997). The two British studies, both on Welsh farmland polecats, revealed that the diet of one population consisted of rodents (35.0%), 'other' mammals (15.0%), amphibians (26.0%) and invertebrates (24.0%) whereas the other population's diet consisted of rodents (32.3%), lagomorphs (36.5%), birds (19.3%), amphibians (6.0%) and carrion (5.9%). Taking into account all the studies throughout Europe, the polecat shows a distinct preference for amphibians (generally toads and frogs) and woodland rodents (such as Bank Voles, Woodmice, Brown Rats and on mainland Europe Common Voles *Microtus arvalis).* These dietary studies could have important implications in the spread and maintenance of polecat populations.

Pine Marten *Martes martes*
A report on the status of the pine marten in England and Wales by John Messenger, Johnny Birks and Don Jefferies (Messenger et al 1997) shows records of Pine Martens on the Gloucestershire/Monmouthshire border (10 km square ST59, the Chepstow/Tintern area) and in 'Avon' (10 km square ST47, includes the Gordano Valley area) - both records being sightings since 1990.

Otter *Lutra lutra*
The Gloucestershire Wildlife Trust Newsletter, *Wildlife News*, Autumn 1997 reported the first confirmed record of an otter in Gloucestershire for over 25 years. A fully grown male otter was found dead beside a road at Stonebench near Gloucester (SO7914).

Badger ***Meles Meles (38, 32)***
Dead badgers (all adults unless specified), probably all as a result of road traffic accidents were recorded from the following one km squares:- ST6286 (4 February), 4775 (two cubs, one adult 16 February), 7766 (19 February), 5371 (2 March), 6569 (11 March), 7477 (14 March), 5571 (22 March), 4571 (25 March), 5770 (27 March), 7575 (30 March), 7660 (3 April), 7858 (3 April), 7569 (6 April, same badger still there 15 April), 7681 (18 April), 7373 (21 April), 7272 (3 August), 5271 (10 August), 5469 (10 August), 7372 (11 August), 6469 (28 September), 7757 (30 September), 6966 (date not specified).

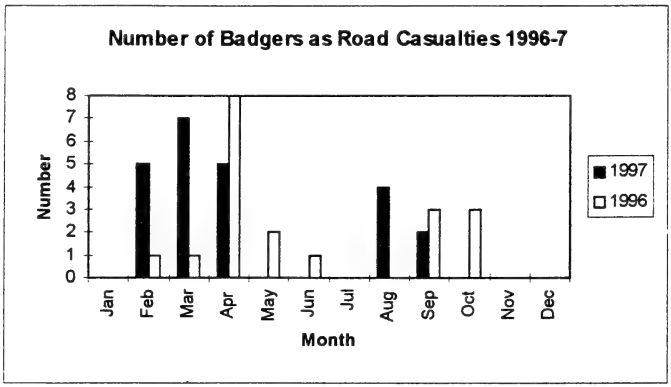

Figure 2. Number of Badgers Road Casualties 1996-7.

Figure 2 shows a pattern of two peaks in the spring and autumn of 1996 and 1997 when badgers are more likely to get run over. The spring peaks reflect an increase in territoriality and the mating season, and the autumn peaks are likely to reflect when the cubs leave the sett where they were born and disperse.

Other badger records from ST4666, 4668, 4777 (numerous scrapes seen), 4876 (actively used main sett), 4962, 5173, 5471 (active main sett), 7476 (latrines along road verge), 5782 (one seen crossing road at 22.30 hrs on 16 January), 7369 (active sett), 7774 (well used latrine on road verge).
(Records from RLB, DC, PJC, JM, MJM, SP, RGS, DPCT, LW.)

The People's Trust for Endangered Species has recently published the results of the Second National Badger Survey (Wilson *et al*, 1997). The survey shows an overall increase of around 24% the in number of badger social groups since the mid 1980's.

After more than a year of argument and discussion the Ministry of Agriculture, Fisheries and Food issued a licence for a dozen badgers to be removed from the centre of Yeovil and released in rural Somerset. The badgers, which had been there for at least 25 years, had dug a huge sett in the gardens of houses owned by South Somerset District Council and were threatening to undermine the foundations of some of the houses ('Badger hole reveals chaos' *BBC Wildlife* **15**(8), August 1997).

Badgers and Bovine Tuberculosis

Badgers and TB continued to make the headlines in 1997 following the long-awaited publication of the Krebs Report in December (Krebs 1997). The report recommends:

- An end to the current policy of limited badger culling, replaced by a policy of no culling in most of the country.
- Trials in some areas with repeated occurrence of bovine TB to quantify the efficacy and cost effectiveness of badger culling.
- Experimental comparisons, outside the trial culling areas, of the effectiveness of different cattle husbandry methods.
- Redirection of the government's TB strategy, focusing on developing a cattle vaccine.

The MAFF report on Bovine TB in badgers (MAFF 1997) summarised the TB control work nationally and badger studies at Woodchester Park up to the end of 1996. There were 15 'herd breakdowns' in Somerset, 54 in Gloucestershire, 22 in 'Avon' and 14 in Wiltshire (down from 27 in 1995). In Gloucestershire/Avon and Wiltshire 72 of the 90 breakdowns have been attributed to badger origin with 31% of the 457 badgers caught during MAFF removal operations confirmed as having TB.

MAFF continued to test for bovine TB (*Mycobacterium bovis*) badger carcasses submitted by the general public. The results for the periods 1972 to 1995 and for 1996 are summarised in table 2 below.

County	Number examined 1972 to 1995	Number positive for *M bovis* 1972 to 1995	% positive for *M bovis* 1972 to 1995	Number examined in 1996	Number positive for *M bovis* in 1996	% positive for *M bovis* in 1996
Avon	1312	104	7.9	96	10	10.4
Gloucestershire	3158	386	12.2	177	39	22.0
Somerset	1086	8	0.7	38	3	7.9
Wiltshire	1508	76	5.0	19	3	15.8
Total for the four counties	**7064**	**574**	**8.1**	**330**	**55**	**16.7**
Total rest of England	**13488**	**365**	**2.7**	**330**	**42**	**12.7**
Total Scotland	**48**	**1**	**2.1**	**0**	**0**	**0**
Total Wales	**1723**	**21**	**1.2**	**49**	**8**	**16.6**
Total Great Britain	**22323**	**931**	**4.2**	**709**	**105**	**14.8**

Table 2. Badger carcasses submitted to MAFF by the public

These figures give an indication of the 'background' incidence of bovine TB in the badger population compared to the prevalence of TB in the areas where MAFF have removed and tested badgers following a herd 'breakdown'. For example, in 1996,

31% of the badgers caught during MAFF removal operations in Gloucestershire, Avon and Wiltshire were confirmed as having TB, compared to 17.8% of those submitted by the public. For the period 1972 to 1995, 9.4% of the badgers submitted by the public tested positive for TB. The 1996 figures are higher than those of the previous years as only badgers from known TB areas tended to be submitted by the public.

Studies of the trapping records at Woodchester Park showed that badgers were more likely to be caught in the summer than in the winter irrespective of age, and that cubs were more likely to be trapped than yearlings which were themselves more likely to be trapped than adults. Only 12% of the 1763 badgers caught in Woodchester Park between 1978 and 1995 moved between social groups. Of those that moved, only 21.6% were permanent moves, 73.6% were temporary moves and 4.8% were 'habitual' moves. Male badgers were more likely to move between social groups than females but there was no significant relationship between age and the type of movement.

Collaborative work between MAFF Central Science Lab, Bristol University and IACR, Long Ashton on the transmission of TB has found that climatic conditions, in particular temperatures, rainfall and amount of sunshine, have a strong influence on the numbers of TB breakdowns in cattle. The transmission of TB to cattle appears to be through environmental contamination rather than by direct contact between animals.

Further information on Badgers and TB can be found on the MAFF web site at **http://www.maff.gov.uk/**

Fox ***Vulpes vulpes (38, 35)***
There were 38 records of foxes from the following one km squares (all ST): **31**60, **40**41, **41**62, **43**71, 4373, 4474*, 4775, 4876*, **50**74, 5276, 5476, 5579, 5677, 5775, 5776, 5777, 5778, 5876, **53**83, 5586, 5781, **64**69, **67**78, 6875, **65**87, 6589, **67**90, 7**66**6, 7863, 7274, 7374, 7470, 7576, 7578, 7677 (records from AB, JFB, MB, PJC, DC, PF, SH, SK, MJM, JM, HN, JRS, RGS, DPCT, ECT). (Those obviously noted with mange are marked *.)

Although something like 95% of Bristol's foxes died from sarcoptic mange between 1995 and 1996, records of foxes in Bristol were once again being received in 1997. Records of foxes seen within the City of Bristol in 1997 are as follows:-

ST 5677 (Jan) - various tracks seen in the Canford Park Allotments (HN)
ST 5775 (Jan) - seen going from the Downs to neighbouring gardens (SH)
ST 5276 (Feb) - one seen regularly at Lamplighters Marsh, Shirehampton (JM)
ST 5876 (Mar) - emaciated fox with white tags in each ear in garden in Henleaze (SK)
ST 5476 (Aug) - tracks of a fox seen by the River Avon at Sea Mills (AB)
ST 5777 (Sept) - a thin young fox seen in Westbury-on-Trym (SK)

ST 5778 (Sept) - pair of adults grooming, in good condition, Westacre Close, Westbury-on-Trym (JFB)
ST 5781 (Oct) - road casualty on Cribbs Causeway (MJM)
ST 5876 (Oct) - up to two foxes in gardens in Henleaze (SK)
ST 5776 (Nov) - large adult in good condition seen walking along road in Westbury-on-Trym (JRS)
ST 5876 (Dec) - fox seen marking territory in Henleaze (SK)

Research undertaken by Bristol University stated that the fox is "the farmer's friend" (*Bristol Evening Post*, 28 October 1997). According to the report, rabbits (which form the majority of the fox's diet) cause approximately £120 million damage every year and if the foxes were not present, the figure for the damage would be considerably higher.

ARTIODACTYLA (deer)

Red Deer *Cervus elaphus*

Recent surveys have revealed that red deer numbers on Exmoor have fallen by 14% since 1994 and by at least 35% on the Quantock Hills. This may be as a result of a 30% increase in the value of venison following the BSE epidemic, resulting in an increase in poaching ('BSE link with deer deaths' *BBC Wildlife* **15**(4) April 1997).

In 1995, Professor Patrick Bateson was commissioned by the National Trust 'To study suffering as a welfare factor in the management of red deer on National Trust properties on Exmoor and the Quantock Hills...'. The main conclusions were that lengthy chases impose stresses on red deer that are likely to cause great suffering and that deer management by shooting is far more acceptable on welfare grounds, even when realistic wounding rates are considered ('How not to kill a deer' *BBC Wildlife* **15**(5) May 1997).

A study by Jochen Langbein (1997) found that a minimum of 3000 Red Deer are present within the combined area of the Exmoor Environmentally Sensitive Area and the nearby Quantock Hills. The sex ratio of mature deer was found to be 2.5 to 1 in favour of hinds. The annual home range of hinds averaged 428 hectares and 1066 hectares for stags. Both stags and hinds showed a positive preference for broad-leaved woodland, together with areas dominated by scrub, gorse and bracken rather than the more barren and open heather moorland. For both hinds and stags >34% of all active feeding bouts as well as >32% of resting periods were recorded within areas of broad-leaved woodland. This has led to concerns about decline in the natural regeneration of broad-leaved trees in particular oak and birch. During daylight hours only 8% of the radio fixes on hinds and 10% of the fixes on stags were on 'improved' grass pastures. These figures increased to 23% and 35% respectively during the night. Now that there is a hunting ban on National Trust land, farmers are less likely to

tolerate the deer damage. The report concludes by recommending the setting up of a number of small local deer management groups to help co-ordinate deer management in conjunction with hunting and other existing management activities.

Roe Deer ***Capreolus capreolus*** **(25, 23)**
There were twenty five records of Roe Deer in the following one km squares (all ST): **4**057, 4455, 4757, **4**373, 4573, 4672, **5**476, 5474, **6**583, 7071, 7278, 7373, 7476, 7572, 7574, 7575, 7577, 7579, 7673, 7677, 7775, 7874 and 7876. The largest group seen was of a buck accompanied by five does in a grass field near Marshfield ST 7673 in April. (Records from AB, RLB, PJC, PF, JM, DPCT)

LEGISLATION

The **Wild Mammals (Hunting with Dogs) Bill** was hotly debated in Parliament in November with MPs overwhelmingly voting in its favour (411 for and 151 against). The Bill is likely to fail this time around due to lack of time, but the Government are likely to introduce and pass related legislation within its current term of office (*British Wildlife* **9**(2) November 1997).

The Joint Nature Conservation Committee (JNCC) have recommended that the Water Vole *Arvicola terrestris* be added to Schedule 5 of the Wildlife and Countryside Act 1981. Although this will not protect the species from predation pressures, it should safeguard existing water vole sites from further development, provided they are discovered in time ('Wildlife Reports' *British Wildlife* **8**(4) April 1997).

The Muntjac *Muntiacus reevesi* was added to Part 1 of Schedule 9 of the Wildlife and Countryside Act 1981 on 5 March 1997 (Statutory Instrument 1997 No. 26). This means that it is illegal to release muntjac into the wild except under licence.

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BRISTOL AND DISTRICT INVERTEBRATE REPORT 1997

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INTRODUCTION

The most noticeable feature about 1997 was the complete contrast it made with the previous year in terms of the absence of migrant insects. After the enormous numbers of Painted Lady butterflies in 1996, the sighting of just one during 1997 was an event. The same was true for moths, dragonflies and hoverflies. It just goes to prove that no two seasons are ever alike.

Another feature of the year was the many reports of species appearing outside the normally accepted flight time, a trend seen over the last few years. In particular the Orange-tip butterfly was on the wing at the end of March, closely followed by the Holly Blue in early April. Moths seen remarkably early were the Spectacle, Knot Grass and Puss Moth in April. Furthermore the Large Red Damselfly was also reported on the wing in early April. As John Weeks records in his weather synopsis below, March and the beginning of April were warm and dry and presumably these environmental cues led to these early emergences.

Records continued to flow into the Bristol Regional Environmental Records Centre (BRERC) from the various insect recording groups, as well as from members of this Society. The Avon Butterfly Project produced a new set of provisional distribution maps for its contributors and the level of monitoring being achieved is providing a fairly clear picture of the status of all our species, year to year. The most significant butterfly event in the district during 1997 was the release of captive bred larvae of the Marsh Fritillary. This species is recognised as declining, not only in the United Kingdom, but also across Europe, and was last seen at a south Bristol site in 1995. The Wildlife Trust, Bristol, Bath & Avon, decided to attempt to reintroduce the butterfly as conditions seemed to be favourable and the foodplant plentiful. Adult butterflies were subsequently seen on the site, but reports of individuals from localities fairly near at hand suggest a number may have wandered away from the release point. The success of this venture remains to be seen and careful monitoring of the site will be necessary.

The Bristol & District Moth Group continued to hold regular field meetings and to expand the quality and quantity of information concerning our moth fauna. A number of new species of micro-moth for the area were noted, or at least species not recorded for many decades. The highlight was the discovery of another new site, Kings Wood, for *Salebriopsis albicilla*. This Red Data Book moth, whose larvae feed upon Small-leaved Lime *Tilia cordata*, was confirmed at Leigh Woods in 1996 as only the third British site. It seems likely that there may be other woodland sites for the moth in this district. Another significant discovery was the confirmation of the Silky Wave *Idaea dilutaria*, one of the other rare species found locally, on the Leigh Woods/Somerset side of the Avon Gorge. This moth has long been thought to be restricted to the

opposite south facing banks of the Gorge as its larvae appear to be particularly dependant upon high temperatures to complete development. Its presence on the Leigh Woods side of the river had been suggested over the last couple of years and this was confirmed in 1997. It is possible that the moth had just been overlooked here in the past but perhaps more likely, given the extent of interest in the lepidoptera of the Gorge over the years, this colonisation has occurred relatively recently with the benefit of warm summers and mild winters. Two species that have also expanded their ranges are the Pine Hawk-moth, reported from Whitchurch and the Brown-tail with two larval webs noted. The notoriously irritant hairs of the latter's larvae and their record of defoliating trees in the south-east of England may give cause for concern to some.

The Bristol & District Hoverfly Group was somewhat in abeyance during the year with no formal meetings arranged. However records were sent from the Group to Ted and Dave Levy, contributing towards their planned atlas of the hoverflies of the whole of Somerset, including what was until recently south Avon. This publication will be a very useful addition to the local literature available to the entomologist and is eagerly awaited. In their own right, Ted and Dave carried out a considerable amount of recording in and around Bristol and were amply rewarded. *Chalcosyrphus eunotus* is a very rare hoverfly of ancient deciduous woodland usually with flowing water, where the larvae are thought to live in semi-submerged timber. They recorded it at two separate localities on more than one occasion during 1997, an excellent find.

A new and potentially dynamic recording group was formed under the instigation of Steve Preddy, during 1997. The Bristol Region Dragonfly Recording Scheme aims to encourage recording of this fascinating order of insects and to link closely the work of BRERC with the South Avon Group of the British Dragonfly Society. The information obtained will enable Simon Randolph's excellent "Dragonflies of the Bristol Region" to be updated in due course and, as with the other such Groups, provisional distribution maps will be produced by BRERC for those submitting records.

On the Orthoptera front, there is no news yet of the appearance of the Long-winged Cone-head *Conocephalus discolor* in our district but its arrival can only be a matter of time. Meanwhile the Large Marsh Grasshopper *Stethophyma grossum*, which is now apparently extinct on the Somerset Levels, is the subject of a captive breeding programme at Bristol Zoo as part of English Nature's Species Recovery Programme. In the fullness of time it is hoped the stock will be used to re-establish populations in the south of England.

Generally, interest in invertebrates still appears quite high, helped by the Local Authorities being obliged to take on initiatives to maintain biodiversity. One such consequence has been the compilation by BRERC, through the work of Lyndon Roberts and Martin Evans, of lists of the fauna and flora of the district, in order to get baseline data as to the rare and uncommon species found here. This work has served to highlight again the great gaps in our knowledge but the number of professional and

amateurs with the knowledge and ability to record invertebrates still stays relatively very small, so the chances of increasing the rate of recording are slim.

Observers mentioned in the species list:
Rick Andrews (RA), Mike Bailey (MB), Ray Barnett (RB), Alan Bone (AB), Janet Boyd (JB), Bristol & District Moth Group (BDMG), Robert Cropper (RC), Roger Edmondson (RE), Martin Evans (ME), Jo Ferns (JF), Rupert Higgins (RH), Carolyn Lamb (CL), Ted & Dave Levy (E&DL), Nigel Milbourne (NM), Sarah Myles (SM), Mark Parsons (MP), Andy Pym (AP), Elise Saunders (ES), Daryl Watts (DW), Mary Wood (MW),

My thanks also to those who, in addition, submitted records which do not appear in this report but which help significantly to build up a picture of our invertebrate fauna.

Scientific nomenclature follows the names given in Duff (1993), Emmet & Heath (1991), Fitton, *et al* (1978), Potts (1964) and Smith (1976).

WEATHER SYNOPSIS (by John Weeks)

Data from Long Ashton

With a mean temperature of 11.3°C, 1997 was the fourth warmest in recent years, behind 1990 (11.7°C), 1989 (11.5°C), and 1995 (11.4°C). Eight of the twelve months were warmer than average, the largest differences being 2.0°C in August, 1.9°C in February and 1.8°C in November. One (October) equalled the average for that month, and three were cooler, January having the largest negative anomaly (-2.7°C). May and July were only slightly below average at -0.2°C and -0.3°C respectively. The coolest weather occurred in the first ten days of the year: there was then no other cold snap lasting more than a few days, except in mid-April and a spell in late October/early November which yielded a run of frosty nights. The hottest month was August, when there were eight days "in the 80's"(°F), including the hottest day of the year (10th) and the only one to exceed 30° C (30.9°C): but there were also a few days of over 80°F (26.7°C) in July and a near approach on 30 May.
Accurate figures for sunshine duration are not available, but it seems that seven months had more than average hours, against which June was miserably deficient (about 50%) despite there being only four days towards month-end completely sunless.

Total rainfall for the calendar year amounted to 838.2mm, a fraction above average (100.4%), but monthly totals fluctuated wildly, from very dry (January, March, April) to extremely wet (August, February, June and May). Daily falls exceeded one inch (25.4mm) on three days (17 February, 5 and 23 August).

As usual in these notes, the table below gives the overall view of the months and seasons, the daily maximum temperature being used, insect (invertebrate) activity being largely controlled by warmth.

Table 1 Monthly and seasonal trends in climate during 1997

	Monthly Differences			Seasonal Differences	
	Max T °C	% Rain	% Sun	Max T°C	% rain
Dec '96	-2.3	37	110		
Jan '97	-2.4	10	60		
Feb	+1.5	190	80	-1.1	67
March	+1.9	38	100		
April	+1.6	32	125		
May	+0.2	170	110	+1.2	70
June	-0.4	180	50		
July	+0.3	75	120		
Aug.	+1.4	250	85	+0.4	167
Sept.	+1.2	60	110		
Oct.	+1.0	66	120		
Nov.	+1.8	100	90	+1.4	75

January was the coldest for ten years and the driest in this station's records (commencing with January 1980). The lowest minimum occurred on 2nd when the air temperature reached -8.0°C and the grass minimum was -12.3°C. Winds came mainly from between NE and SE, and there was a partial covering of snow lying for a few days. February went to the other extreme, being the wettest on record and the third warmest. Winds blew predominantly from SW to W, an almost complete reversal of January's. On 17th, 26.3mm of rain fell.

March made a significant start to Spring: it seemed to have all the virtues - the third warmest (exceeded only in 1990 and 1981), low rainfall (the twelve rain days having only small amounts) and eight sunless days. The dry spell continued into April, when there were only four days with measurable rain, but it was relatively cool because of low night-time minima, the mean maximum for the month being lower than February's and March's.

May was a month of near normal temperatures, but two ground frosts in the last week were the latest in Spring since records began. Rainfall was often of a thundery nature: the six days with thunder was the highest number in any month since 1983. With only four completely sunless days, May brought a quite pleasant end to the season.

June, on the other hand, made an inauspicious start to Summer. The warmest days occurred early in the month, the succession of mediocre days thereafter reaching a nadir on 26th when the maximum of 11.5°C was the lowest in June on record here. Although, again, there were only four days completely sunless, the total was only about fifty percent of normal. There were fifteen rain days. Against this, the two days without some sun in July helped boost the total to well over average; otherwise there was no special feature.

As noted above, August was a real Summer month in two ways. The mean maximum of 23.7° C was exceeded (in my records) only in 1995 (27.3°C), 1983 (24.3°C), and

1990 (23.8°C) and the mean minimum of 15.0°C was the highest on record. This heat set off some very thundery outbreaks, including the wettest day and second wettest, of the year - 31.7mm fell on 5th and 29.4mm on 23rd.

Altogether there were sixteen rain days and seven sunless days.

There were no exceptional features to the autumn months. The trends to warmth and dryness continued. The September and November mean maxima were the highest since 1991 and 1994 respectively. October began warm but a rapid cooling off occurred from 22nd with the onset of frosts. There was an overnight ground frost on every night from 22nd to 3rd November. Sunshine also remained above normal with only three sunless days in September and five in October.

SPECIES OF NOTE IN 1997

ORTHOPTERA (grasshoppers and crickets)

Stripe-winged Grasshopper *Stenobothrus lineatus* (Panz.) Coombe Hill, Wotton-under-Edge ST7694, 6 July (RC), still plentiful - first noted here in 1976; Launcherley Hill ST5542, 21 July (RC).

Lesser Marsh Grasshopper *Chorthippus albomarginatus* (DeG.) Knowle Moor, Wookey ST4745, ST4746, ST4845, ST4846, 16 August (RC).

Rufous Grasshopper *Gomphocerippus rufus* (L.) North Wootton ST5641 2 August (RC); Knowle Moor, Wookey ST4845 16 August (RC), atypical habitat, probably accidentally introduced.

DERMAPTERA (earwigs)

Lesser Earwig *Labia minor* (L.) Lyncombe Hill, Churchill ST4458, 8 March (RC); Tortworth ST6993, 6 July (RC); Shapwick ST4038 9 August (RC); Claverham ST4567, 24 August (RC); Farmborough ST6661, 14 September (RC).

Lesne's Earwig *Forficula lesnei* Finot. River Avon, Newbridge ST7165, 25 August (RC); Batheaston ST7767, 14 September (RC).

HEMIPTERA (true bugs)

Corizus hyoscyami (L.) Uphill ST3158, 31 May (RC).

Megalonotus praetextatus (Her.-Sch.) Berrow ST2951, 24 May (RC), noted here in 1977.

Pyrrhocoris apterus (L.) Filton ST6179 February (AP), dead specimen thought to be from bird-seed of foreign origin.

Dicranocephalus medius (Muls. & Rey) Kings Wood ST4564, 14 June (RB).

Ranatra linearis (L.) Wickwar ST7188, 31 March (RC).

LEPIDOPTERA (butterflies)

Grizzled Skipper *Pyrgus malvae* (L.) Ubley Warren ST5257, 12 April (NM), early date.

Brown Argus *Aricia agestis* ([D. & S.]) Ubley Warren ST5257, 12 April (NM), early date.

LEPIDOPTERA (macro-moths)

Currant Clearwing *Synanthedon tipuliformis* (Cl.) Winscombe ST45 no date (JB).

Small Eggar *Eriogaster lanestris* (L.) Engine Common, Yate ST700844, 4 June (ME, SM), larvae; Leek Bed Lane, West Huntspill ST2946, 26 June (RC), two larval webs.

Silky Wave *Idaea dilutaria* (Hb.) Avon Gorge (southern bank) ST5673, 24 June (ME, RE).
The Vestal *Rhodometra sacraria* (L.) Timsbury ST6558, 27 September (MB).

Clouded Border *Lomaspilis marginata* (L.) Hotwater Brake ST668798, 30 April (ME, SM), early date.

Small Brindled Beauty *Apocheima hispidaria* ([D. & S.]) Inglestone Common ST7488, 6 March (ME, RE, AP).

Pine Hawk-moth *Hyloicus pinastri* (L.) Whitchurch ST6067, 31 May (RA).

Puss Moth *Cerura vinula* (L.) Pilning ST556849, 24 April (JM), early date.

Brown-tail *Euproctis chrysorrhoea* (L.) Sand Point ST3265, April (RA), larvae; Filton ST6179, 14 May (AP), larvae.

Cinnabar *Tyria jacobaeae* (L.) Keynsham ST66, 18 April (NM), early date.

Northern Drab *Orthosia opima* (Hb.) Keynsham ST66, 16 April (NM).

Varied Coronet *Hadena compta* ([D. & S.]) Pilning ST556849, 3 July (JM).

Knotgrass *Acronicta rumicis* (L.) Filton ST6179, 10 April (AP), early date.

Old Lady *Mormo maura* (L.) Midford Viaduct ST762807, 1 August (ME, CL), Gloucester Road, Bristol ST57 August (ES), Keynsham ST66 August (AB).

Spectacle *Abrostola triplasia* (L.) Bishopston, Bristol ST5875, April (RH), early date.

Buttoned Snout *Hypena rostralis* (L.) Newton St. Loe ST7064, 1 October (DW).

LEPIDOPTERA (micro-moths)

Coleophora ochrea (Haw.) Avon Gorge ST5673, 26 April, 10 May (MP).

Ethmia dodecea (Haw.) Stroud Common ST627876, 11 June (RA, RE, RH, JM, ME).

Pancalia leuwenhoekella (L.) Walton Common ST4273, 17 July (JM, JF).

Cochylis hybridella (Hb.) Filton ST6179, 15 August (AP).

Endothenia ustulana (Haw.) Kings Wood, ST 451648, 27 June (BDMG).

Epinotia demarniana (F.v.R.) Blagdon ST55 29 June (NM).
Pelochrista caecimaculana (Hb.) Saltwell Viaduct, Whitchurch ST613682, 10 July (ME, SM, MW).

Cydia lathyrana (Hb.) Spaniorum Hill, Bristol ST5681, 17 April (ME, SM).

Platytes alpinella (Hb.) Timsbury ST6558, 9 August (MB).

Thisanotia chrysonuchella (Scop.) Stroud Common ST627876, 11 June (RA, RE, RH, JM, ME).

Sitochroa verticalis (L.) Parkway ST6279, 4 June (RH); Filton ST6179 no date (AP).

Salebriopsis albicilla (H. - S.) Kings Wood ST451648, 27 June (BDMG), 3rd Somerset record.

COLEOPTERA (beetles)

Bembidion genei (Kust.) Stoke St. Michael ST6697, 27 April (RC).

Pterostichus macer (Marsh.) Kingston Seymour ST3767, 26 May (RC).

Laemostenus terricola (Herbst) Sandy Cave, Compton Bishop ST3954 (RC); Wookey Hole ST5347, 25 October (RC), associated with bat droppings.

Licinus punctatulus (Fabr.) Shute Shelve Hill ST4255, 19 July (RC).

Lebia chlorocephala (Hoff.) Filton ST6179, October (AP).

Choleva agilis (Ill.) Draycott Cave ST4851, 16 March (RC).

Platydrachus stercorarius (Oliv.) Crook Peak ST3856, 21 September (RC).

Omaloplia ruricola (Fabr.) Crook Peak ST3855, 5 July (RC).

Ptinomorphus imperialis (L.) Wetmoor ST7487, 18 May (RB).

Dasytes plumbeus (Mull.) Lodge Hill, Westbury-sub-Mendip ST49448, 12 July (RC).

Meloe proscarabeus (L.) Loxton Hill ST3655, 5 May (RC).

Clytra quadripuncta (L.) Kings Wood ST451648, 27 June (BDMG).

Miarus graminis (Gyll.) Coombe Hill, Wotton-under-Edge ST7694, 6 July (RC).

DIPTERA (flies)

Bombilius canescens (Mik.) Draycott Sleights ST4851, 1 June (RC).

Meligramma triangulifera (Zett.) Lords Wood ST635633, 5 July (E&DL).

Cheilosia soror (Zett.) Combe Dingle ST559775, 30 August (E&DL).

Brachyopa insensilis (Collin) Lords Wood ST635633, 4 July (E+DL).

Orthonevra brevicornis (Loew.) Lords Wood ST635633, 26 May, 27 May (E&DL).

Neoascia obliqua (Coe) Cleaves Wood, Wellow ST758578, 18 May (E&DL).

Sphegina verecunda (Collin) Lords Wood ST635633, 26 May (E&DL).

Eumerus ornatus (Meig.) Combe Dingle ST559775, 21 June (E&DL); Postlebury Wood ST740430, 22 June (E&DL).

Volucella inflata (Fabr.) Postlebury Wood ST740430, 24 May; Kings Wood ST4564, 14 June (RB); Combe Dingle ST559775, 21 June (E&DL); Lords Wood ST635633, 11 July (E&DL).

Volucella zonaria (Poda) Combe Dingle ST559775, 30 August (E&DL).

Chalcosyrphus eunotus (Loew) Two localities south of Bristol (E&DL).

Criorhina ranunculi (Panz.) Postlebury Wood ST740430, 27 April (E&DL).

Xylota tarda (Meig.) Lords Wood ST635633, 25 May, 26 May, 27 May, 4 July (E&DL).

HYMENOPTERA

Arachnospila anceps (Wes.) Crook Peak ST3955, 21 September (RC).

NB Correction to 1996 report; *A. anceps* from Berrow redetermined as *A. trivialis*.

Evagetes dubius (Van der Lind.) Berrow ST2852, 20 September (RC).

Andrena labiata (Fabr.) Crook Peak ST3955, 26 May (RC); Uphill ST3158, 31 May (RC).

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GARDEN BIRDS IN WINTER IN THE BRISTOL REGION, 1975/6-1996/7.

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SUMMARY
The large changes in the winter garden bird populations in the Bristol region since 1975/76 are discussed and possible reasons are for them are examined. The changing patterns for all common species are outlined.

THE SURVEY

Every winter since 1975/6 between twenty and forty observers within the boundaries of what used to be called Avon have kept a regular record of the birds using their gardens between October 1st and March 31st. Usually about half the gardens were from Bristol itself, and half from the area around it. Some participants recorded on a daily basis, some at weekends only. For the purpose of analysing the records, the largest number of birds of each species present in each garden in each week was used, and weeks ran from Sunday to Saturday. Using a garden was taken to mean being present within it, feeding in it, or sitting on a roof, but not flying over it. Sparrowhawks attacking birds in a garden were included. The smallest number of garden-weeks in any winter was 500 the largest 1000.

Results were analysed in two ways. Firstly the proportion of gardens in which a species occurred was recorded. This varied from 100% for the commonest species to present in only one garden for the least common. This provided a good method of assessing change between winters for less common species. Secondly for each week, and for each species, the average number of birds present per garden-week was calculated. This was done by adding the totals for every garden and dividing by the number of gardens participating in that week. An average for the whole winter for each species was also calculated.

There have been 92 observers who have recorded for more than one year; they have done so for an average of 7.6 years, and the total of observer years is 696. J. O. Taylor has recorded for 24 winters, N. J. Gibbs for 20, B. Winter and R. W. Rowe recorded for 19 years. Although every year a few observers leave and a few join, there has been a great deal of stability which ensures that the results are in general comparable from year to year. However the results presented simply show the totals for all gardens in any winter, and do not attempt to compare the gardens recording in one winter with the same gardens recording in the previous winter.

The gardens surveyed vary considerably in size, nature and position, and hence in the species they can attract. Because of the small sample, no attempt has been made to distinguish the results from large gardens as opposed to small ones, or between urban and rural ones.

THE WEATHER

No two winters are alike, and it was clear from the start that a record of the weather would play a vital part in the differences recorded. Winters were graded by five criteria as follows:-

1 The overall average noon temperature between October 1 and March 31. These figures were taken from the daily report for Bristol in *The Times*. This average gives a general feel to the difference between a warm winter and a cold one.

2 The average noon temperature of the three months December to February. These are the months that make the difference from a bird's point of view. On the whole there is plenty of food around everywhere in October and November, and birds fatten up at this time. But short days in December and frost in January and February may reduce food supplies, and will have the effect of bringing birds into gardens where it is available.

3 The number of frost nights, defined as nights when the ground temperature fell below zero. This is another general measure of the severity of the winter, because birds, especially small ones, have to find a lot of food simply to keep themselves alive through cold nights, and if frost remains throughout the day food can be hard to find.

4 The intensity of the worst night of frost. One night of very severe frost can kill a proportion of some species regardless of the availability of food. Also a severe frost will freeze the soil several inches deep, and leave ice on water, making food harder to find.

5 The number of days when the ground was continuously frozen. Winters that may in other ways appear to be similar may be very different if there is a sequence of frost and thaw that enables birds to feed up in between cold spells.

To provide a simple measure of the severity of a winter, each of these criteria was scored from 0, very mild, to 5, severe, and the score added for every winter, running for 0 for a mild winter to 25 for a severe one. The results are shown in Table 1 overleaf. The three most severe winters were, in order of severity, 1978/79, 1985/86, 1981/82, the three mildest 1989/90, 1987/88, 1988/89.

Row 1 is the average temperature October to March in ^{o} C
Row 2 is the average temperature of December-February in ^{o} C
Row 3 is the number of nights of frost, October to March.
Row 4 is the minimum temperature reached if below -5^{o}C. No value given if above -5^{o}C
Row 5 is the maximum number of days of continuous frost, if more than 15. No value is given if 15 or less.
Row 6 is a score for each winter from 0 for mild to 25 for severe.

Table 1. A summary of the weather conditions in the 21 winters

	76/7	77/8	78/9	79/80	80/1	81/2	82/3	83/4	84/5	85/6	86/7
1	7.9	8.4	7.5	8.4	8.2	7.6	8.5	8.5	7.9	7.5	8.5
2	5.3	6.1	3.8	6.7	6.6	4.9	6.5	7.1	5.1	5.6	6.2
3	15	26	56	22	16	24	22	17	43	40	36
4			-5	-7		-25				-10	-8
5			29			18				27	
6	8	8	25	13	5	19	6	5	15	23	18

		87/8	88/9	89/0	90/1	91/2	92/3	93/4	94/5	95/6	96/7
1		8.9	9.9	10.1	8.9	8.9	8.8	9.1	11.3	9.4	9.8
2		7.7	9.1	8.6	5.5	6.9	7.2	7.6	9.5	5.9	6.7
3		12	23	11	30	26	23	30	22	41	36
4						-6		-6	-6	-5	
5											21
6		4	5	2	16	13	7	13	10	17	9

Figure 1 below shows the results in graphical form.

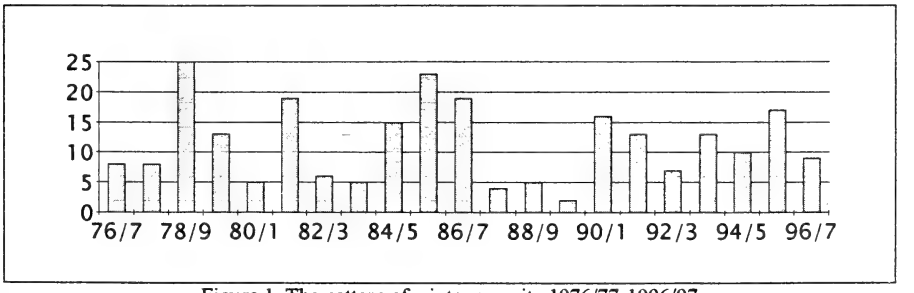

Figure 1. The pattern of winter severity 1976/77-1996/97

OVERALL PATTERN

The graph below shows the annual average of the total number of birds seen per 100 garden-weeks over the twenty years, and the total number of species seen in each winter. Numbers fell in the first decade, and rose in the second. The number of species fluctuated in the first decade, and has risen steadily in the second. There have normally been between thirty and forty birds per garden per week throughout each winter. There is no relationship between the average total and the average temperature of the winter, despite the fact that there is a close relationship in any particular winter between the numbers recorded and the daily temperature.

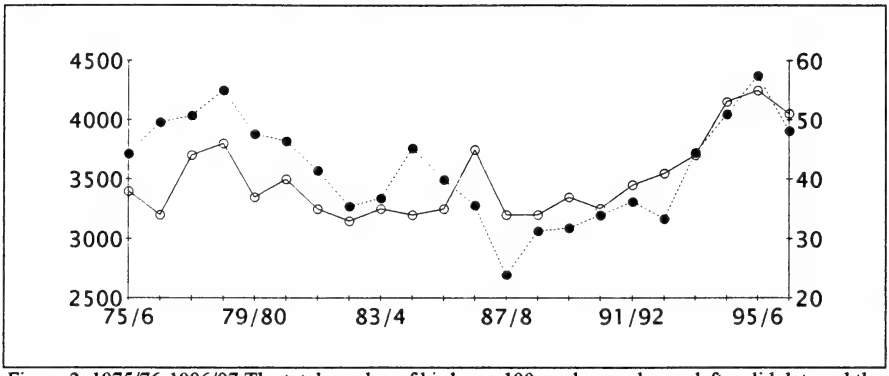

Figure 2. 1975/76-1996/97 The total number of birds per 100 garden weeks, on left, solid dot, and the total number of species recorded by all gardens, on right, open dot.

STRUCTURAL CHANGE

In the course of twenty years there has been a large structural change, which can be summarised briefly as a decline in the numbers of Starlings and House Sparrows, and an increase in corvids and doves. In terms of overall biomass supported by gardens there has actually been a 90% increase because crows and doves are heavier than the House Sparrows and Starlings they have replaced.

Between 1976/77 and 1996/97 total numbers declined a little from 39 to 37 birds a garden-week, but biomass increased from 1.8 to 3.4 kg per garden-week. In 1976/77 only 13 species each made up more than 1% of the numbers, but twenty years later 23 species were more than 1% of the total. In 1976/77 House Sparrows and Starlings made up 65% of the total number seen and 73% of the biomass. Twenty years later they were 32% of the numbers and only 20% of the biomass. By contrast Collared Doves and Woodpigeons, though only 9% of the numbers in 1996/97 were 29% of the biomass, and Crows and Magpies, 5% of the numbers, were 23% of the biomass. Twenty years earlier these four species had formed only 2% of the numbers and 6% of the Biomass. In other words a much wider variety of species, many of them larger than House Sparrow or Starling, have become regular users of gardens, and House

Sparrow and Starling numbers have fallen, perhaps in consequence. In particular the spread of the Collared Dove as a direct competitor for kitchen scraps may have been important.

On the other hand some species remained substantially unchanged - Dunnock, Robin, Blackbird, Blue Tit, Great Tit, Chaffinch, and Greenfinch, all show comparatively small changes in either the percentage of the numbers or of the biomass. Indeed in total these seven species were 31% of numbers and 16% of biomass in 1976/77, and 42% of numbers and 14% of biomass in 1996/97.

Table 2. A comparison between 1976/77 and 1996/97
The figures are numbers per 100 garden-weeks. The weights are Kilo per 100 garden-weeks.

	1976/77			1996/97	
	Avg Nos	%		Avg Nos	%
Sparrow	1660	42		528	14
Starling	980	25		660	18
Blue Tit	460	12		369	10
Greenfinch	200	5		253	7
Blackbird	140	4		217	6
Great Tit	120	3		153	4
Chaffinch	110	3		331	9
Robin	70	2		113	3
Dunnock	60	2		105	3
Collared Dove	60	2		208	6
Magpie	0	0		120	3
Wood Pigeon	0	0		110	3
Crow	0	0		82	2
Total	3940			3767	
Weight, Kg	175			335	

CAUSES OF STRUCTURAL CHANGE

There is a close relationship between the Common Bird Census (CBC) index of increasing national populations of Crows, Magpies, and Collared Doves, and the numbers recorded in gardens in winter. The same parallel can be seen in the declining figures for Starlings and Song Thrush. Whether a fall in House Sparrow numbers enabled other birds to start using gardens, or whether their use of gardens as competitors caused a decline in House Sparrow numbers cannot at present be demonstrated.

Some species have appeared more frequently in gardens as a result of a change in their behaviour, rather than because of any change in their populations. They have learnt to

use the food available in gardens. This is true especially of Siskin, Long-tailed Tit, Brambling, Goldfinch, Blackcap, Jay, and Jackdaw.

There has also been a change in human provision of bird food. It is almost certainly the case that the amount of bird feeding has increased, as has membership of the RSPB, which has always encouraged bird feeding. There has also been much greater commercial provision of modern feeders, cheap peanuts and a variety of types of seed, and fat balls. These ensure that gardens are permanently stocked with food, rather than birds being dependent on odd scraps flung from the kitchen.

RELATIONSHIP TO WEATHER

It has always been obvious that in snow and hard frost birds both become increasingly dependent upon gardens, and that the numbers of birds using gardens increases. The survey has enabled this to be measured with precision, and it is clear that in every winter both number of birds and number of species are directly related to temperature. Figure 3 below shows this for 1996/97 The relationship is roughly one new species and 2.5 birds for each degree of temperature change. This relationship varies a little from winter to winter, but not greatly.

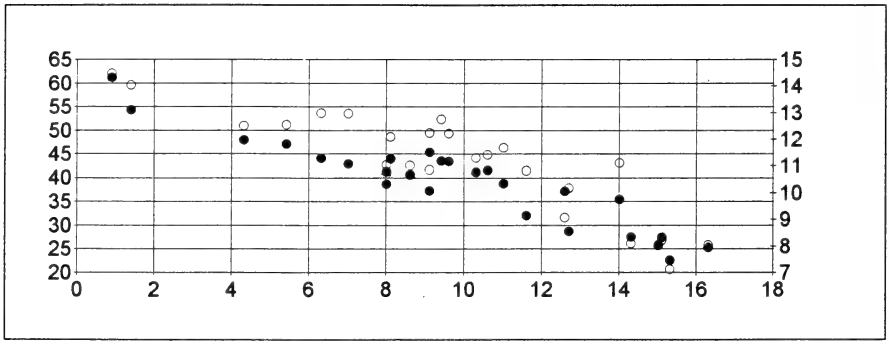

Figure 3. The relationship between weekly temperature and both numbers and species in 1996/97. Scale on left - numbers, horizontal scale - temperatures (^{0}C), scale on right - species. Filled circles, numbers, hollow circles, species.

The implication of this is that birds are coming into gardens from the wider countryside. They might do this both because urban areas are warmer that rural ones, and because there is a greater supply of food. The most obvious occasion when this happens on a mass scale is the invasion of gardens by Redwings and Fieldfares to strip all remaining berries from bushes in frosty weather. There are two reasons why this has become an increasingly common practice. One is that there are far fewer berries in the countryside now than there used to be because modern hedge maintenance has reduced the amount of berries produced. The other is that Redwings and Fieldfares will gather invertebrate prey from fields when they are not frozen, but are driven to

rely on berries as soon as there is a frost. It is also the case that urban grassland is likely to thaw sooner than rural grassland because of the warmth of city areas.
However a study of the figures reveals that there are other species that either only use gardens in cold snaps, or that increase their numbers dramatically during these periods. Blackbird and Song Thrush numbers usually double in a frost. Black-headed Gulls become bold enough to snatch food from gardens, as do Herring and Lesser Black-backed Gulls, and sometimes Rooks. These are scavengers forced to look at food sources that they would normally ignore as too risky. Long cold spells will bring unusual species such as Reed Bunting. It is clear that garden provision is helping a variety of species to survive, and that it is playing a role that is much wider than simply keeping the resident urban bird population alive.

A SPECIAL CASE, THE BLACKCAP

The history of wintering Blackcaps in this country over the past twenty years is also a demonstration of the importance of gardens for survival. There have been occasional reports of Blackcaps overwintering for the past century, and many of our summer visitors migrate no further south than central France. At some point, probably in the 1960s, a number of Blackcaps of German origin began to travel west or north west to their wintering site rather than SW to the Mediterranean as most do. They found themselves in Ireland and the Cornish peninsula, and discovered that they could survive. They returned to Germany ahead of other Blackcaps, obtained the best nest sites, and gained an evolutionary advantage. In a short time a west or northwest migration became an inbuilt habit for a population of German Blackcaps. Numbers grew and the areas occupied in Britain became more extensive. Reports of wintering Blackcaps became more regular from the mid-seventies. In cold weather they moved to gardens, and found that a combination of their own aggression, and the tender care of property owners, who were delighted to have a resident Blackcap, enabled them to survive conditions that otherwise would have been fatal. Ringing demonstrated site fidelity in successive winters. The birds were willing to be both omniverous and experimental with the food they ate, attracted first by berries in gardens, they readily turned to raisins, apples, grated cheese, and Christmas pudding. It seems probable that the severe winter of 1981/82 would have ended this evolutionary experiment quite abruptly but for their ability to use gardens to survive. If we had another winter like 1962/3 it may be that they would not survive, but the pattern of warm winters in recent years has seen numbers grow.

It is interesting to contrast the overintering Blackcap population with Chiffchaffs, who have also tried to overwinter, but whose diet remains insectivorous, and whose numbers are cut down by every severe frost. In consequence the totals recorded overwintering have altered very little over time, though there are occasional peak years. Figure 4 overleaf shows the total of Blackcap-days and Chiffchaff-days in the Bristol region for every winter since 1975/76

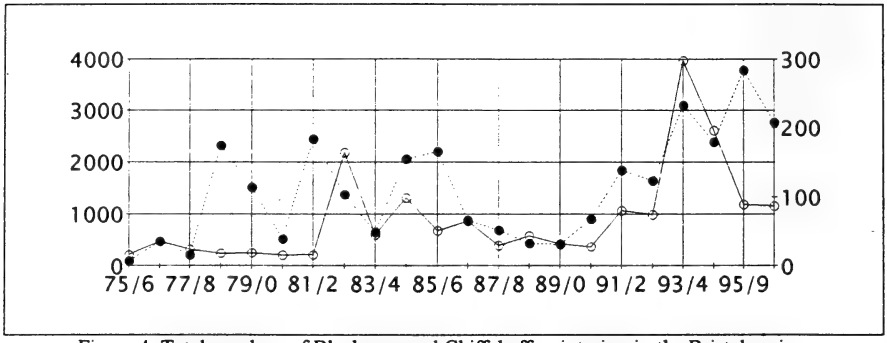

Figure 4. Total numbers of Blackcaps and Chiffchaffs wintering in the Bristol region, 1975/76-1996/97. Blackcap on left, filled dot, Chiffchaff on right, open dot.

Thus wintering Blackcaps demonstrate vividly the way in which the feeding of birds in gardens has enabled evolutionary change to take place. Of course it is dangerous in the long run for birds to become dependent on man in this way, but bird species that cannot adapt to the conditions that humans create will not survive.

INDIVIDUAL SPECIES

The 30 species present on average in more than 15% of gardens since 1975/76 are listed below. The figure after each species shows the average percentage of gardens in which it has appeared over the twenty years period. Birds are placed in order of average percentage. Numbers are totals per hundred garden-weeks.

For most species, a comparison is made between the numbers recorded in gardens and the index of the Common Bird Census organised since 1962 by the British Trust for Ornithology. The CBC population index has been set at 100 in 1974 for each species. This ensures that it is easy to compare the national pattern of change with that recorded locally. The CBC index figure for 1975 is plotted in the same vertical plane as the count in the winter of 1975/6, as the change in the breeding season population, measured by the CBC, may affect the population recorded in the subsequent winter. The CBC index is indicated by a dotted line with a filled circle and the left hand scale. Garden numbers are a solid line with an open circle and the right hand scale. For some species the figures shown are the percentage of gardens in which the species has been seen, and the numbers in which they occur.

In severe winters the totals of many species are higher than in mild winters. The high mortality caused by such winters is apparent in the subsequent breeding season, and following winter shows the reduction in population that the severe winter caused.

Blue Tit. 100%

Blue Tits are semi-migratory, and in autumn and spring large numbers are on the move. The total numbers moving through a garden are not obvious unless they are ringed; this will reveal that the two or three that are seen at any one time represent as many as fifty individuals in the course of a day. The numbers seen have fluctuated over the twenty years roughly in line with the CBC index. The impact of the severe 1981/2 winter is the most striking parallel.

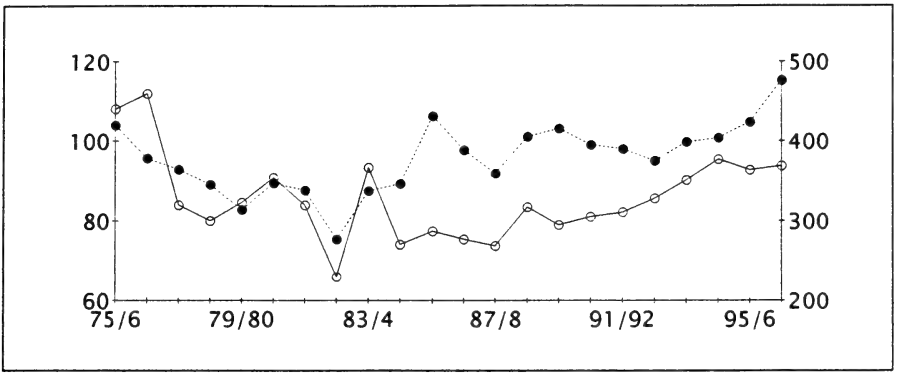

Figure 5 Blue Tit. National CBC index, on left, filled dot, garden numbers on right, open dot.

Blackbird 100%

Nationally Blackbird populations have been undergoing a long term decline, as the CBC index shows, but numbers in gardens in winter have grown fairly steadily. Whether this is because increasing numbers have come to rely on gardens, or whether it is related to migrant blackbirds that undoubtedly winter here, is uncertain. Numbers invariably increase abruptly, often doubling, in a cold spell.

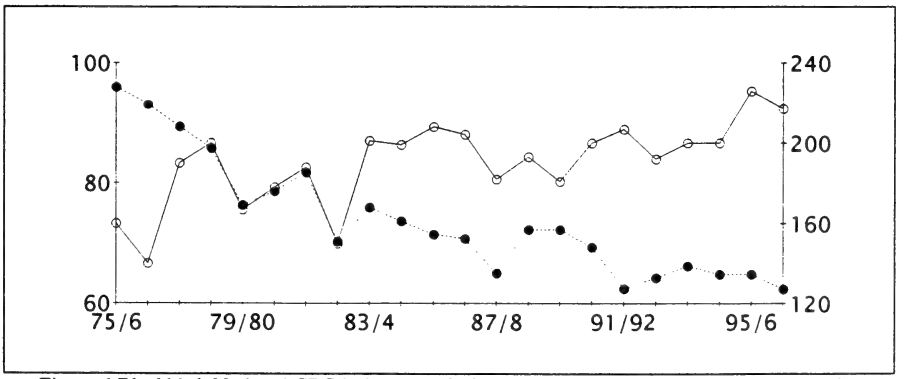

Figure 6 Blackbird. National CBC index, on left, filled dot, garden numbers on right, open dot

Robin 99%

The Robin is highly territorial and until the spring it is exceptional to see more than one at any particular time in a garden. The peak in 1985/86 is not readily explained. There is a fairly close relationship wth the CBC index, though the national decline after the 1990/91 winter had no impact locally, and the increase since the nadir in 1982/83 is greater locally.

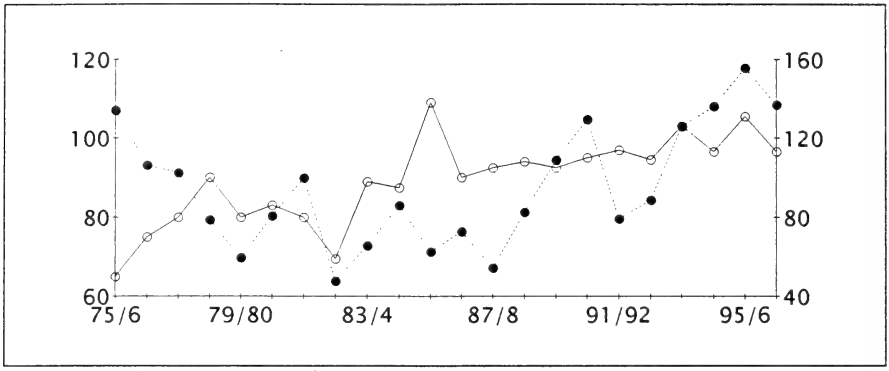

Figure 7. Robin. National CBC index, on left, filled dot, garden numbers on right, open dot

Starling 97%

Figure 8 below shows a close link between the national CBC farmland index and the numbers recorded by this survey. This implies that Starlings recorded here in winter are native rather than migrants from Europe. Unlike House Sparrows, that are usually sedentary Starlings are a highly mobile flocking species, exploiting food as it appears, and covering an extensive area in their search for it. They also move around the country under the impact of cold weather, and numbers recorded in any garden very often change abruptly from day to day and week to week. The local decline since 1978/79 is almost two thirds, whereas the national one is half.

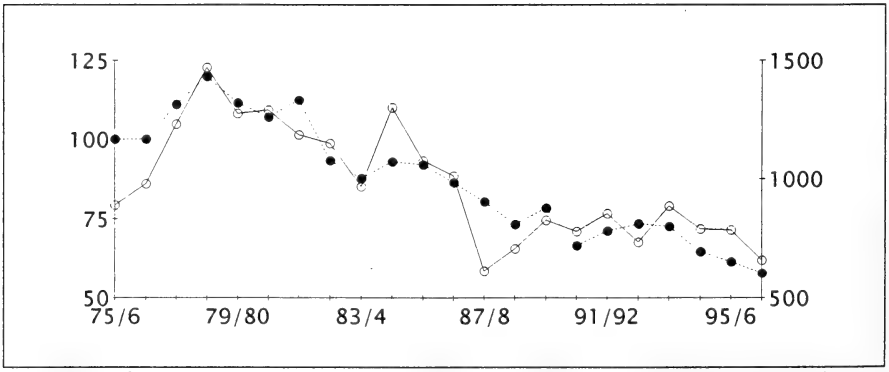

Figure 8 Starling. National CBC index, on left, filled dot, garden numbers on right, open dot

GreatTit 95%

The Great Tit is a partial migrant like the Blue Tit, and large numbers of continental birds sometimes arrive here. There is however some link between the CBC index and the numbers recorded in gardens.

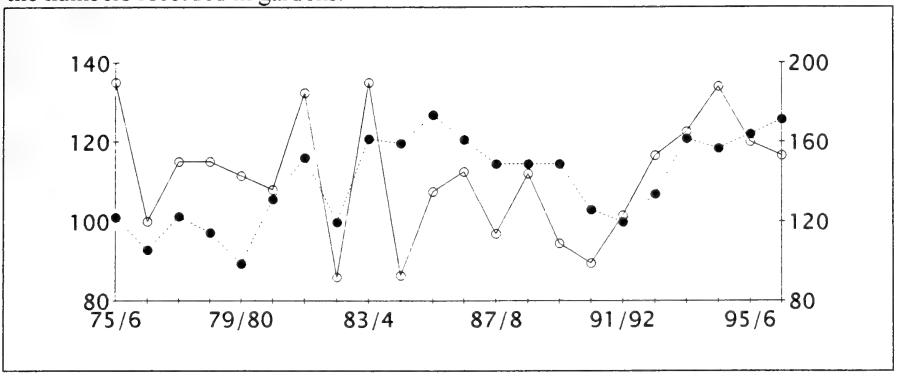

Figure 9. Great Tit National CBC index, on left, filled dot, garden numbers on right, open dot

House Sparrow 94%

There is some evidence to suggest that House Sparrow numbers reached a peak in the mid-seventies. Competition from other species such as Collared Dove, Crow, and Magpie grew rapidly after that date. Figure 10 is a like-for-like comparison of Bristol gardens in successive winters, showing the average number recorded per garden. It shows that there has been a more or less continuous decline of two thirds in the numbers of House Sparrows in Bristol. The most confusing thing about this change is that it has happened only to some gardens, and in some areas, and not in others. The cause of this varied distribution is quite unclear. In Bristol the regions with the highest House Sparrow density now are the housing estates put up in the 1950s mainly in south Bristol. There are almost none in the older central areas, and also very few in the wealthy north west of the city. But it is not merely a function of the date of the building, for there are some House Sparrows in the recently built estates, such as Bradley Stoke. There is no comparable CBC index, because that survey did not record it effectively.

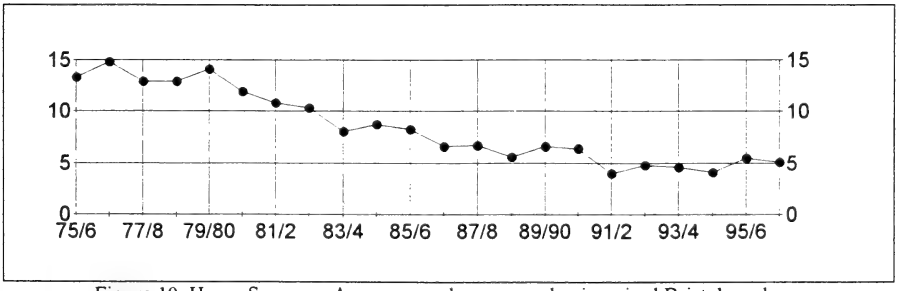

Figure 10. House Sparrow. Average number per garden in paired Bristol gardens.

Chaffinch 94%

The Chaffinch is a mainly migratory species, and large numbers come to Britain in winter from Europe. However Figure 11 shows a close relationship between the CBC Index and the numbers seen in gardens, though the iundex has increased by 25%, whereas loical numbers have gone up threefold. Numbers seen in gardens tend to increase in the course of the winter, and there are occasional surges in population suggesting a migratory wave.

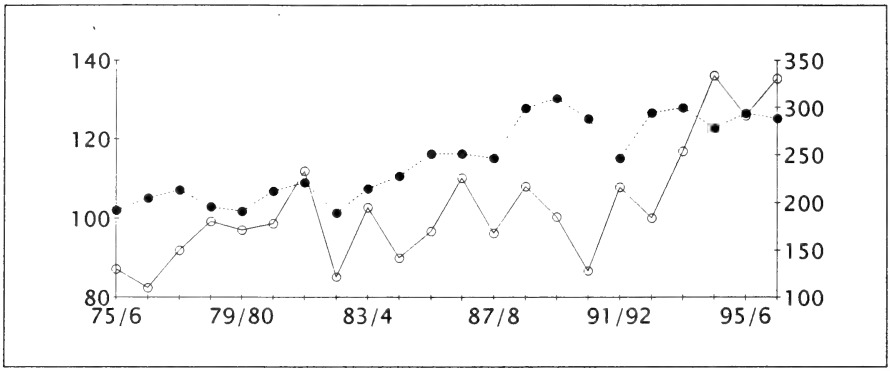

Figure 11. Chaffinch. National CBC index, on left, filled dot, garden numbers on right, open dot

Wren 89%

Wrens are very inconspicuous when not in song, and they are not normally attracted by artificial foods. However both the shelter and warmth that gardens provide are attractive to them. Cold winters cause heavy mortality and this is reflected in the figures despite the very small numbers seen. The impact of the 1981/2 and 1990/91 winters is clear, and the 1995/96 winter had an even bigger effect locally, but 1985/86 and 1986/87 had little impact, and the 1987 and 1988 breeding seasons must have been exceptional.

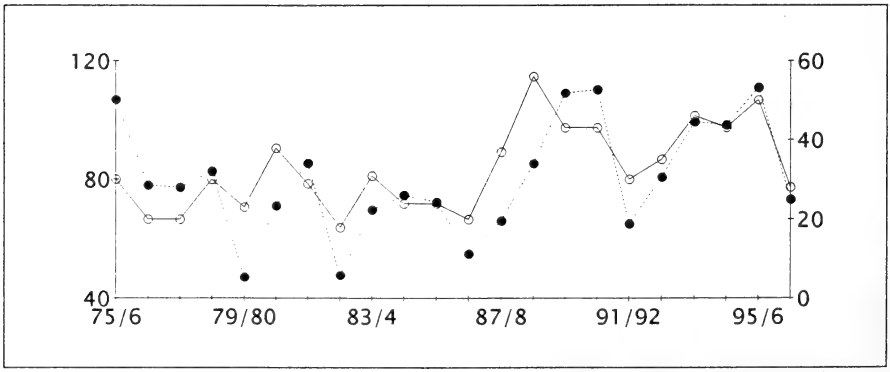

Figure 12. Wren. National CBC index, on left, filled dot, garden numbers on right, open dot

Dunnock 86%

Dunnocks are solitary and unobtrusive birds, almost certainly much commoner than appears. There seems to be no relationship between the CBC index and the numbers recorded in this survey. Nationally they have never really recovered from the 1981/82 winter, but locally numbers have been more buoyant.

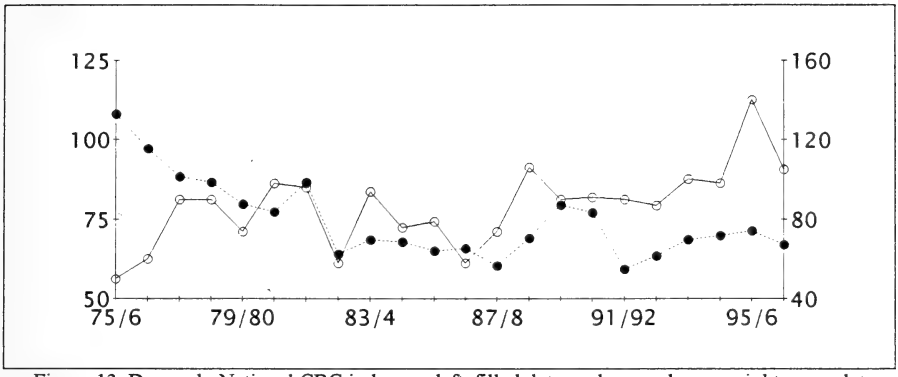

Figure 13. Dunnock. National CBC index, on left, filled dot, garden numbers on right, open dot

Greenfinch. 85%

In the autumn there is a large Greenfinch movement from east to west across Britain, but numbers seen in Bristol gardens have never been as large as in some other areas of the country, where flocks of twenty or more can dominate a bird feeder throughout the winter. There has been a strong upward trend in numbers since 1987/88, but an average of 2.7 birds a garden each winter week is not large. The pattern is similar to the CBC index, with a recovery roughly back to the level of the mid seventies. There is a tendency for numbers seen to increase in the course of individual winters, but numbers do not vary with temperature.

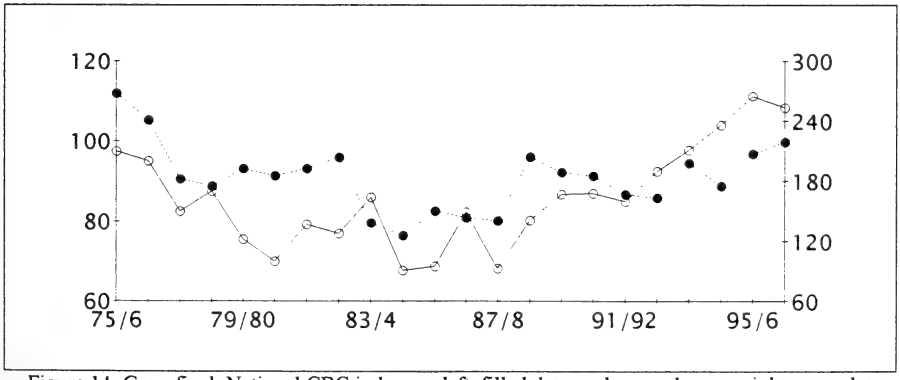

Figure 14. Greenfinch National CBC index, on left, filled dot, garden numbers on right, open dot

Song Thrush 83%

Song Thrush populations have declined by 70% since 1975, and the garden numbers reflect this. They tend to appear in gardens only in colder weather, or when they sing to advertise their territory. They will take artificial foods, but not as readily as many species, and are often attacked at bird-tables by Blackbirds. Their ability to break open snail shells help them survive periods of hard frost and drought, and it may be that the widespread use of slug pellets has reduced the snail population, though there is no evidence either that snails numbers have fallen or that Song Thrushes are poisoned by the pellets. The decline in the CBC index is greater than, but similar to, that of Blackbird; there may be a more general problem affecting thrushes.

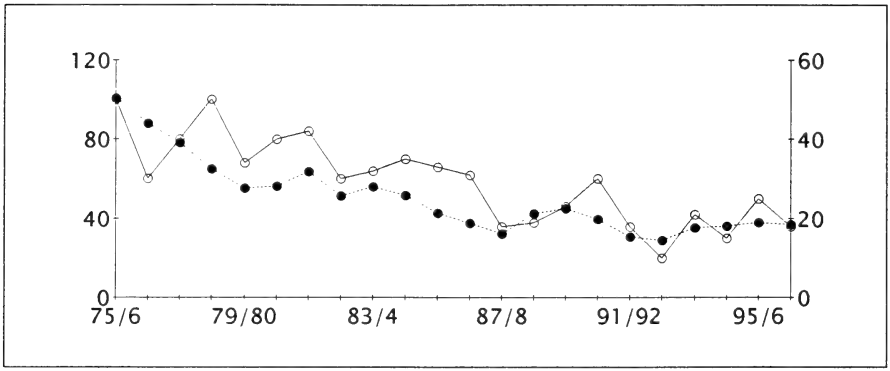

Figure 15. Song Thrush. CBC index, on left, filled dot, garden numbers on right, open dot

Collared Dove. 77%

This was already a significant species in 1976/77 making up 2% of the garden population. Numbers began to increase, dramatically so after 1992/93, which followed a period of growth in the national CBC index. This index only began in 1982, as previously there were not enough CBC plots recording it. The implication is that numbers on farmland have increased and that this has led to an increase in towns in winter.

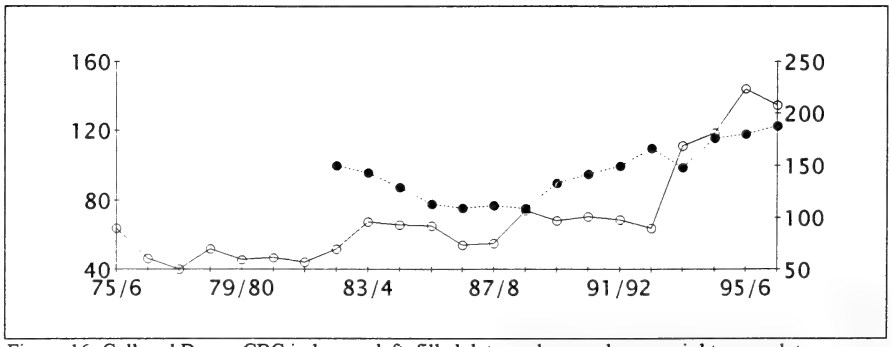

Figure 16. Collared Dove. CBC index, on left, filled dot, garden numbers on right, open dot

Magpie. 76%

As the chart shows Magpie numbers grew steadily from 1975/76 to 1987/88 in line with the national CBC index. They first became semi-resident in larger gardens, and in the smaller ones they would fly in to dominate the bird table unless driven off by Crows. The winter of 1986/87 was the first in which they were seen in every participating garden. Since then numbers have fluctuated, as has the CBC index.

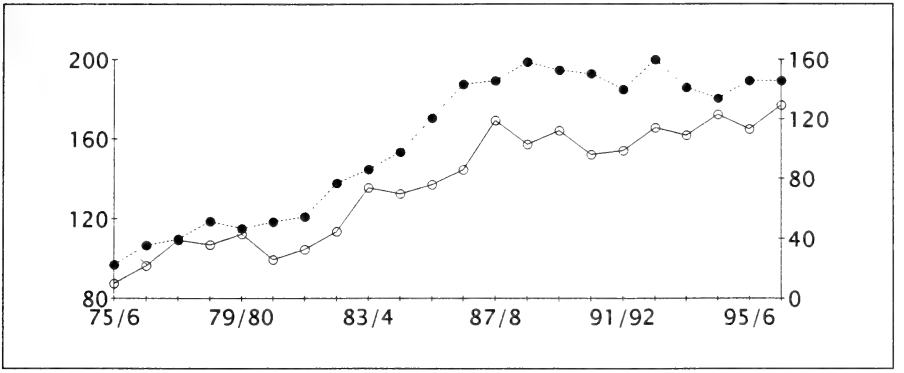

Figure 17. Magpie. National CBC index, on left, filled dot, garden numbers on right, open dot.

Coal Tit 66%

Coal Tits are semi-migratory within Britain. They are very dependent upon beech mast for winter feed, and the numbers that appear in gardens is related to the size of the beech mast crop. Numbers seen in gardens fluctuate quite abruptly. During some periods there is a two year cycle, with low numbers every other year, but in the eighties this was broken by two successive four year cycles. There is little relationship between the totals in gardens in winter and the CBC woodland index, though numbers clearly fell by up to a fifth after the 1978/79 and 1985/86 winters.

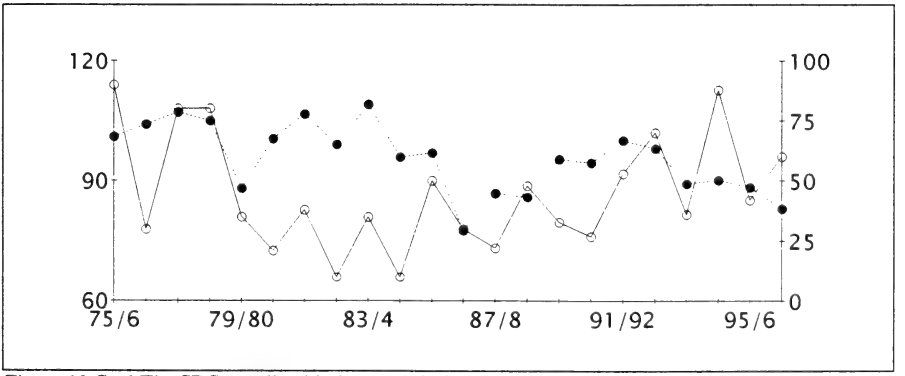

Figure 18 Coal Tit. CBC woodland index, on left, filled dot, garden numbers on right, open dot.

Carrion Crow 46%

Despite continuous growth in the CBC index since 1981/82, the numbers of Crows seen in Bristol gardens remained low until 1991/92. Since then they have increased fourfold, whereas the CBC index has only increased by 25% in the same period. This pattern of change is similar to the Woodpigeon. The blip in 1978/79 is related to a particular garden. They tend to be scavengers who come in and take what food is available, driving off all other competitors. However they are often surprisingly nervous, and may not eat very much.

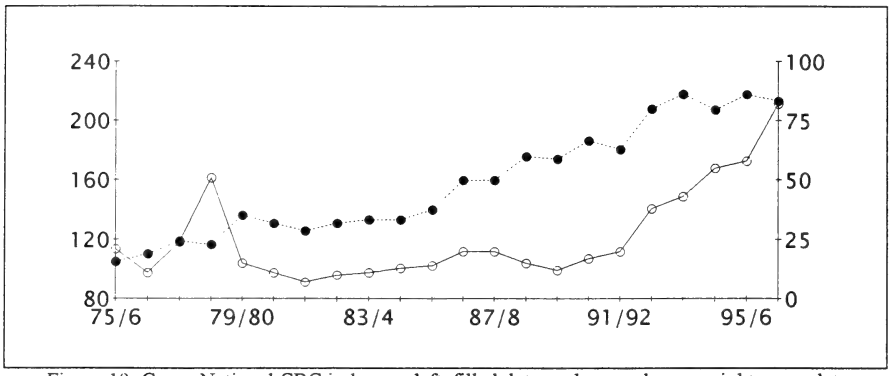

Figure 19. Crow. National CBC index, on left, filled dot, garden numbers on right, open dot.

Pied Wagtail 46%

Although Pied Wagtails are a mainly resident species, their winter numbers are increased by migrants. They seem particularly attracted to cities and often form large roosts in their centres, presumably seeking the warmth. They are occasional garden visitors, but they do not take artificial foods, and both their numbers and the proportion of gardens they visit have remained fairly constant over twenty years.

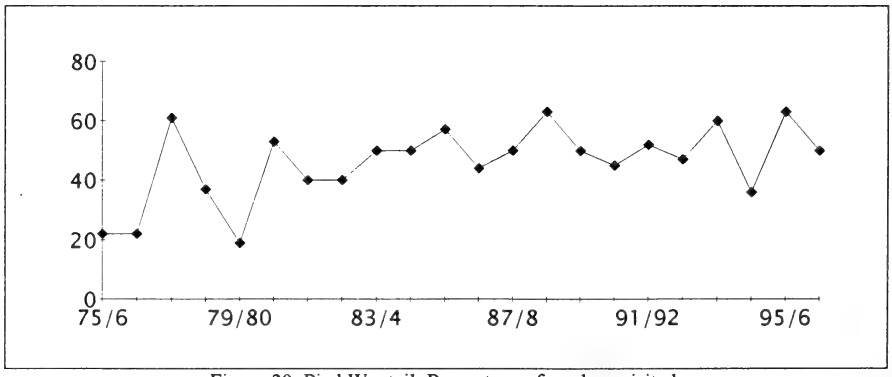

Figure 20. Pied Wagtail. Percentage of gardens visited.

Blackcap 44%

Blackcaps now visit a majority of gardens, and many become resident over long periods. A good supply of berries is always an attraction. Some gardens have had up to six present whereas others only see birds very occasionally. Some individuals are very aggressive for their size, driving off all other small birds. There has been a marked increase both in the percentage of gardens and numbers since 1989/90. The figures shown in Figure 4 above were based on a separate survey. Figure 21 shows the information derived from gardens in this scheme only.

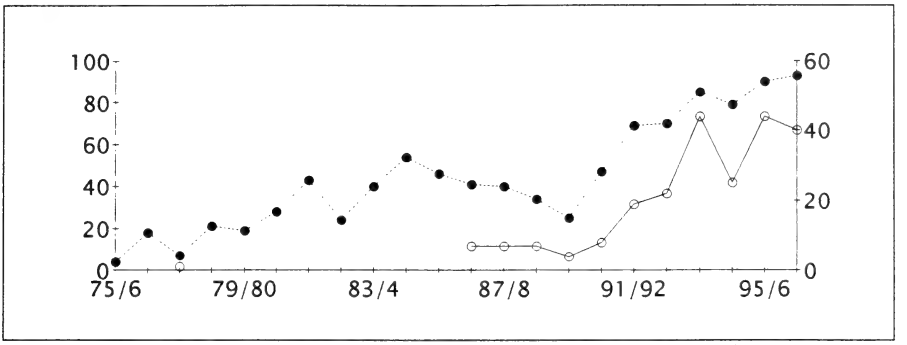

Figure 21. Blackcap. Percentage of gardens, on left, filled dot, numbers on right, open dot.

Wood Pigeon 43%

Woodpigeon are a partly migratory species, and in some winters native birds populations are increased by large numbers from the continent. The species is not readily surveyed by the CBC. The proportion of gardens in which they have been seen has gone up fairly steadily, and is approaching 100%, but the increase in numbers only began to rise fast after 1989/90, largely because birds began to visit gardens with regularity, whereas previously they had only appeared during cold snaps. Once satisfied that a garden is safe they will readily stay all day, tending to dominate, and eating everything they can find.

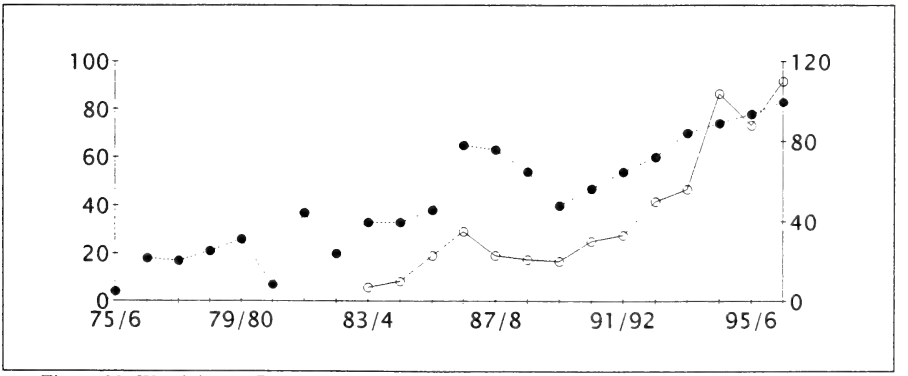

Figure 22. Woodpigeon. Percentage of gardens, on left, filled dot, numbers on right, open dot.

Redwing 36%

Redwing only appear in large numbers during cold snaps, but they only eat berries, and refuse to take artificial foods even if they are starving, which can be distressing. They normally leave gardens abruptly with a thaw. They were more widespread in 1984/85 than in any other winter, and that was the first winter in which they appeared in gardens in any numbers. It has been surprising to see large numbers in the past two winters, which have been in most ways quite mild.

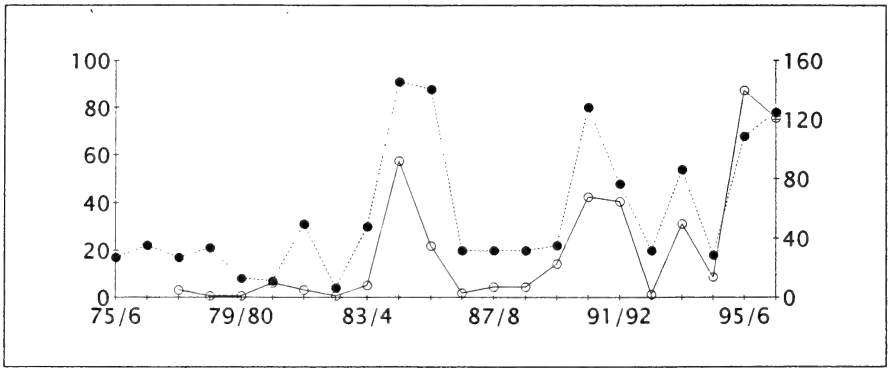

Figure 23. Redwing. Percentage of gardens on left, filled dot, numbers on right, open dot.

Jackdaw 35%

The Jackdaw is an attractive but aggressive corvid, which usually appears in a garden in a small noisy flock, though they may also take up residence. The national population grew steadily to 1987, and again after 1989, and the proportion of gardens in which it has been seen has followed this trend closely. Actual numbers seen have varied more abruptly, depending very much on particular gardens.

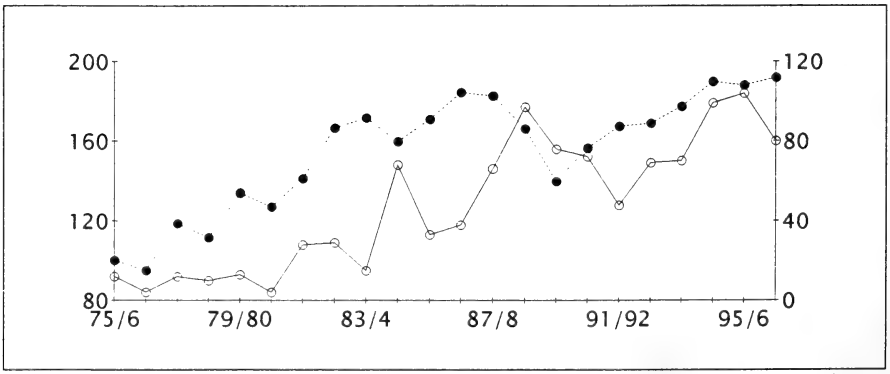

Figure 24. Jackdaw. National CBC index, on left, filled dot, garden numbers on right, open dot

Long-tailed Tit 34%

Few species are so liable to heavy losses in cold winters, or such rapid growth after a good breeding season and a mild winter. The proportion of gardens in which they have been seen follows the CBC index closely. Locally there was a decline after the 1983/84 winter, which was generally mild but the 1985/86 winter had no apparent impact. Figure 25 shows the percentage of gardens, but does not show the substantial increase in numbers using gardens since 1989/90, which reached a peak in 1995/96. Birds both locally and nationally have begun to use peanut feeders, whereas previously they have been insectivorous, and this may be the start of a largescale change in habits that may help their winter survival.

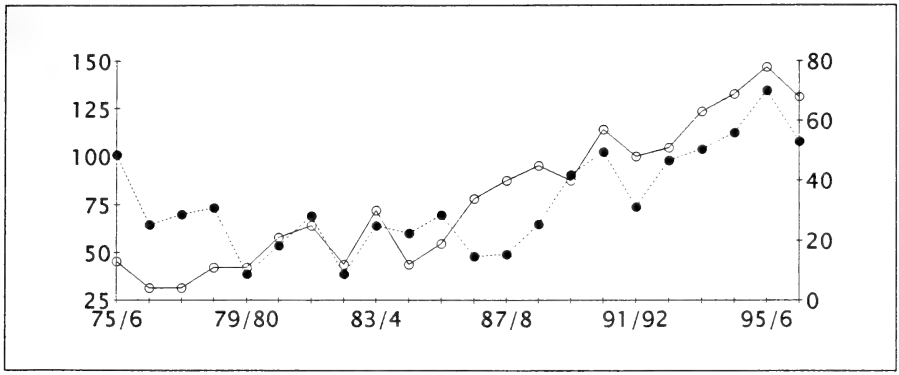

Figure 25. Long-tailed Tit. CBC index, on left, filled dot, percentage, on right, open dot.

Black-headed Gull 28%

Birds only come into gardens when frost prevents them using playing fields and similar sites to find invertebrates. They will scavenge anything, and will outcompete most other species. The peaks in the graph below mark the cold winters with great precision.

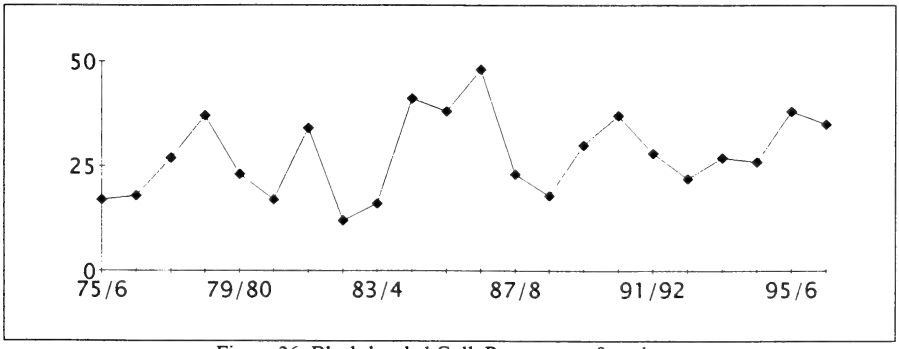

Figure 26. Black-headed Gull. Percentage of gardens.

Goldfinch 28%

Goldfinch numbers declined through the seventies, but have increased steadily since 1986. This increase has been reflected in an increasing presence in gardens, assisted by the provision of thistle seed, and the planting of teasel, and like Long-tailed Tits, they have been recorded using peanuts feeders.

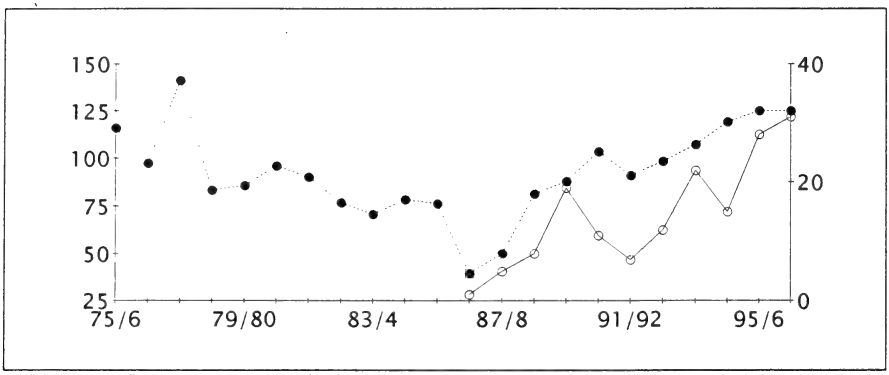

Figure 27. Goldfinch. National CBC index, on left, filled dot, garden numbers on right, open dot

Mistle Thrush. 28%

Mistle Thrushes are occasional, and mostly cold-weather, visitors to gardens, though they may sometimes guard a berry laden tree through much of a winter. There has been fluctuation but little apparent change in their use of gardens.

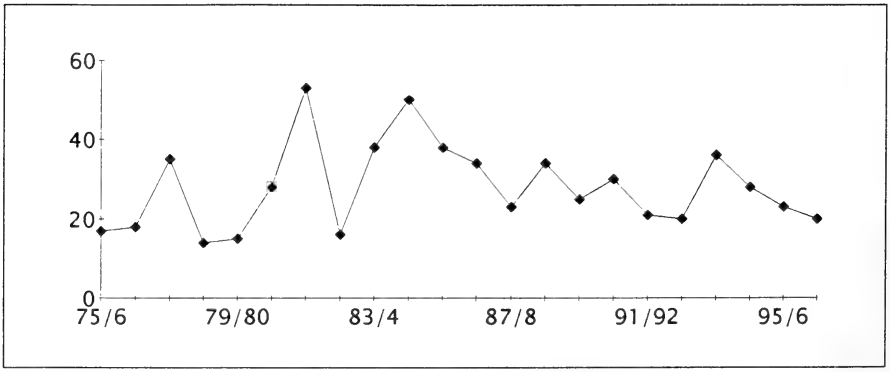

Figure 28. Mistle Thrush. Percentage of gardens.

Bullfinch. 27%

Bullfinches tend to come into gardens late in the winter, presumably when other food is exhausted. They tend to be confined to larger gardens, and visits are usually brief. The percentage has fluctuated without obvious trend or relationship to the severity of the winter.

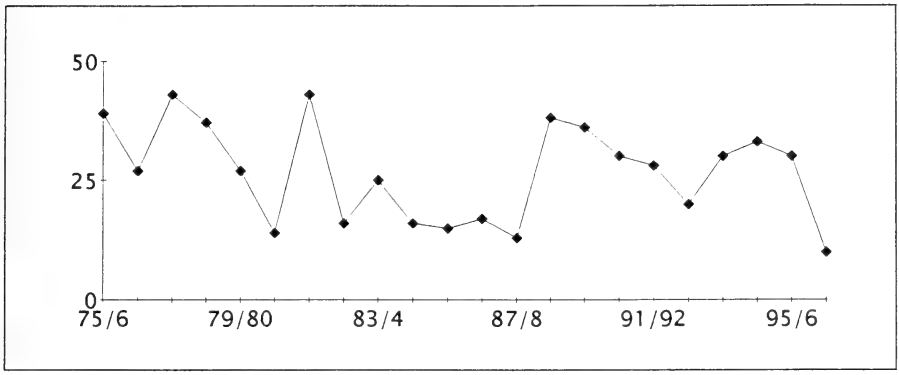

Figure 29. Bullfinch. Percentage of gardens

Jay 22%

Jays were once shy woodland birds, but they have become increasingly common in suburban gardens in both winter and summer. They have developed a taste for peanuts if they can get at them. There was an extraordinary influx in 1983/84, which is reflected in Figure 30 below, when thousands came into Britain from Europe probably as a result of a failure of the acorn crop. Indeed the local spread of the knopper gall, which prevents the formation of acorns on English oaks, may lie behind Jays increasing readiness to seek food in gardens. As the figure shows, in the past five years their numbers have increased considerably.

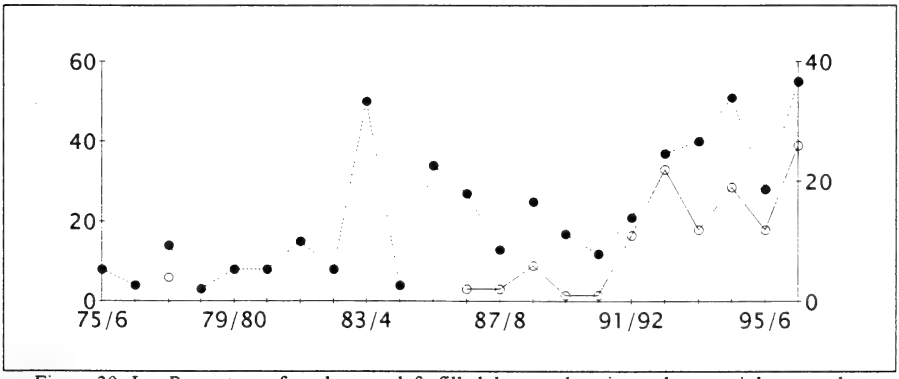

Figure 30. Jay. Percentage of gardens, on left, filled dot, numbers in gardens on right, open dot.

Siskin 20%

Up until 1988/89 the Siskin was an occasional irruptive species, known to be attracted to peanuts in red bags, but less common here than in many other areas. Since then it has been present in at least 30% of gardens every winter, and in 1993/94 there was a sevenfold increase on the previous winter, though counts reverted to normal in 1995/96. The numbers wintering with us depend upon availability of food elsewhere. Some birds have become apparently resident in gardens sometimes for two months or more, and, unlike other winter visitors, they often stay well into April.

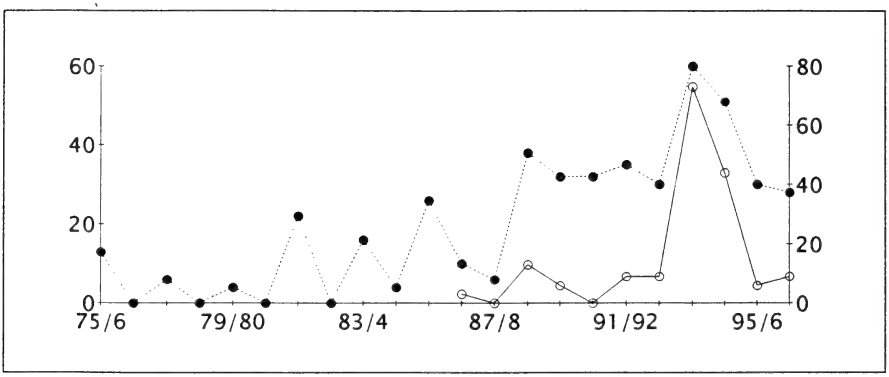

Figure 31. Siskin. Percentage of gardens, on left, filled dot, numbers on right, open dot.

Goldcrest 19%

Goldcrest numbers are regularly cut back by harsh winters, and expand again after good breeding seasons and mild winters. There was quite a good relationship in the past decade between the CBC index and the proportion of gardens in which they were seen. Somewhat surprisingly the 1990/91 winter affected them locally more than any other, and the 1995/96 winter also had a considerable impact. Their diet remains insectivorous and they do not take artificial foods.

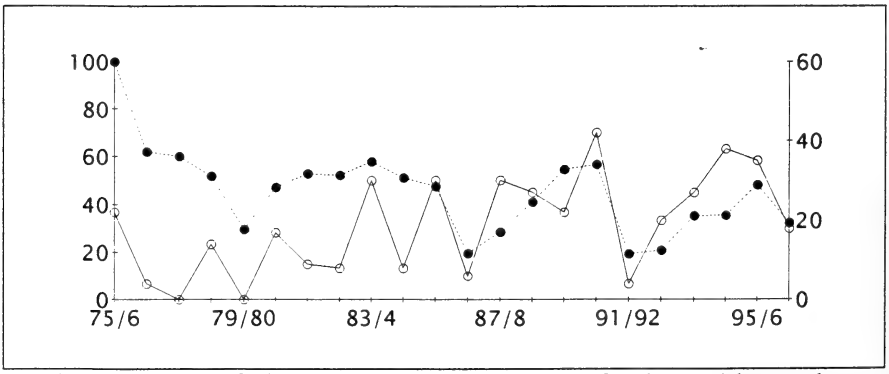

Figure 33. Goldcrest. CBC Index, on left, solid dot, percentage of gardens on right, open dot.

Sparrowhawk 18%

Sparrowhawk numbers have increased nationally and locally, and gardens have become a simple larder for them. There is no obvious explanation for the exceptional proportion of gardens in which they were present in 1986/87.

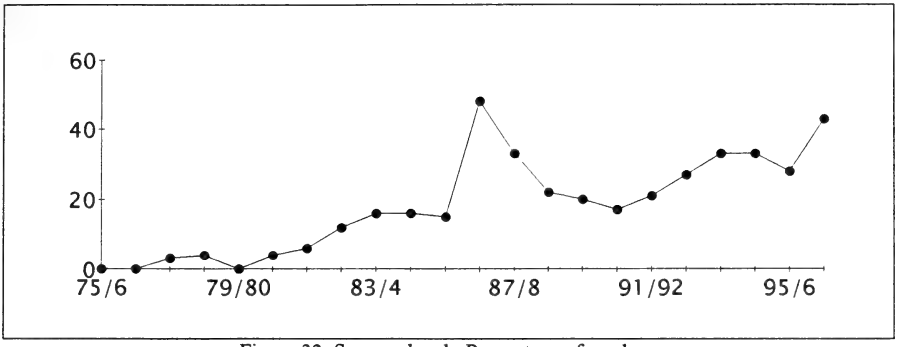

Figure 32. Sparrowhawk. Percentage of gardens

Fieldfare 16%

Fieldfares, like Redwings, come into gardens in cold weather. They are more shy than Redwings, and in some years are not reported at all. The best year was 1985/86.

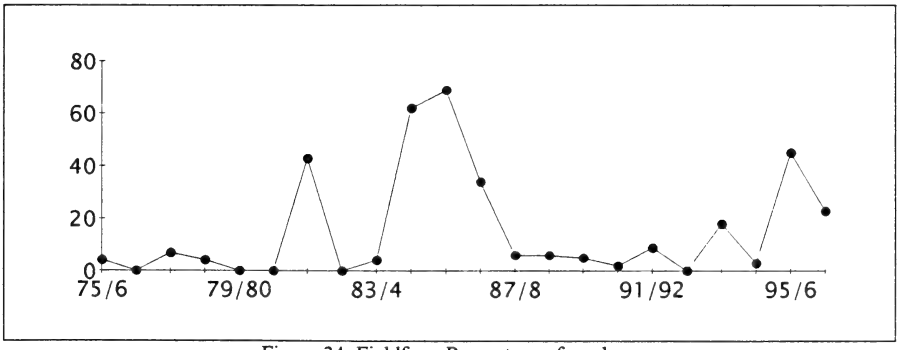

Figure 34. Fieldfare. Percentage of gardens

Other species.

A total of 32 other species have been seen in gardens during the survey. In order of average frequency the commonest were Great Spotted Woodpecker 17%, Green Woodpecker 15%, Rook 8%, Brambling 8%, Grey Wagtail 7%, and Reed Bunting 6%.

CONCLUSION

Gardens, and the food and shelter they provide, are a winter resource for an average of forty species, though that number has been exceeded in each of the past five years. Each garden has its own particular pattern of use, and some individual birds become regular, and on occasion are recognisable. Many birds tour an area in the course of the day, taking what food they can get. An average garden will provide for some 35 birds of eleven species in any week, and will see 22 species in the course of the winter. How many birds are thus being supported, and what proportion they represent of the total population is not easily assessed. However it is clear that for many species bird densities are higher in residential areas than in rural ones, and that these species are increasingly learning to make use of gardens and the food they provide. The bird population of the City of Bristol may be some 50,000 individuals in the winter months, over half of which will be supported by garden feeding. Unless there is a reversal of the long term trends towards urban sprawl, and increasingly intensive agriculture, which leaves little animal or vegetable food available for birds, it is likely that those species that can readily adapt to using gardens in winter will flourish, and those that cannot will decline. Continuing and possibly accelerating change is likely, and the Garden Bird Survey will continue to monitor it.

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I list below all the participants of the survey who have recorded for more than one year in alphabetical order. Without their support, often every day of every winter for many years, this study would not have existed. I am very grateful to them.

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PROBLEMS CAUSED BY BADGER ACTIVITY IN WESTBURY SUB MENDIP AND ELSEWHERE IN SOMERSET: the case for a return to badger culling. *

By W. I. STANTON
Kite's Croft, Westbury sub Mendip, Wells, BA5 1HU

SUMMARY

Badger setts, latrines, paths and crop damage in an area of four square kilometres centred on Westbury-sub-Mendip were surveyed in some detail in Autumn 1996. Questionnaires on badger damage were answered by householders in the village and by gardeners across Somerset. In recent years many new setts have been established close to the village. Before the late 1980s badger damage to gardens and garden wildlife was rare, but now it is an acute problem. Acts of Parliament from 1973 onwards ended centuries of hunting and routine culling of badgers by country people. In consequence there has been a major increase in badger activity at Westbury-sub-Mendip and throughout Somerset. The animal has become a pest of farms and gardens. The case is argued for a return to routine culling.

INTRODUCTION

I undertook this study in response to widespread discontent in Westbury-sub-Mendip at the high level of badger activity in the village. Over the month between 9th October and 8th November 1996 I spent from two to five hours most days in fieldwork. The area studied is about four square kilometres centred on the village square. The inner zone, about 20%, is the village, the remainder being farmland with a few small woods and isolated houses. The study period was a normal autumn with no significant seasonal changes in the pattern of badger activity.

The study included:

- field survey of badger setts, latrines, paths and crop damage.
- questionnaire on badger activity in the village.
- telephone survey of badger activity in a sample of Somerset gardens.
- historical research.
- consideration of the findings in relation to badger population growth and public nuisance.

I revisited all the setts in Autumn 1997 and classified them as main, annexe, subsidiary and outlying setts, using the methodology employed in the 1997 "Harris" survey of the British badger population (Wilson, Harris, & Mclaren, 1997, Appendix 10.1).

*The opinions expressed in this paper are those of the author, and not necessarily those of the Editor, or members of the Society.

PHYSICAL GEOGRAPHY AND GEOLOGY OF THE STUDY AREA

(See Figure 1)

Westbury-sub-Mendip lies at the foot of the southern escarpment of the Mendip Hills, about halfway between Wells and Cheddar. The oldest houses are mostly close to the stream that flows south from springs at Old Ditch. South of the village the land is low-lying with two small isolated hills, Windmill Hill and Lodge Hill. North of the village the ground rises, first gently and then more steeply almost to the level of the Mendip plateau. The height range is from 15m to 240m above sea level. The aspect is generally south to southwest.

Virtually all the escarpment consists of hard calcareous conglomerate, Triassic 'Dolomitic Conglomerate'. The soil is thin and the rock shows through here and there. A thick stratum of softer red marl ('Mercia Mudstone') runs from Lynch Lane southeast across the centre of the study area and south from it another mass of conglomerate extends from Westclose and Broadway Hills to Hollybrook Farm and beyond. The softer marl reappears in the lower ground south of the A371 main road (Wells road to Easton), where Lodge Hill is an isolated mass of carboniferous limestone and there are layers of clay hillwash ('Head') and alluvium beside streams.

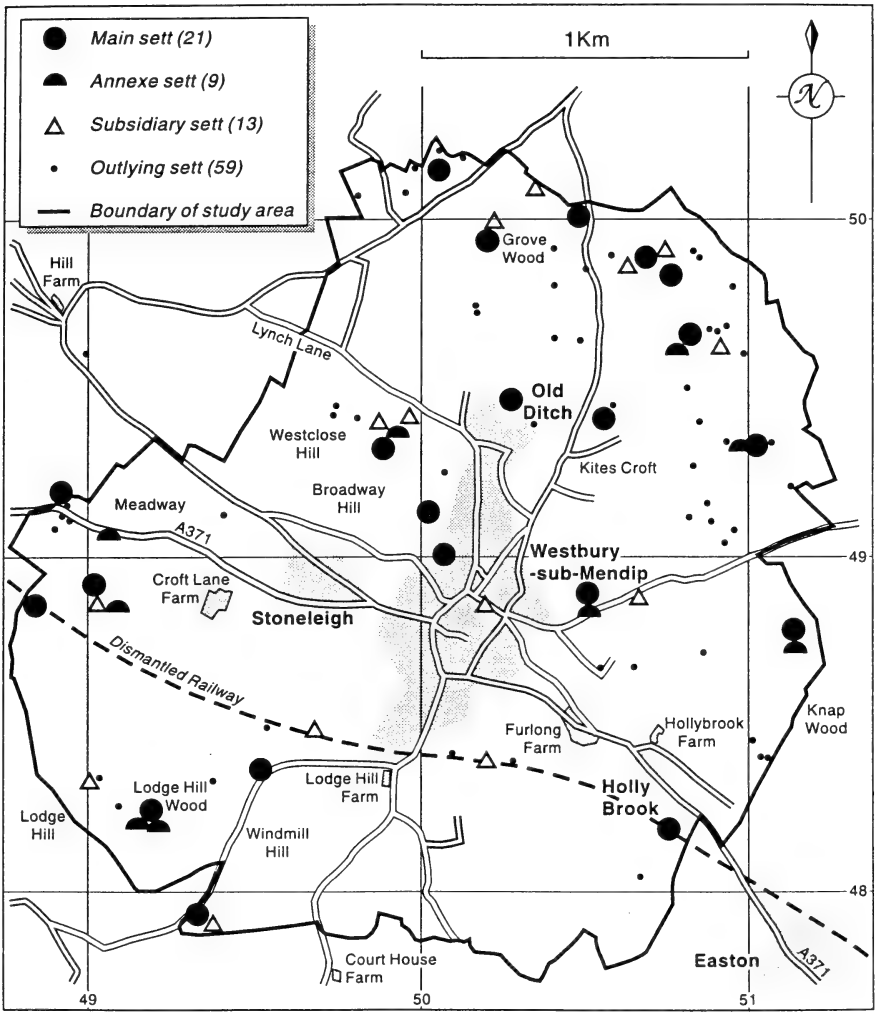
Naturally thin soils notwithstanding, badger setts are most common on the Dolomitic Conglomerate of the high escarpment. This is possible because Saxon and mediaeval agriculture, mainly strip farming, on this steep ground moulded the soil into extensive terraces ('lynchets') and field boundary banks in which the thickness of the soil reaches five metres. A few setts seem to be in the soil filling cave entrances.

SURVEY PROCEDURE

Badger setts, isolated burrows, latrines, paths, and crop damage (especially maize) were located and plotted on a recent Ordnance Survey map enlarged to a convenient scale. Following landowner consultation every field and wood was examined. In most fields a simple walk around the boundaries was sufficient. The majority of badger tunnels were beneath hedges and walls; setts in open pasture, arable land, or under buildings were very familiar to the landowner and were described to me in the initial consultation.

In a few large fields individual lynchets were walked. Some had impenetrable thickets of bramble or gorse, possibly concealing setts, because well-worn badger paths led into them. Regularly used paths were locally obliterated in fields that were being grazed by cattle or sheep. No attempt was made to follow badger paths across the interiors of fields, or to locate latrines in field interiors, because of the extra time involved. A number of latrines were encountered by chance in field interiors and on this basis I estimated that at least as many latrines were missed by the survey as were located by it.

Figure 1.
BADGERS AT WESTBURY-SUB-MENDIP, AUTUMN 1996



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It was impractical to survey the village built-up area in detail. Forty three householders out of the village total of about 300 answered questions about badger damage in their gardens.

The resurvey of setts in Autumn 1977, using the Harris survey methodology, involved counting the numbers of well-used, partially-used, and disused entrance holes in each sett, and then, on the basis of hole numbers, spoil heaps, spatial distribution, continuity of occupation and the layout of well used paths, assigning each sett to one of the categories: main, annexe, subsidiary or outlying.

FINDINGS OF THE SURVEY

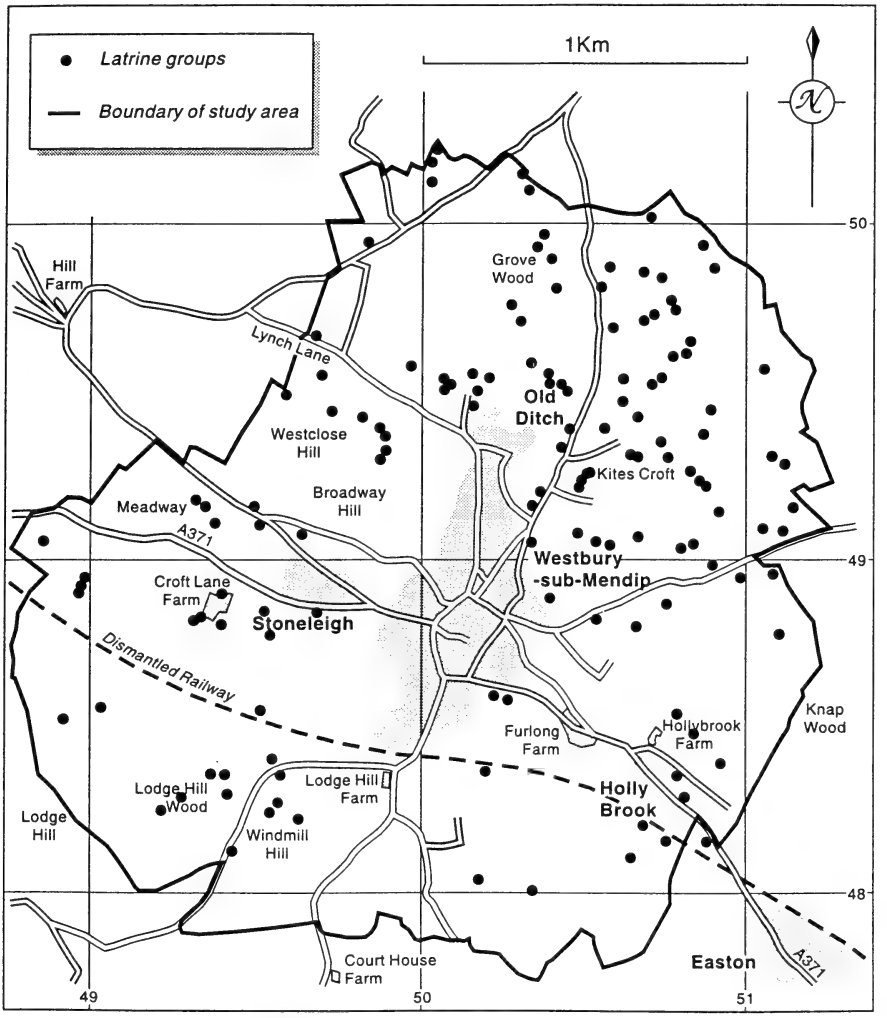
Figure 1 shows badger setts in the study area in Autumn 1996. There were 21 main setts, some of them large and complex with as many as 20 entrances; 9 annexe setts with fewer well-used entrances, close to a main sett and linked to it by a well-used path; 13 subsidiary setts, frequently but less intensively used; and 59 outlying setts with a few entrances in part-time use.

The great majority of setts are located on field boundaries, where centuries of cultivation have thrown up lynchet-like banks in which the soil is abnormally thick. Some setts occur in lynchets in the interiors of fields. A few main setts are found on slopes with thin soil over Dolomitic Conglomerate, as at ST 500.501 near Knyfton's Firs, ST 510.493 east of Kites Croft and ST 511.488 north of Knap Wood. At the first mentioned, fragments of old decomposing bone have been thrown out, suggesting that it is in a soil-filled cave entrance, perhaps with palaeontological deposits. Four setts on Lodge Hill, ST 491.482, may be in caves.

There are two main setts and five lesser ones in the old railway embankment between Croft Lane Farm and Hollybrook. Two setts are dug in the high alluvial banks of the stream between Lodge Hill and Windmill Hill. One main sett has developed around rubbish dumped in an old pond.

Figure 2 shows the distribution of badger latrine groups during the 1996 study period (latrines reported by village respondees in Table 1, which I did not observe personally, are not shown). A total of 178 groups of up to ten latrines close together were located. A typical latrine is a shallow pit roughly the size of a soup bowl, containing faeces from one to more than ten in number. Most faeces were brown with a soft sticky texture, probably representing a diet of earthworms, but some contained plentiful beetle debris, and others, near maize fields, were packed with undigested grains of corn.

Figure 2.
BADGERS AT WESTBURY-SUB-MENDIP, AUTUMN 1996



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Figures 1 and 2 show that latrines are commonest where setts are commonest, i.e. on the steep hillsides north and east of the village. Favoured locations are the bases of hedges and walls. They also occur in grazed grassland away from boundaries, but as mentioned above, such areas were not searched. Latrines are usually present within a few metres of a main sett.

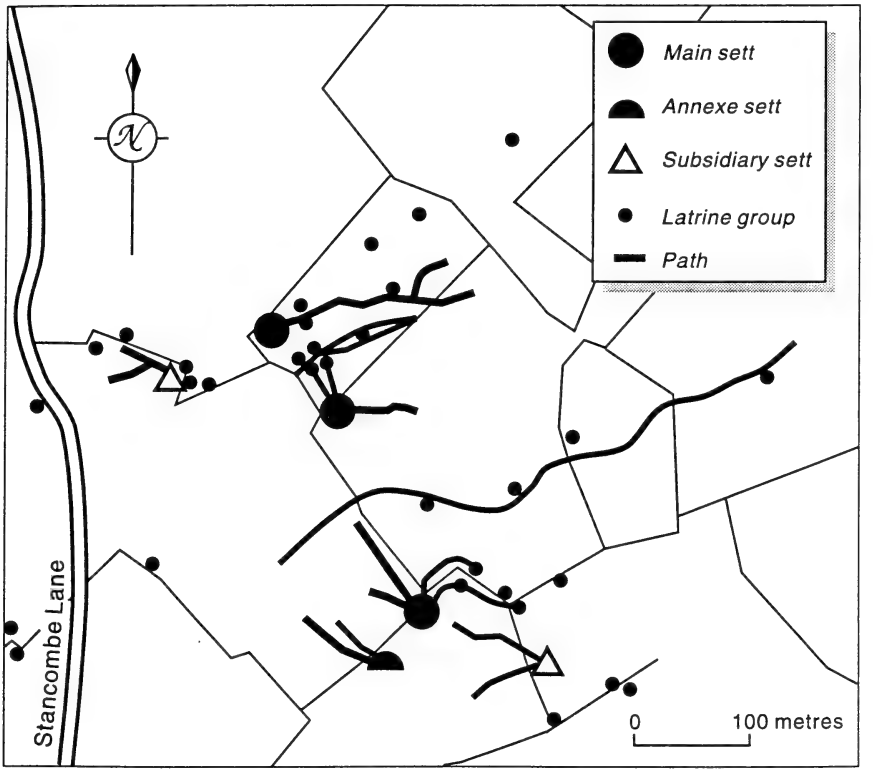
Pits or scrapes of latrine size without faeces were extremely common. In some grazed fields the ground beneath every cowpat was excavated in search of worms or grubs. Sometimes such scrapes, usually a small group, were used as latrines, but the ratio of empty scrapes to latrines was at least ten to one.

When the weather became wintry in November the pattern of badger activity changed. Many autumn latrine groups became disused. A few new "winter" latrine groups were noticed.

During the autumn 1997 resurvey of setts I paid particular attention to badger paths near setts, plotting them as far as they could be traced in the grazed grassland. The large main sett at ST 508.498, (Figure 3) has a similar one only 100m to the NW and another 200m to the SSE. No paths connect these setts, instead the space between them is bisected by well-trodden frontier paths up to 500m long with spaced out latrine groups like service areas on a motorway. The longest path peters out in open fields at both ends. Between the two closest setts the frontier path crosses a heavily trodden area with many dispersed latrines.

In March and April 1998 I resurveyed the latrines along the boundaries of eleven fields, an area of about 0.5 square kilometres, to investigate the longevity of individual latrine groups. Of 32 groups mapped in 1996, seven were still present, mostly alongside setts, but 25 had vanished. Twenty two new groups were in use. Latrine turnover is rapid: badger latrines in my own garden are used for about two months, then abandoned.

Figure 3.
CLOSELY SPACED MAIN SETTS, FRONTIER PATHS AND LATRINE GROUPS, AUTUMN 1997



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BADGER ACTIVITY IN THE VILLAGE

Until about ten years ago there was no badger problem in Westbury-sub-Mendip gardens. It was in the late 1980s that gardeners began to find their vegetable plots raided, their flowerbeds and lawns dug up, their spring bulbs eaten and their paths fouled by latrines ('dungpits'). At roughly the same time benign and often much-loved garden wildlife such as hedgehogs, slow worms, grass snakes, frogs and toads vanished. By 1993 it was realised that badger predation was the probable cause (Stanton, 1993). Their loss was linked, rightly or wrongly, to sharply increased numbers of garden pests such as slugs, snails, woodlice and earwigs

Question	% Yes	% No	% No response, or not applicable
Vegetables eaten or spoiled?	51	14	35
Fruit eaten or spoiled ?	35	14	51
Flowering plants eaten or spoiled?	37	63	
Other damage ?	60	40	
Latrines established ?	51	28	21
Garden wildlife lost ?	7		93
Defence attempts successful ?	21	37	42
Badgers welcome ?	2	91	7
Badgers present before 1980?	5	33	62

Table 1. Summarised responses from 43 householders, (shown as percentages) to questions about badger activity in village gardens.

Miscellaneous badger damage includes destruction of compost heaps, plastic footballs, garden ornaments, a bird-table, and injury to a cat. More seriously, at a farm 150m northwest of the village centre, badgers began digging under the floor of a calf-rearing shed in 1992. By 1996 the shed was unusable with a nearly a metre depth of earth on the floor, and the sett extended under the shed wall into the kitchen garden, which was abandoned by the householder. In 1995 a new sett was begun at the opposite end of the kitchen garden.

In a field just north of Old Ditch a pet pony broke its leg in a badger hole and had to be destroyed. The same fate befell a cow in the sett at ST 495.484. With badger setts on the fringes of the village and even within it, pet dogs, especially terriers, cannot be prevented from occasionally visiting them and coming home infested with fleas. Some dogs roll in garden latrines, with particularly foul results.

When wooden articles stored in a small old quarry on the edge of the village (ST 503.486) caught fire, the Fire Brigade reported that badgers were living beneath the store. After the fire badger activity in adjacent gardens was reduced for a while, but the subsidiary sett, (not located in the 1996 survey) was soon re-occupied. In a nearby village badgers broke into a beehive, ate all the honey, and dragged some of the frames a distance of 200 metres.

The defence of gardens against badgers is difficult, expensive and not always successful. Walled gardens are the easiest, needing only a badger-proof gate in most cases. Electric fences cost at least £100 for a small garden, need constant attention, are unsightly, and do not always restrain a determined badger. Fenced gardens can be made safe temporarily by blocking access routes with rocks or driving in stakes, but new entrances are soon dug. Permanent protection of an average family vegetable garden by chainlink fencing dug in to 0.3m depth and turned outwards underground cost £150 to £200; protection of a large garden on the same basis would cost well over £1000. One gardener has found that badgers can climb over a metre-high fence.

Wire fencing of any kind is unsightly, a serious consideration in one village garden which opens to the public through the National Gardens Scheme. Two large allotments (ST 505.492) have been protected by digging in wire netting reinforced by corrugated iron sheets fitted end to end, at high cost; these defences were nevertheless breached in 1997.

HISTORICAL ASPECTS OF BADGER PROBLEMS IN THE MENDIP AREA.

The local historian Francis Knight researched church and parish records of the Uphill-Cheddar-Burrington region for his books *The Seaboard of Mendip* (1902) and *The Heart of Mendip* (1915). He noted (1902, p. 100) that an 'Act for the Preservation of Grayne' passed in the time of Elizabeth I, set down payments to be made for the destruction of vermin. He found (1915, p. 345) "many entries of rewards paid for the destruction of vermin of various kinds. A shilling was paid for the killing of either a fox or a badger (the latter was always entered as a 'gray'), fourpence for a polecat or a hedgehog, and twopence for a stoat. Sparrows were destroyed in great numbers ...." This was in the 17th and 18th centuries. Knight recorded (1915, p. 72) that still in the early 19th century Axbridge Square was often the scene of badger-baiting when " the badger was put into a barrel, and dogs were then set to 'draw' it, that is to drag or worry it out of its shelter..."

Why were so many animals (fox, badger, otter, stoat, weasel, polecat, marten, hedgehog, sparrow, tom-tit etc.) classified as vermin? Many of them took farm animals, especially domestic fowls and eggs, fish, or other produce such as grain, vegetables and fruit when the opportunity arose. However sentimentalist modern authors have tended to find excuses for the vermin and blame the dark side of human nature instead. Thus Matthews (1968, p. 220) wrote "One cannot help feeling that [the persecution of vermin in the 17th and 18th centuries] was the outcome of the natural destructiveness of man, and the fact that some beasts were classed as vermin provided a splendid opportunity for indulging it ...." He was ill-informed, as explained later in this paper.

Ernest Neal's pioneering monograph *The Badger* first published in 1948, examines this subject (Neal, 1969, p. 42) "it is strange that man should persecute [badgers] so much in spite of the indisputable fact that they do much more good than harm. Partly, no doubt, it is due to ignorance... and partly because badger digging is looked upon as a sport by some..... If an animal causes harm there is a logical reason for destroying it... We know all about the depredations of the fox, we know it for the rascal it is... Ignorance about the badger is, on the contrary, appalling.... It is to be hoped that as people come to know more about these grand animals they will .... begin to appreciate the presence of one of the finest animals on our fauna list."

Neal's insistence that badgers are on balance beneficial was based on his finding that their regular diet included pests and vermin, in particular young rabbits and to a lesser extent wasps' nests and rats. However, his meticulous studies of stomach and dung

content were made at a time when badger numbers were kept low by routine culling, before Britain's rabbit population was decimated by myxomatosis from 1953 onwards, and before badgers were suspected of spreading TB in cattle in the 1970s.

Farmers and landowners continued to treat badgers as vermin, holding down their numbers by trapping, gassing, and digging into the 1960s. At Westbury–sub-Mendip retired farmers recall how, in the 1950s and 1960s, badger skins were in demand for hearthrugs and shaving brushes. The 1963 price list of Horace Friend Ltd. of Wisbech offered fifteen shillings (about £8 today) for a full-grown badger skin. If badgers caused problems on the farm they were gassed in the sett with cyanide powder. After skinning, in those days of post-war austerity, the corpse was tied to a post in the farmyard for the hens to eat meat and maggots. Nothing was wasted. Older residents of the village also remember attending 'badger suppers' as late as the 1960s when they were regular events in many parts of Somerset. Several animals were barbecued at a local pub, usually once a year in the autumn.

The Badgers Act, 1973 was the first of a series of Acts which made it an offence to take, injure or kill badgers and provided protection for setts. The current Protection of Badgers Act, 1992 consolidates the provisions of the earlier Acts.

So by the 1980s farmers and landowners could no longer control badgers without special licences. Gassing of setts by Ministry officials was permissible in areas where badgers were thought to be responsible for outbreaks of bovine TB. Badger culling of any kind is now strongly opposed by animal rights activists and badger clubs. The preferred practice, where badgers are causing abnormally serious problems, is to trap the animals and release them elsewhere, or to exclude them from their home sett, which can then be filled in and destroyed.

BADGER NUMBERS AT WESTBURY-SUB-MENDIP

Neal (1969, p. 34) discovered during his early studies of badgers in Conigre Wood near Cirencester that it is hard to determine how many badgers inhabit a sett or group of setts. Family groups often move from one sett to another. After three years monitoring Neal concluded that the six setts in Conigre Wood normally sheltered a total of nine to eleven badgers. In the surroundings of Conigre Wood he knew of (1969, p. 42) "Fifteen setts in an area of about 18 square miles. The larger setts certainly have a normal population of three mated pairs, though trapping is extensive... Cubs... soon take the place of trapped animals..."

Neal's map of badger distribution in the British Isles in the 1940s (1969, p. 30) showed the greatest density in a broad belt from Cornwall through Devon, Somerset (including the Mendips), Gloucestershire and the Midlands to the Dee estuary. Badgers were "very numerous", "very common", or "abundant" within this belt, where just under one sett per square mile was typical.

The first national survey of badger setts in 1988 was carried out using the new method of classifying setts described above, which assumes that each social group of badgers has one main sett in continuous occupation and a variable number of annexe, subsidiary and outlying setts. In 1988 it was assumed that the number of adult badgers in a social group was, on average, six, so once the main setts were identified a simple calculation gave the approximate number of adult badgers. On this basis Neal (1989) reported that in 33 square kilometres of "excellent badger country" near Milverton, Somerset, there were about 324 adult badgers (ten per square kilometre). However the Harris report on the second national badger survey in 1997 found evidence (Wilson, Harris, Mclaren, 1997, pp. 57-60) that the size of social groups had increased, perhaps to as many as eight or nine adult badgers on average.

In 1996, in four square kilometres at Westbury-sub-Mendip, my survey located 21 main, 9 annexe, 14 subsidiary, and 58 outlying setts. 21 social groups represent 126 adult badgers in 1988 terms and perhaps as many as 168 or 189 adult badgers in 1997 terms.

If a median figure of 150 adult badgers is taken as the population of my survey area in 1996, the density of 37 adult badgers per square kilometre may be compared with earlier estimates of just under one per square kilometre in areas of Britain where badgers were "abundant" in the 1940s (Neal, 1969, p. 40), three per square kilometre for Somerset as a whole in the 1980s (Neal, 1989, p. 11), or ten per square kilometre in the "excellent badger country" of Milverton (Neal, 1989, p. 9).

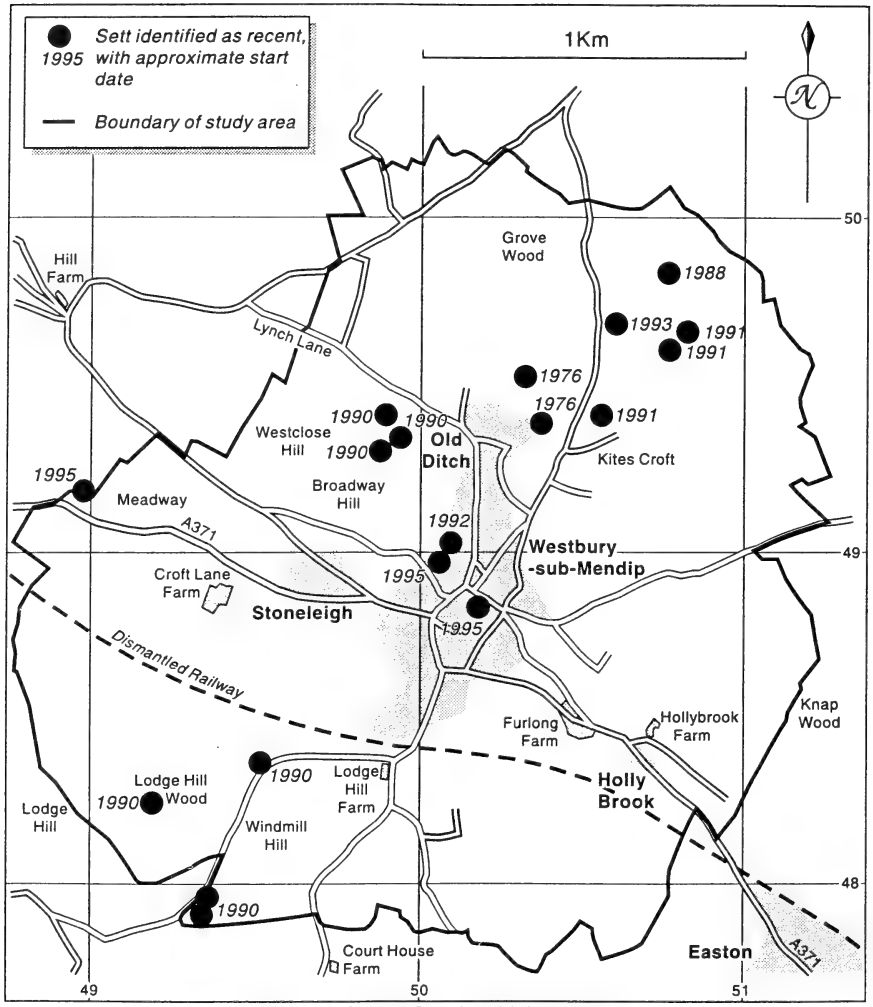
LOCAL EVIDENCE OF BADGER POPULATION INCREASE

On completion of the field survey I discussed my maps with the farmers and landowners involved, asking if any of their setts were new, and if so, the approximate year of establishment. New setts were noticed because of their visual prominence, their prejudicial effect on farm business, and the perceived threat of bovine TB.

Figure 4 shows the 17 setts identified as new, with the approximate year when they were first noticed. In 1996 ten of them were main setts, two annexe, two subsidiary and three outlying, but some have enlarged rapidly. For example, the sett at ST506.494 began as a single tunnel under a hollow ash tree in 1991, but by 1997 it had six well-used and two partially-used entrances. Two of the 17 date from as long ago as 1976 but all the others were begun after 1987. The more recent the establishment, the greater the confidence placed in the dating. I have no reason to doubt the identifications, being able to confirm two of them, (ST 506.494 and ST 502.488) myself.

Probably a significant number of minor setts were established recently but were not noticed by the landowner. They tend to be better concealed, in hedges and thickets, than the main setts. For example the subsidiary sett in the quarry (ST 503.486) was undetected until the fire revealed it.

Figure 4.
RECENT BADGER SETTS AT WESTBURY- SUB-MENDIP



Based on the Ordnance Survey's 1:25,000 map of 1976
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Several consultees stated that old setts had grown much larger, with more entrances, in recent years. Many of the recent setts are close to the village, and inside it in some cases. Evidently since the 1970s badgers have moved into the village, reaching its centre (ST 502.488) in 1995.

Of the 43 village householders questioned (Table 1) 14 were able to give an approximate date to the first invasion of their gardens by badgers. The earliest date was 1988. Of 22 other households with badger problems some could not remember the date of the badgers first appearance, and several recently-arrived occupants found badgers already active in their gardens. Badgers were acknowledged long-term visitors to two adjacent gardens on the periphery of the village, at Old Ditch, where one of the owners has attracted badgers and foxes to her garden for many years by feeding them. The other owner does not welcome them.

Gardens close to the new sett at ST 506.494, established in 1991, first began to suffer from badgers in 1990 and 1991. Many respondees reported seeing badgers in their gardens when coming home at night. Others hear them playing or fighting at night. Security lights come on unexpectedly, triggered by badgers. Overall it is clear that badger nuisance is a regular feature of more than half the gardens sampled, whereas a decade ago it was rare.

I conclude that the establishment of ten main new setts since the 1970s close to and in the built-up area of the village, coinciding with an invasion of many gardens that previously were badger-free, and also coinciding with compulsory cessation of the routine culling of badgers that had been the norm for centuries, is powerful evidence of a very large increase in the local badger population.

BADGERS AND PUBLIC OPINION

To understand why, in the 16th, 17th and 18th centuries, badgers were classified as vermin, to be killed whenever possible, it is necessary to understand the social conditions of those times. (Briggs, 1994; Morgan, 1993). When badgers and other vermin were culled it was not persecution through sheer ignorance, (Flynn, 1997) but to preserve human life, as explained below.

In the centuries before the Agricultural and Industrial Revolutions, (which began about 1750), when agricultural technology was primitive by modern standards, England's population never rose much above 5 million. Lacking the agrochemicals: the fertilisers, pesticides and herbicides that we now take for granted, the crops produced by England's basically peasant farmers were always scanty and were very vulnerable to droughts, floods, pests and diseases. When harvests were good the population expanded; in bad years it was drastically reduced as the labouring poor, especially the youngest and oldest persons, weakened by malnutrition, succumbed to

endemic diseases like TB, pneumonia, and diarrhoea. Birth rates and death rates were high (Briggs, 1994, pp. 130-132).

In those times "for the overwhelming majority of people food meant vegetables" (Ponting, 1993, p. 102). Farmers and labourers depended on their kitchen gardens to support their families. The shilling paid to the slayer of a badger was a huge sum when *per capita* incomes were mostly less than £10 per year (Briggs, 1994, p. 207).

In the 19th century the pressures on badgers and other vermin remained high. Farm labourers never prospered. As late as the early 1900s they "were worse off than many of the casual labourers in the docks" (Briggs, 1994, p. 259). To them, homegrown produce was vital, and the garden raiders, the badgers, could actually provide extra sustenance. Neal (1969, p. 132) noted that badger skins and grease were much valued, "the hairs are extensively used for the best shaving brushes... badger hams were at one time smoked and thought much of... at West Chinnock, near Yeovil, they still have an annual badger feast". Badger meat is said to taste like pork.

Entertainment was at a premium in those days before cinema, radio or TV. If country people could derive entertainment from everyday chores like controlling vermin, they did so. Foxes and otters were hunted with hounds, rats killed with terriers, rabbits trapped with ferrets and eaten or sold, and badgers dug with terriers and eaten or baited. Pain and suffering were a part of everyday life, for humans and animals alike, before life became easier after the Industrial Revolution; we may regret it, but to pretend it was not so is sentimentalism.

Slowly in the 19th and early 20th centuries rural poverty decreased and life became more agreeable. Farms still depended on horses, and badger setts in which a horse might break a leg could not be tolerated. Villagers still depended on homegrown produce as epitomised by the slogan "Dig for Victory" in World War Two. But this was a watershed. In post-war England the burgeoning urban populations grew to prefer 'convenience shopping', buying their fruit and vegetables, fresh or processed, at greengrocers and supermarkets.

"In 1950 there were still 300,000 horses working on farms; in 1975 there were 3,575. In 1945 there were 563,000 regular full-time farm workers; in 1980 there were 133,000" (Briggs, 1994, p. 328). By the 1960s, 80% of the population lived in towns or cities and urban attitudes to the countryside were dominant. This was particularly true for badgers. More than any other book, Kenneth Grahame's classic *The Wind in the Willows*, written for his young son in 1908 when he was Secretary of the Bank of England, has created an anthropomorphic image of Mr Badger as a wise and benevolent leader of wild animals. Badgers commonly figure as trusty police officers in children's books and games. Probably this positive image was behind the choice of the badger as the symbol of many wildlife organisations, as the regular columnist in the wildlife magazine *Natural World*, and even the name of a major West of England bus company.

Widespread indignation at the cruelties of badger digging and baiting was behind the passage from 1973 onwards of the Acts of Parliament protecting badgers. Since then, public opinion has polarised for and against them. Farmers soon became frustrated at their inability to control a pest which, they believed, was spreading TB to their cattle. Remarkable advice is sometimes given by badger experts; thus one Westbury-sub-Mendip farmer was advised to fence off badger latrines on his land to reduce the TB risk. There are about sixty latrine groups on that part of his farm within my study area, new groups are frequently established and old ones abandoned. Dealing with them as recommended would take several days per month of his time (Stanton, 1998).

In the 1990s gardeners began to suffer badger problems (Tables 1 and 2). Vegetables and flowers were taken and other garden wildlife such as hedgehogs, slow-worms, toads and grass snakes declined, often to extinction.

A series of letters to a Bristol newspaper, the Western Daily Press, in the mid-1990s illustrated the polarised state of public opinion. The initial letter describing the damage badgers do to gardens and hedgehogs provoked emotional responses from badger group spokespersons. They were confident that people, not badgers, were to blame for declining hedgehog populations and that badgers would prefer not to eat hedgehogs if other food was available (although Neal, 1969, p. 53 remarks "Hedgehogs are certainly a favourite food"). They denied that badger populations were increasing because the 'balance of nature' prevents it. Notably absent from their letters was any concern for gardeners or hedgehogs.

Unlike most wildlife organisations, badger groups are involved with one species only. Having achieved blanket protection for it, they are naturally sensitive to allegations that, in consequence, it has begun to pressurise other animals, including humans, in ways that are unacceptable.

TOTAL PROTECTION FOR BADGERS: SENSE OR SENTIMENTALISM?

The 'Wind in the Willows' image of the worthy badger, allied with natural revulsion against the cruel sports of badger digging and baiting have resulted in badgers enjoying a degree of legal protection seldom achieved by a single species. The question must be asked: has it a sound scientific basis?

Table 2 was compiled by telephoning or visiting the owners of a random sample of the 145 Somerset gardens open to the public for charity through the National Gardens Scheme in 1996. Typically the owners took a keen interest in the terrestrial residents of their gardens. Hedgehogs and slow worms were particularly prized as slug eaters, and were sadly missed when they vanished.

Table 2. Summarised responses (expressed as percentages) to questions about badger activity in 54 Somerset gardens.

Question	% Yes	% No	% No response or N/A
Badgers active in garden?	70	30	
Badgers present before 1980?	30	28	42
Produce or plants eaten or spoiled?	41	15	44
Latrines established?	43	57	
Hedgehogs still living in garden?	24	69	7
Slow worms still living in garden?	41	52	7

A total of 54 gardens were investigated; 38 (70%) were suffering badger damage. Of the remaining 16, six are protected by walls or fences and badger-proof gates. Seven have escaped damage even though badgers are present all around.

Many owners commented that badgers are recent invaders. In 18 gardens they are thought to have arrived since 1986. Badgers were known to have eaten hedgehogs in three gardens. 14 owners believed that badgers had wiped out their hedgehogs. 29 gardens had badgers and no hedgehogs, 7 had hedgehogs and no badgers and only 6 gardens had both hedgehogs and badgers. Suburban gardens not yet invaded by badgers are most likely to have hedgehogs.

Slow worms appear to be slightly more resistant than hedgehogs to badger predation. Thirteen gardens had both badgers and slow worms, 22 had badgers and no slow worms and nine had slow worms and no badgers. Other animals recorded as taken by badgers included bantams, a broody hen and chicks, eggs, lambs and grass snakes.

Normally animals are protected if they are rare or endangered. In Britain badgers are neither. They survived through prehistoric times when all their natural predators, wolf, lynx, wolverine, bear and man were ranged against them. After Britain's last wild wolf was killed in the 1740s man on his own failed to exterminate them, although he proactively hunted them for meat, grease, skin, hair, and entertainment, as well as for the large rewards payable to the slayers of vermin.

There has been a huge increase in badger numbers since the 1940s when Ernest Neal found badgers to be "abundant" with a density of about one animal per square kilometre in western England and Wales, when they were still being routinely culled to keep their numbers down (Neal, 1969, p. 38). Legal protection of the badgers began in the 1970s and by the late 1980s "excellent badger country" in west Somerset supported about 10 adults per square kilometre (Neal, 1989, p. 9). From 1988 to 1997 the badger population of Britain increased by 77%, or 180,000 adults (Wilson, Harris & Mclaren, 1997), and by 1996 "good badger country" such as Westbury-sub-Mendip had as many as 37 adult badgers per square kilometre.

Westbury-sub-Mendip is unlikely to be a strange exception. My telephone survey of Somerset garden owners (Table 2) shows a high level of badger activity throughout the county. It is no longer safe to assume, as Neal did in 1989 (p. 10) that badgers are uncommon on the low-lying moors of central Somerset. Badgers are now tunnelling in the banks of rhynes where the water surface is only a metre below the level of the adjacent field. This was the case at an outlying sett dug in March 1997 on Westbury Moor two kilometres southwest of my study area, ST 474.481.

Given that man was always the main, and since the 1740s the only, predator of badgers in Britain and given that in spite of all man's efforts badgers survived in most parts of the country, it is not in the least surprising that when human predation was legally terminated in the 1980s the badger population hugely expanded.

No evidence has been produced to indicate a general decline in badger numbers between the 1940s when badgers were abundant by the standards of that time and the 1970s when protective legislation was initiated. Clearly, when the animals were given protection it was not because they were rare or endangered.

Neal and Cheeseman explain (1996, p. 249) that the Acts protecting badgers "were all primarily concerned with ill-treatment, particularly against the practice of badger digging with the aid of dogs...." It is now illegal for anyone "wilfully to kill, injure or take a badger or attempt to do so" without a license, or to dig for a badger, or to possess any part of a dead badger taken illegally, or to recklessly damage or obstruct a sett, or to cause a dog to disturb a badger in a sett. The penalties are very severe: up to six months imprisonment and/or a fine of up to £5000. Given that the original aim of the Acts was to prevent ill treatment of badgers it seems particularly unfair that farmers and gardeners who are deprived of the normal use and enjoyment of their properties are in practice unable to reduce badger numbers by the most humane methods available.

Neal and Cheeseman exult in the "delight" that badger lovers experience when watching badgers (1996, pp. 222-223). To the "magic circle of those who love to watch them in the wild, [badgers] seem to typify the very essence of the countryside. They are part of our heritage". A related mindset is found in the Harris report (Wilson, Harris & Mclaren, 1997) in which badgers are never culled, killed or controlled; they always suffer "persecution". This emotive word appears 15 times on one page. Rabbits, by contrast, are controlled, and foxes killed.

If sentimentalism is defined as the elevation of feelings and image above reason and reality (Anderson & Mullen, 1998, p. 6) there can be no doubt that sentimentalism, not sense, is the attitude that now, sheltering behind Acts of Parliament that were passed for a different purpose, prevents the rational control of badgers.

Regarding the claim, mentioned above, that the 'balance of nature' prevents badger populations exploding, countless ecological studies have shown that any form of life blessed with ample food and few predators is likely to explode. In 1944, 29 reindeer

were landed on an Alaskan island rich in reindeer moss that had no other mammals. By 1963 the island held 6000 reindeer and all the moss was eaten. By 1966 only 42 reindeer were still alive (Hardin, 1993, p. 209). More familiar, perhaps, are the periodic explosions and crashes of lemming and locust populations in Scandinavia and Africa. Newsweek magazine (8.1.96 and 9.9.96) described the consequences of animal sentimentalism in the USA: "in 1972, preservation-minded Californians banned hunting cougars [mountain lions]...the cougar population ballooned, from an estimated 2,400 lions to 6,000 today. Without hunters to thin the ranks, increased competition for food has sent hungry mountain lions to suburban backyards, shopping centers and elementary schools....when wildlife authorities killed the cougar that killed a woman ...in California in 1994, donors raised $321,000 to care for the cougar's cub". Again in 1987 "local animal lovers persuaded the town fathers [in North Haven, New York] to discontinue the brief hunting season. The deer population doubled, then doubled again.... [now] you'll seen them grazing by the road, preening on a lawn like they own the place, which in a way they do". Alistair Cook in *Letter From America* (BBC Radio 4, 31.12.95) described a similar deer problem in Vermont.

THE CASE FOR REDUCING BADGER NUMBERS

Ernest Neal, who pioneered badger studies in Britain in the 1940s, stated unequivocally "If an animal causes harm there is a logical reason for destroying it, but when it is well proved that the good it does far outweighs the occasional harm, why do we go on persecuting it?" (Neal, 1969, p. 128). He was defending the badger, justifiable at that time by the evidence of badger diets that he amassed, but he did not point out that the reason why badgers did little harm was because their numbers were kept low by regular culling.

What good (from the human point of view) do badgers do? Neal (1969, p. 67) found that " the number of insect pests and vermin that a badger destroys must be very large indeed.... the badger is a real friend to the farmer". Harmful insects eaten include wasps and their nests and moth and cockchafer larvae. The vermin are largely rats, moles and young rabbits. Badgers also eat small numbers of garden pests such as slugs, snails and woodlice. Beyond its appetite for certain pests the badger is of little use to mankind apart from being an interesting and attractive wild animal in its own right, the "delight" of badger watchers. Some people enjoy feeding badgers and treat them as pets.

Neal's conviction that badgers are the farmer's friends is no longer tenable. Rabbit populations have been reduced by various diseases but they are still locally common even where badgers are abundant (at Westbury Quarry, just north of the study area, there is a main sett in a sandy deposit in the quarry face, but dozens of rabbits keep the grass grazed short close by). Most farmers believe that badgers can infect their cattle with TB. The current surge in badger numbers has not noticeably reduced the

population of moles, rats and small pests; indeed it is arguable that in gardens whose resident hedgehogs have been wiped out by badgers the numbers of slugs, woodlice and earwigs have increased. Some people claim that there are fewer wasps now than in past years, which could, if true, be due to increased badger predation of wasps nests.

The victims of badger proliferation includes farmers, gardeners, the general public, wildlife, and the badgers themselves.

Farmers suffer:

- constant worry over TB infection risk.
- buildings undermined or soil-filled and made unusable or unsafe.
- walls undermined.
- danger to stock from setts in open fields.
- damage to crops especially maize and soft fruit.

Gardeners suffer:

- loss of vegetables, fruit, bulbs and flowering plants.
- pitting of lawns.
- damage to fruit trees.
- fouling of paths, lawns, and flower beds by latrines.
- excavation of watered areas of gardens for earthworms in dry weather.
- inability to grow their own special quality food e.g. organic, pesticide-free or herbicide-free.
- high cost of fencing to protect areas of garden.
- undermining of paths and fences.
- loss of harmless garden residents: toads, frogs, hedgehogs, slow worms, grass snakes and bumble bees; which are the "delight" of many gardeners.
- infestations of pests such as slugs, snails and woodlice caused by the
- loss of resident full-time pest–controllers: such as hedgehogs, toads, and the slow worms.

The general public suffer:

- danger of injury where badgers undermine gardens. In 1992, in Yeovil, a lady fell and broke her neck when a badger tunnel in her garden subsided under her weight.
- loss of property value when badgers move in. Near Pensford a cross-country riding course was abandoned because of the danger posed by badger setts.
- traffic hazards. Badgers are large enough to cause damage and accidents when they are hit by cars, as often happens. In 1997, in Nailsworth, a car swerved to avoid a badger late at night, left the road down an embankment and crashed through the roof of a house.
- frustration as regards one of the most popular national hobbies, gardening.
- flea infestation of pet dogs that investigate badger setts.

- fouling of pet dogs that roll in badger latrines.

Wildlife suffers:

- serious loss, even local extinction of badger prey species. Gilbert White wrote (1829, pp. 95-96) "hedgehogs abound" in Selborne in the later 18th century. Badgers were probably absent, due to culling, for they are not mentioned in his letters or journals. Nowadays it seems that hedgehogs are rare or extinct over wide swathes of countryside where badgers are common: in such areas suburban gardens are probably their only safe havens. Excessive badger numbers equate to a loss of biodiversity.

Badgers suffer:

- chronic malnutrition and lingering death by starvation in dry summers in places where their population has outgrown its reliable food supply. In the drought summer of 1995 emaciated badgers roamed through my garden in broad daylight searching for food. Although badger lovers lament such occurrences, they seem unconcerned that population reduction by starvation, The 'balance of nature', is the logical and cruel consequence of the total protection that they have obtained for the animal that is their "delight".

CONCLUSION

Legislation from 1973 onwards, ending the ancient practice of badger control by landowners, has caused a great increase in the badger population at Westbury–sub-Mendip and throughout Somerset. In this county badgers are now so common as to be a serious pest, causing financial, material and emotional hardship to large numbers of people, especially gardeners and farmers.

To argue that badgers still need special protection is sentimentalism. Badgers need to be controlled, like rabbits, rats, grey squirrels, foxes, deer and other animals that easily multiply to the point where they prejudice the well-being of humans or wildlife, including themselves. Logically, control should be a humane cull. Badger numbers should be reduced until the animals make up a small and respected component of local wildlife, as they did before the 1970s, causing negligible harm to farmers, gardeners and the general public and allowing repopulation by those elements of wildlife that the badger has exterminated, in particular hedgehogs, slow-worms, grass snakes and toads.

Ideally the pre-1973 badger population of any particular area would be re-established. At Westbury-sub-Mendip this would be about one badger social group per square kilometre. There should be no setts within striking distance, say 750 metres, of human dwellings, or areas of particular importance to endangered prey species such as ground-nesting birds.

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Proceedings of the Society, Volume 57, for 1997.

Besides the annual reports on botany, invertebrates and mammals in the Bristol District, this issue contains original papers on a twenty year study of the changes in the use made of gardens by birds in winter, and a study of the growing badger population of Westbury-sub-Mendip, and the damage that they are doing.

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