The Bedfordshire Naturalist 50 (Part 1)

Journal for the year 1995

Bedfordshire Natural History Society 1996
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BEDFORDSHIRE NATURAL HISTORY SOCIETY 1996

(Established 1946)

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Council (in addition to the above):
Mr J. Adams, Ms J. Childs, Mr R. Dazley, Mrs G. Dickens, Mr D. Green, Mr P. Irving, Dr P. Madgett, Mr P. Trodd, Mr P. Wilkinson, Mr M. Williams.

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Committees appointed by Council:

Finance: Mr P. Clark, Mr J. Comont, Mr A. Cutts (Chairman), Mr E. Newman, Mrs L. Puddephatt, Mrs M. Sheridan, Mr P. Wilkinson.

Scientific: Mr C. Baker, Dr G. Bellamy, Miss R. Brind, Mr P.A. Cannings, Mr J. Comont (Sec.), Mr A. Fleckney, Dr P. Hyman, Mr P. Irving, Mr D. Odell, Mrs R. Madgett, Mrs H. Muir-Howie, Dr B. Nau, Mr E. Newman, Ms A. Proud, Mr R. Revels, Mr H. Winter.

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Programme: Mr J. Adams, Dr P. Madgett (Chairman), Mrs B. Matthews, Mr J. Niles, Ms A. Proud.

Registered Charity No. 268659

THE BEDFORDSHIRE NATURALIST

No. 50 Part 1 (1995)
Edited by R.A. Brind
Photographic Editor : R.C. Revels

CONTENTS

The Bedfordshire Bird Report for 1995 is published separately as Part 2 of the *Bedfordshire Naturalist*

Front cover: Purple Hairstreak butterflies had a very good year in 1995. Female on left, male on right. *Richard Revels*

The Society would like to thank Bedfordshire County Council, Bedford Borough Council, South Bedfordshire District Council and Luton Borough Council for grants towards Society publications this year.

EDITORIAL

Last year I noted that publishing the Journal in two parts would allow an increase in the number of articles. It has, and we have reached our size limit rather more quickly than anticipated! This year I found myself in the unexpected, but very encouraging, position of again editing 112 pages and, for the first time, have had to hold over articles for next year. Articles by members about their own work, such as the research into the ecology of the Gatekeeper butterfly, are particularly welcome.

Bernard Nau's article on "The First Fifty Years" shows how the Journal has increased in size since the formation of the Society. In this 50th Jubilee editorial it is appropriate to acknowledge the nine Honorary Editors and the valuable work they have done in helping to publish the work of the Society.

Numbers 1 (1946) – 5 (1950)	R. Palmer	5 years
Numbers 6 (1951) – 9 (1954)	H.F. Barnes	4 years
Numbers 10 (1955) – 19 (1964)	A.W. Guppy	10 years
Numbers 20–22 (1965–67) – 24 (1969)	J.N. Dymond	(3) years
Number 25 (1970)	B. Squires	1 year
Numbers 26 (1971) – 30 (1975)	R.V. Wagstaff	5 years
Numbers 31 (1976) – 32 (1977)	C.R. Boon & J.G. Dony	2 years
Numbers 33 (1978) – 45 (1990)	C.R. Boon	13 years
Number 46 (1991) – present	R.A. Brind	5 years

The Journal has changed in style over this time, but the next 50 years are likely to see even greater changes with the advent of new technology. Let us hope, however, that the Society continues its valuable work in recording and publishing information about the flora and fauna, geology and meteorology of our county for many years to come.

LIST OF COLOUR PLATES

CORRECTIONS

Two colour plates in *The Bedfordshire Naturalist* 49 (Part 1) were wrongly dated: Plate 6 was photographed on 31.7.1995 and Plate 7 was photographed on 5.8.1995.

REPORT OF COUNCIL FOR 1995

The Society again maintained a high standard of meetings in terms of number, quality and variety. During the year there were 35 field meetings and 19 indoor meetings. A number of the field meetings concentrated on the identification and recording of invertebrate groups. Among these were Pond Dipping in the Finger Lakes at Priory Country Park, Invertebrates at Frithsden Beeches, Dragonflies on the River Ouse, Hoverflies at Flitton Moor, Roesel's Bush Cricket at Sundon Hills Country Park, Grasshoppers and Crickets at Stockgrove Country Park, Spiders at Coopers Hill, Shield Bugs at Maulden Wood and Orthoptera at Folkestone Warren. In addition, there was a variety of meetings devoted to birds (both general Society meetings and the Bird Club's programme), to plants, to mammals and to general natural history. A number of meetings were held jointly with other organisations. These were a talk on Bat Seasons and Food Supply by Frank Greenaway and a field meeting on moths and bats at Pegsdon Hills (both in conjunction with the Bedfordshire Bat Group); Migration Day at Priory Country Park (with the Bedford Group of the RSPB); a field meeting on dormice in Stoke Wood, Northants (with the Wildlife Trust); Badger Day at Stockgrove Country Park (held on National Badger Day, jointly with the Bedfordshire Badger Network and the Greensand Project); and a meeting in Leighton Buzzard with and about the Greensand Project.

The quality of the Society's publications continues to improve. The colour plates, first introduced in 1994, have been continued, and the Journal is now published in two parts allowing an increase in the amount of information that can be presented. The quality of the newsletter, *Muntjac*, both in terms of presentation (reflecting the Society's investment in a computer in 1994), and in content is also high. Work continued during the year on the Society's book on Bedfordshire Lepidoptera, due to be published in 1996.

In May, it was with sadness that Council learned of the death of Chris Dony. Chris was an active botanist who spent countless hours in the Bedfordshire countryside recording in the company of her husband, the late John Dony.

The Society owes a considerable debt to David Anderson, who will stand down as Chairman of the Society at the AGM in 1996, having served as Chairman since 1990. The Society has benefited enormously from his energy, his enthusiasm, and his constant input of ideas on all aspects of the Society's work. Other officers standing down this year are Bob Cornes, Honorary Secretary for two years; Errol Newman, Honorary Secretary of the Scientific Committee for 2 years; and Kevin Sharpe, Honorary Chairman of the Bedfordshire Bird Club for 3 years. Council thanks these and other committee members, Recorders and members who have contributed to the work of the Society.

Membership of the Society 1991–1995

	1991	**1992**	**1993**	**1994**	**1995**
Ordinary	348	435	450	430	414
Associate	46	62	68	41	48
Student	3	4	5	3	2
Corporate	10	12	13	10	7
Life	5	5	5	5	4
Hon. Life	2	1	1	1	1
Total	**414**	**511**	**542**	**490**	**485**

(Totals include Bird Club members from 1992 onwards.)

BOB CORNES
Hon. Secretary

PROCEEDINGS

Indoor Meetings

701st Ordinary Meeting 4th January, Bedford. Members' evening. Chair Mrs R. Madgett.

702nd Ordinary Meeting 17th January, Dunstable. "Bugs and more bugs" by Dr B. Nau and Dr C. Malumphy. Chair: Mr C. Baker.

703rd Ordinary Meeting 26th January, Aspley Guise. "Travels in search of birds" by Mr D. Tomlinson. Chair: Mr R. Revels.

704th Ordinary Meeting 31st January, Maulden. Twitchers' evening. Chair: Mr D. Ball.

705th Ordinary Meeting 2nd February, Bedford "Current affairs in Beds" by Mr R. Barker, Forestry Authority and Mr J. Niles, Bedfordshire County Council. Chair: Miss R. Brind.

706th Ordinary Meeting 9th February, Luton. "An evening of butterflies" with various speakers. Chair: Mr J. Adams.

707th Ordinary Meeting 21st February, Dunstable "Mud Glorious Mud! – Birds of Dunstable Sewage Works" by Mr P. Trodd, Warden. Chair Mr R. Dazley.

708th Ordinary Meeting 1st March, Bedford. "Bat seasons and food supply" by Mr F. Greenaway, Natural History Museum. Joint meeting with Bedfordshire Bat Group. Chair: Mr R. Cornes.

709th Ordinary Meeting 8th March, Maulden "The Great Tits' year" by Mr A. Gosler. Chair: Mr P. Wilkinson.

710th Ordinary Meeting 14th March, Dunstable. "Antarctica" by Mr A. Livett. Chair: Mr B. Nightingale.

Annual General Meeting 21st March, Maulden.

711th Ordinary Meeting 4th October, Bedford. "Golden Orioles in Britain – the story so far". by Mr P. Mason and Mr M. Rains of the Golden Oriole Group. Chair: Mr D. Kramer.

712th Ordinary Meeting 17th October, Dunstable. "Zambezi Safari" by Mr P. Symonds. Chair: Ms A. Proud.

713th Ordinary Meeting 26th October, Luton. "Good Company – a general introduction to spiders" by Mr T. Thomas. Chair: Dr P. Hyman.

714th Ordinary Meeting 2nd November, Bedford. "Management of Red Deer in Scotland" by Mr T. Parish. Chair: Mr D. Anderson.

715th Ordinary Meeting 16th November, Leighton Buzzard. "Wildlife Safari, Leighton Buzzard" by Dr P. Madgett. Chair: Ms L. Kelly.

716th Ordinary Meeting 21st November, Dunstable. "Pamber Forest" by Mr G. Dennis. Chair: Dr G. Bellamy.

717th Ordinary Meeting 30th November, Aspley Guise. "Birds in Peril" by Mr N. Collar, Bird-Life International. Chair: Mr D. Odell.

718th Ordinary Meeting 6th December, Bedford. "Fish of Bedfordshire Rivers – their status and conservation" by Mr A. Taylor, National Rivers Authority. Chair: Mr H. Winter.

719th Ordinary Meeting 13th December, Maulden. Christmas Quiz/ Social Evening. Organiser: Mr D. Parsons.

Field Meetings

Isle of Sheppey 22nd January. Birdwatching. Leader: Mr A. Livett.

Campton Plantation, Shefford 4th March. To look at Wild Snowdrops. Leader: Mr J. Niles.

Tring Museum 30th March. A "behind-the-scenes" visit to the bird collection. Leader: Mr D. Anderson.

Evenlode Valley, Cotswolds 9thApril. Spring flowers and exploring the Cotswolds. Leader: Mr C. Baker.

Blows Downs 23rd April. Looking for spring migrants. Leader: Mr R. Dazley.
Priory Country Park, Bedford 29th April. Pond dipping. Leader: Mrs H. Muir-Howie.
Maulden Woods 7th May. Dawn Chorus. Leader: Mr P. Trodd.
Dunstable Sewage Treatment Works 10th May. Visit to the wader scrape. Leader: Mr P. Trodd.
Frithsden Beeches and Pancake and Hockeridge Woods, near Tring, Herts 13th May. Leaders: Mr G. Canon, National Trust Forester and Mr J. Jackson, Director of Royal Forestry Society.
Priory Country Park 14th May. Migration Day. Organiser: Mr D. Smith.
Wymington Meadow and Sharnbrook Summit 20th May. Flowers and spring butterflies. Leader: Mr P. Horn, Reserve Warden.
Pennyfathers Moor, Clophill 24th May. Identification of Black Poplars. Leader: Mr D. Alderman.
Centenary Wood, Pulloxhill 3rd June. Territory analysis of common breeding birds. Leader: Mr J. Niles.
Waterloo Thorns 10th June. Botanical meeting. Leader: Mr J. Comont.
River Ouse, St. Ives 11th June. Dragonflies. Leader: Mr S. Cham.
Thrift Wood, Bicknacre near Chelmsford and Backwarden reserve, near Danbury 18th June. Butterflies. Leader: Mr C. Baker.
How Hill, Ludham, Norfolk 25th June. Weekend visit. Organiser: Dr P. Madgett.
Fowlmere RSPB Reserve and Devil's Ditch, Newmarket 2nd July. Birds and botany. Leader: Ms M. Stanier.
River Ivel 8th July. Circular walk from Sandy. Leader: Mr J. Carre, R. Ivel Project Manager.
Pegsdon Hills 14th July. Moth trapping. Organiser: Mr V. Arnold.
Swineshead Green Lane 22nd July. Botanical survey of lane and adjacent woods. Leader: Mr C. Boon.
Flitton Moor 30th July. Hoverflies and general natural history. Leader: Mr K. Sharpe.
Sundon Country Park 6th August. Roesel's Bush Cricket workshop. Leader: Mr K. Sharpe.
Rammamere Heath 15th August. Viewing experimental heather regeneration plots and general natural history. Leader: Mr P. Irving.
Stockgrove Country Park 19th August. Grasshoppers and crickets. Leader: Mr K. Sharpe.
Cooper's Hill, Ampthill 27th August. Spiders. Leader: Mr T. Thomas.
Salem Thrift, Bromham 1st September. Moth trapping. Leader: Mr V. Arnold.
Wilstead Wood 2nd September. Looking for shield-bugs. Leader: Dr B. Nau.
Whipsnade Zoo 3rd September. Exhibiting at this major countryside day.
Folkestone Warren 10th September. Grasshoppers and crickets and general natural history. Leader: Mr K. Sharpe.
Stoke Wood near Kettering. 17th September. Dormice nest box survey. Leader: Mr M. Miley, Dormouse Conservation Officer, Northants.
Mammalthon 24th September. Competition for seeing highest number of tetrad records for mammals in the county. Organiser: Mr D. Anderson.
Wootton Wood 15th October. Annual fungus foray. Leader: Dr D. Reid.
Woburn Park 22nd October. Deer rut and visit to the Evergreens. Leaders: Mr D. Anderson and Mr D. Alderman.
Stockgrove Park 28th October. Introduction to badgers. Joint meeting with the Bedfordshire Badger Group and the Greensand Project. Leader: Dr P. Madgett.
Chicksands Wood 10th December. Search for overwintering butterfly eggs. Leader: Mr R. Revels.
Woburn Park 26th December. A Boxing Day walk through the Park. Leader: Mrs M. Sheridan.

REPORT OF THE TREASURER

The Society again received grants during the year towards its publications of £600 from Bedfordshire County Council, £300 from Luton Borough Council and £150 from South Bedfordshire District Council. In addition the Society also received donations towards the printing of the Butterfly and Moth Atlas. Last year there was no publication cost for the Journal or the Bird Report. There has therefore been the cost of two publications during the year, for 1994 and 1995 (£2766 and £3516) which included twelve additional pages in the Bird Report. The M & G Accumulation Units have done well, but this type of investment can go down as well as up.

The final result is that the total assets of the Society have increased by £1479 and now stand at £50,146.

P.S. CLARK
Hon. Treasurer

INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 31ST DECEMBER 1995

	1994	1995
OPENING BALANCE (Current Account and Building Society Account)	26,338	21,121
INCOME		
Subscriptions (for 1995)	2,947	3,149
Subscriptions (for 1996 received in 1995)	746	1,028
Sales	145	-
Journal and Bird Report sales	209	87
Receipts from meetings	229	191
Sundries/Donations/Grants	1,932	4,123 [1]
Bird Conference	-	-
Interest received from Building Society	1,903	1,654
Interest received from Bank (gross)	5	59
Receipts from Publication Account	1,973	2,167
SUB TOTAL – Income	**10,089**	**12,458**
EXPENDITURE		
1993 cheques presented in 1994	1,702	-
ADMINISTRATION		
Postage and stationery	-	175
Sundries	60	56
Insurance	256	282
Officers' expenses	110	86
Auditors' honorarium	20	-
Computer	2,431	241
Books	174	-
Bank charges (Safe Custody)	10	17
	3,061	**857**
MEETINGS		
Hire of halls	514	404
Lecturers and leaders	278	258
Programmes	338	232
Accommodation deposit	-	-
Bird Conference	-	-
	1,130	**894**
SCIENTIFIC		
Journal and Bird Report	78	2766
Recorders' Expenses	69	165
Sundries	164	39
	311	**2,970**

PUBLICITY/DEVELOPMENT/MEMBERSHIP		
Newsletter	430	5
Sundries	853	1,770 [2]
Advertising/Publicity	-	-
Car stickers and items for resale	-	-
	1,283	**1,775**
PUBLICATIONS ACCOUNT - EXPENDITURE	**7,819**	**952**
Beds Naturalist & Bird Report		3,516
SUB TOTAL - EXPENDITURE	**15,306**	**10,964**
CLOSING BALANCE (Current Account and Building Society Account	**21,121**	**22,615**

STATEMENT OF ASSETS AS AT 31ST DECEMBER 1995

FIXED ASSETS	**1994**	**Cost**	**Depreciation Total**	**Depreciation per Year**	**1995**
Display Boards	211	371	180	20	191
Display Table	41	69	35	7	34
Mist Nets	111	555	555	111	-
Computer	2,309	2,431	708	486	1,723
	2,672				**1,948**

CURRENT ASSETS	**1994**	**1995**
Stock at cost - Bedfordshire Wildlife Print	-	-
- Vertebrate Fauna of Bedfordshire	428	369
- Bird Atlas	4,694	3,400
Bank Current Account	2,014	2,021
Woolwich Building Society	19,107	20,594
City of Nottingham Bonds to 30/6/99 (at 7.5%)	3,000	3,000
City of Nottingham Bonds to 30/6/99 (at 7.5%)	3,000	3,000
M & G Charifund Accumulation 475 Units Cost £10,000		
Bid Price at 21/12/95 3,545.7 pence per unit	14,498	16,842
TOTAL CURRENT ASSETS	**46,741**	**49,226**
Fixed Assets (see above)	2,672	1,948
TOTAL ASSETS	**49,413**	**51,174**
CURRENT LIABILITIES		
Subscriptions received during 1994 for 1995/1995 for 1996	746	1,028
NET ASSETS OF THE SOCIETY	**48,667**	**50,146**

NOTES

1. Includes: grants of £1,050; interest from City of Nottingham Bonds £500; donations towards cost of Butterfly and Moth Atlas £1,250; contribution towards cost of printer £547 (Luton Borough Council).

2. Includes: printing £667; stationery £621; donation to Bedfordshire Wildlife Trust £250.

The following sums have been paid from the Woolwich Building Society during the year up to 31st December 1995: Akalat Publishing (Journal and Bird Report) £3,516.

The Current Account includes Income of £1,951 and Expenditure of £1,790 in respect of the Bird Club.

P.S. Clark
Hon. Treasurer

P.A. Giles (F.C.C.A.)
Hon. Auditor

The First Fifty Years
by Bernard Nau

THE BEGINNING

It was the best of times and the worst of times. The previous summer, 1945, six years of destructive all-out war had come to an unexpectedly sudden end when two nuclear bombs were dropped on cities the other side of the globe. The spectre of a bloody invasion of mainland Japan suddenly vanished. At home, in the months that followed, something approaching normal life resumed, although the economy was in ruins and food, clothing and fuel were ever more severely rationed. However, there was now freedom to pursue hobbies and enjoy the countryside again. Radio, the 'wireless', had become a central feature of life during the war years and now attracted audiences like television today. Programmes such as *The Naturalist* and, for children, *Nature Parliament* began to draw attention to the fascination of wildlife, although it would be another 30 years or so before 'wildlife' became fashionable.

On an autumn evening in the year following the end of the war a hundred people gathered in a hall in the county town. They had been attracted by the prospect of a talk by James Fisher, already in 1946 building a reputation as a broadcaster on natural history – 'wildlife' was not yet invented.

The meeting in Bedford on Thursday 14th November 1946 had been organised by a few enthusiasts to launch a new county natural history society. James Fisher proved a good choice of speaker and the audience went away stimulated by his infectious enthusiasm for natural history in general and ornithology in particular. Shortly afterwards, on 14th December, a corresponding meeting was convened in the south of the county, at Luton Museum. The speaker was the Director of the Royal Horticultural Society's gardens at Wisley, J.S.L. Gilmore, and he spoke on the history of botany in Britain. This too drew an audience of 100 or so.

The Society had been well and truly launched! The following year saw publication of the first annual edition of the Journal, which still flourishes, fifty years later, as *The Bedfordshire Naturalist.*

The name of the new society was not as we know it today, it was the Bedfordshire Natural History Society & Field Club, only changing to its present name in 1962. An earlier society of the same name as the new society had been formed much earlier, in Bedford in 1875. It started with 59 members but survived barely ten years. This was followed by a town natural history society, formed in Bedford in 1888 and still surviving in 1946. Interestingly this grew rapidly after the 1914-18 War, echoed 30 years later by the new Society. However, until 1946 there was no longer a county-wide society, although there were now active naturalists in both Bedford and Luton, and elsewhere in the county.

Behind the scenes

Throughout the autumn of 1946 the acting Council of the new county society held long meetings to define the objects, plan activities, agree rules and decide organisation of the Society. The main objects were to be to:

- promote study of natural history, especially in schools
- compile lists of the flora and fauna of the County
- record and protect rare and interesting species
- promote establishment of nature reserves
- hold lecture meetings on all aspects of natural history
- hold field meetings and rambles

This list has been modified a little over the years, but maintains the spirit of the original.

The concept of a county natural history society has stood the test of time well; the only major refinement was the formation of a Bird Club, within the Society, in 1992. This was to cater better for the increasing number of birders, often with limited interest in other branches of wildlife.

THE PEOPLE

Founders

Fifty years on, few of the first Council of the new Society survive. It was headed by a President, the Leighton Buzzard nature photographer and ornithologist, Oliver Pike, a Fellow of the Royal Photographic Society. This office was discontinued in 1972. The first Chairman was a Clifton naturalist, W. E. Keith Piercy BSc, and the energetic Secretary was Henry Key, ornithologist and Bedford pharmacist, now in retirement in Rushden and remembered by older members. Henry Key was to see the Society through its first quarter century. First Editor of the Journal was Flitwick entomologist Ray Palmer, with support from Dr H. F. Barnes of Bedford, and Dr Vic Chambers, then living in Luton, a wide-ranging naturalist with a national reputation in Hymenoptera (bees, wasps, ichneumons, sawflies, etc). On retirement Ray Palmer moved to Cornwall but on his death in 1975 he left notebooks and collections to the Society. These are now housed in Bedford Museum. Other members of Council included Dr John Dony, a botanist of national repute who was to play a key role in wildlife conservation in the county; and Bernard Verdcourt, living in Luton, later a professional botanist at Kew and already a keen entomologist, currently our Recorder for Lacewings. Dr Verdcourt, now long resident in Maidenhead, is the only member of the original Council still active in the Society.

Growth

One measure of a Society's success is growth of membership, Figure 1 shows this in graphical form. This resembles a plot of stock market values! A long-term upward trend with short-term excursions up and down. Indeed there is perhaps even a correlation since membership has several times declined during difficult economic times.

Some notable members

The Society's more notable members, additional to those already mentioned, include the following. The 12th Duke of Bedford who joined in 1946 was President from 1948 until his death in a shooting accident in 1953. The Society counted a holder of the Victoria Cross amongst its early members: Brigadier Fuss VC, who also served on the Council. The ornithologist and radio broadcaster James Fisher was perhaps our most widely known member, from 1946 to his death in 1970. Other professional ornithologist members include David Snow, a founder-member then at school in Bedford and later Director of the British Trust for Ornithology before moving to the British Museum; and successive editors of British Birds, James Ferguson-Lees (1955) and Dr Tim Sharrock (1963-). The move of the RSPB headquarters from London to Sandy has brought many active members from among its staff over the years. Future professional botanists also figured strongly amongst the early members. Dr Verdcourt has been mentioned, the well-known mycologist Dr Derek Reid joined in 1950 and maintained contact for many years through his leadership of annual fungus forays in the county.

A member who was little known to the general membership but had a disproportionate influence on the Society was Theed-Pearse. A resident of British Columbia he joined the Society after a visit to England during which he met Henry Key, among others. In 1974, following his decease, the Society was fortunate in receiving a bequest from him in excess of

£6000 (several times this in 1996 terms). This was invested soundly and has provided a financial cushion over the years, enabling us to undertake projects which otherwise would not have been possible.

RECORDING THE COUNTY'S WILDLIFE

From the beginning this was a prime objective of the Society. It involves first the gathering of information by members, which is then brought together in permanent form by the Society's appointed Recorders, for future reference and analysis. Formal progress reports by Recorders are presented each year at the Annual General Meeting and published in the Journal. More extensive articles and reviews are also printed in the Journal.

Recording

The first Recorders for the Society were appointed by the acting Council on 12th October 1946, apparently a month before the first meeting of the Society – an inconsistency which luckily went unchallenged; times were not always thus! Clearly, recording the County's flora and fauna was viewed as a high priority. Appendix I shows the period of office of Recorders for each group. Many have carried out their more or less onerous duties over many years, for which they are deserving of our gratitude. Inspection of Appendix I reveals a trend to specialisation in recent years. This is exemplified by the subdivision of the Recorderships for Hymenoptera, Lepidoptera, Crustaceans, and Mammals.

Initially most Recorders concentrated on making an inventory of our fauna and flora. This raised a geographical issue. Since the boundaries of the administrative county of Bedfordshire change not infrequently (sometimes whole parishes have been added or removed from the county), a permanent definition of the boundaries is needed. The 'Watsonian Vice-County' concept provides this. In 1873, botanist H.C. Watson defined 'once for all' the boundary of every county in Britain, large ones being sub-divided and very small ones combined, to give more uniformly sized areas. In the first issue of the Society's Journal an article by John Dony describes the discrepancies between the Vice-County of Bedford and the administrative county, at that time.

After ten years or so, the emphasis of Recorders' work shifted to mapping species distributions within the county. The stimulus for this came from a project of the Botanical Society of the British Isles (BSBI), launched in the 1950s, to map the current distribution of the British flora. Wishing to do this on a finer scale than the Vice-County, BSBI chose to base this on the Ordnance Survey's National Grid, by then recently standardised and conveniently over-printed on OS maps. They decided to use the 10-kilometre square as the unit of area and species found were to be recorded simply as 'present'. To have recorded abundance would have stretched to the limit both current data-processing technology and the limited number of botanists participating. Data processing had by then reached a stage where 'present/absent' data could be processed automatically by punching holes in special cards and sorting these using automatic high-speed mechanical equipment. Using this technology the *Atlas of the British Flora* was published in 1962 with a distribution map for each species, based on 10 km squares.

However, a 10km grid gives a rather coarse impression of distribution. Therefore, when John Dony came to map the flora first of Hertfordshire and then of Bedfordshire, he chose a finer scale, a 2km grid, following a precedent set in Staffordshire. This came to be adopted by many other Bedfordshire Recorders and led to the tetrad maps still familiar today.

The success of the BSBI project led the national Biological Records Centre (BRC) at Monks Wood, Hunts, to initiate schemes for other groups of the national fauna and flora during ensuing decades – Society Recorders channel records to these schemes as part of their

duties. During the 1960s and 1970s the grid approach to recording was adapted by BRC to the increasingly powerful electronic digital computers, giving greater flexibility of analysis and presentation. More recently, during the 80s and 90s, the BRC focus shifted to a 'site-record' approach to recording, site-based information being more useful for conservation planning, for reserve management, and indeed when recorders must re-find sites of uncommon species.

The days of the grid approach may be numbered; in 1996 there is no reason why the approach dictated by punch-cards should prevail – I write this article on a laptop computer which would have required an air-conditioned room full of electronic equipment twenty years earlier.

In recent years the Recorders have convened for an annual discussion meeting, to exchange views and discuss mutual interests. Also, in the last few years, one or two special field meetings each year have been arranged for Recorders, to visit sites needing special attention or normally inaccessible.

The Bedfordshire Naturalist

Another measure of the success of the Society is its printed output, Figure 1 shows how the Journal has grown. For many years there were 40–50 pages annually. This increased in the 1970s, and a little more in the 1980s. In the 1990s there was a marked increase, largely due to the formation of the Bird Club in 1992. The Society has been well served by its Honorary Editors, of which there have only nine in 50 years.

Major milestones included the change from setting the Journal in traditional metal type, to using the offset litho process (from No. 27, the Journal for 1972). This was not only cheaper but made it possible to include drawings and photographs economically. Another milestone came in No. 48 (for 1993) with the first colour photographs. The following year saw division of the Journal into two separately bound parts. This was partly necessitated by reaching the size limit of the current binding method and partly for convenience in distributing the Bird Report separately.

The Bird Report has always formed a substantial part of the Journal and has grown with the changing approach of birders to their hobby in recent years. County coverage is now much more intensive and the Bird Report includes more rarities and more detail about each – often an almost minute by minute account of their stay in the county! Once again, advancing technology has helped. Computer-designed optics with improved glass and coatings give today's birders better tools for observing birds. Also, improving communications technology, especially pagers and mobile phones in the last few years, together with co-ordination and networking of 'sightings' information, enables individual birds to be followed up rapidly. Finally, the mobility provided by universal ownership of the car enables the birder to get to the bird. All of which would have seemed miraculous when the Society was founded!

Of course quantity is no measure of value, though it does reflect the activity, interests and enthusiasm of members. Perhaps this is a good time to consider whether the level of detail in the Bird Report is right? Raw data needs preservation, for subsequent analysis and future reference, but how much should be published? A more digested and interpreted format could be more readable and of greater value.

Biological Record Centres

Over the years the Society's Recorders have maintained records in the traditional way, usually transcribing information sent in on miscellaneous pieces of paper onto cards. But by the mid-80s reducing computer hardware costs and enhanced computer power provided an alternative. Following discussion at a Recorders' Meeting, the Society convened a meeting on

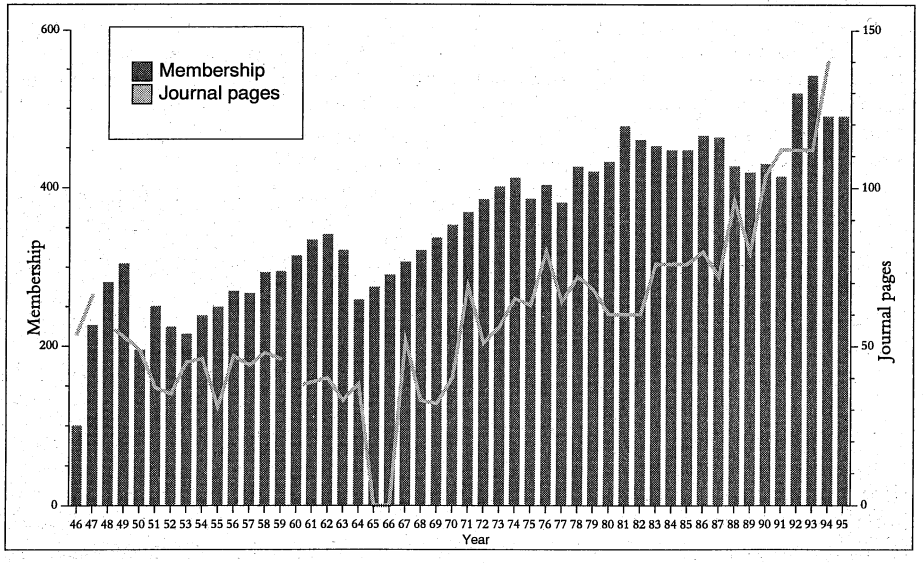

Figure 1 Growth of membership and the Journal

20th March 1986 to discuss setting-up a county computer database of wildlife information – a computerised Biological Record Centre. The meeting was held in County Hall and attended by representatives of Bedfordshire County Council (BCC), the four local authorities, the Beds & Hunts Wildlife Trust (BHWT), and Bedford and Luton Museums. The proposal was well-received and a working party was formed to sort out details and implement the scheme.

The Society was joined in this task by representatives of the BCC and South Beds planning departments, the two museums, BHWT, and the Nature Conservancy Council (NCC). The Working Party considered such aspects as computer hardware and software specification, its location and use. The biggest problem was funding input of data – a major task. The solution was found in a government scheme for unemployed people, amongst whom graduates in biological sciences were prominent. Under this scheme NCC funded, for one year, a team of about six people who were to input data and carry out a basic survey of wildlife habitat (an NCC Phase 1 Survey). BCC found office accommodation for the team and Bedford Museum procured the computer equipment. Subsequently the database would be linked to Luton Museum and the BHWT, and accessible by Local Authorities for planning purposes. NCC also made available database software then being developed at their Peterborough office, This was *Recorder*, now used by many Biological Record Centres. The Recorder installation at Bedford Museum was one of three national prototype installations.

The survey team began work in March 1987; by March 1988 fieldwork was complete but the objective of inputting data was not achieved, although later the Phase 1 Survey data was input to the system. The government scheme for the unemployed was discontinued so further funding from this was unavailable. Most recently, data from the Bedfordshire Flora Mapping Project has been entered at Bedford Museum.

Books

To spread information on the County's wildlife to a wider public, dedicated members of the Society have authored a number of books over the years, and these are listed below. No-one has been more active in this endeavour than the late John Dony. His name appears as author or co-author of various botanical works (see list) but he also played a key role in the preparation and publication of the 1976 bird atlas. Of all the works listed, *Bedfordshire Wildlife* involved the most members in its preparation. Published in 1987, this is likely to remain the primary account of the County's wildlife and habitats for many years.

Flora of Bedfordshire 1953, J. G. Dony, 526 pp 25 photographs, 22 maps. Published by The Corporation of Luton Museum & Art Gallery.

Bedfordshire Plant Atlas 1976, J. G. Dony, 132 pp, 818 maps. Published by Borough of Luton Museum & Art Gallery.

Bedfordshire Bird Atlas 1976, B. D. Harding, 144 pp, 123maps, 113 line drawings. Published by Bedfordshire Natural History Society.

The Common Lichens of Bedfordshire 1981, Frances B. M. Davies, 33 pp, 30 maps, ca. 70 line drawings. Published by Bedfordshire Natural History Society.

Bedfordshire Wildlife 1987, ed. B. S. Nau, C. R. Boon, J. P. Knowles. 180 pp, large format, 15 colour plates; 100+ photographs, maps and line drawings; 44 tables. Published by Castlemead Publications, Ware, Herts.

The Birds of Bedfordshire 1991, P. Trodd & D. Kramer, 349 pp, 8 colour plates, 19 black & white photographs, 58 line drawings (A. P. Chick), 34 diagrams, 13 tables. Published by Castlemead Publications, Welwyn Garden City, Herts.

The Wild Flowers of Luton 1991, J. G. Dony & C. M. Dony, ed. C. Boon, 64 pp, 15 maps. published by J. G. Dony.

An Atlas of the Breeding Birds of Bedfordshire 1988-92 1991, R. A. Dazley & P. Trodd, 280 pp, 246maps, 119 line drawings (A. P. Chick). Published by Bedfordshire Natural History Society.

Newsletters

Two newsletters, *Muntjac* and *The Hobby* are circulated several times a year to keep members of the Society and the Bird Club, respectively, in touch throughout the year. These are less formal than the Journal and broader in scope. The *Muntjac* first appeared under that name in July 1978 but was already issue no.30 of the Society's newsletter, hitherto without a name. *The Hobby* first appeared in May 1992, although there had been a bird newsletter in the very early days of the Society.

CONSERVATION

From the start, wildlife conservation was a high priority for the Society. In 1942 the government had set up a Nature Reserves Investigation Committee and two of our founder members, John Dony and Keith Piercy, represented Bedfordshire on its Beds & Northants sub-committee. Sadly, when the main Committee reported back to the Minister in 1947, it had deleted all Bedfordshire sites – even though chalk downland was included through Bucks and Herts right to the Beds border!

SSSIs

On its formation, the Society set up a Conservation Committee comprising the above-mentioned plus Ray Palmer and Vic Chambers. They set to work on a new improved list of

sites which was completed in 1949. This listed 70 sites in four categories of importance: A) 2 Sites of National Importance (Knocking Hoe and Flitwick Moor), B) 10 of Great Local Importance (three of which were subsequently destroyed), C) 12 of Local Importance, and D) 46 of Local Interest. Thus we were well prepared when the Nature Conservancy was formed in 1949. The list was put to the NCC who, in 1951, based the first schedule of Sites of Special Scientific Interest on this, including all the A and B sites and six of the Cs. The Society continued to assist when the list of wildlife SSSI sites was expanded to 32 in 1970, by 4 deletions and 15 additions.

When the list was again due for update, in 1979, three members (John Dony, Nancy Dawson – for the Beds & Hunts Naturalists Trust – and myself) were invited to form a working group with the NCC officer for Beds. The group made site visits and brought the list up-to-date but this effort came to nothing, being overtaken by NCC staff changes, changing SSSI criteria, and then a new Wildlife and Countryside Act in 1981 and yet further changes of criteria. In 1984 the Society again took the initiative to build liaison with NCC but little came of this and the eventual revised list of SSSIs emerged over an extended period of time.

However, Knocking Hoe had been designated a National Nature Reserve in 1958, for its floristic richness, followed more recently by Barton Hills and Kings Wood (Heath & Reach).

Rivers

By the mid-70s, the Society's Scientific Committee was becoming increasingly concerned at the damage being done to wildlife habitat along the river valleys, and especially on the rivers themselves. Water levels were being lowered, banks graded, and shallows dredged, activities funded by agricultural subsidies – the object being to lower water levels under river valley pastures to permit conversion to arable. The Ivel was already beyond redemption but the Ouse still had a few good wildlife features although these were scheduled for 'improvement'. Bromham Weir was next on the list. The Anglian Water Authority planned to build a new weir in the adjacent field and fill in the old weir pool, and shallows downstream, using the spoil from the excavations. We argued strongly against this, meeting AWA engineers, marking-up engineering drawings with compromise solutions, etc. We lost this battle but won the war and shortly afterwards AWA finally accepted that they had wildlife conservation responsibilities.

County Plan

During the 70s and 80s the Society was represented on the Countryside Committee/Rural Environment Advisory Panel of the County Planning Department. This led to a major project in 1979 when the Society was asked to prepare the wildlife component of a County Plan. This resulted in a document of 100+ pages, with many maps and tables, and a long list of sites of wildlife interest, with quality scores. The scores were based on site assessments by each of the Recorders, combined to give overall scores for each site both for diversity and rarities. Interestingly, Maulden Wood had the highest diversity score but Flitwick Moor had the highest rarity score.

The high score for Maulden Wood's diversity itself arose from another Society activity. When the idea of a county natural history book was first mooted, about 1973, it seemed a good idea to generate more detailed records and information for several key sites, by concentrated fieldwork over several years. In the event all the effort went into Maulden Wood, which proved very rewarding. The end result was a bulky file of detailed information on the Wood's wildlife. Indeed, it resulted in the tetrad containing the Wood having the longest County site species-lists for several disciplines, including flowering plants, Lepidoptera, Heteroptera, and others. In this respect Maulden Wood is now among the top few sites in the country. This background proved a valuable resource when *Bedfordshire Wildlife* was compiled in the mid-80s.

The Scientific Committee continues to monitor planning applications and, where necessary, make submissions, to help conserve the wildlife interest of the county. A related activity, since the earliest days, has been site surveys and preparation of reports on their wildlife interest and management requirements. Although with increasing commercialisation of such activities, and wide availability of professional consultants, the Society has been less active in this area in recent years.

MEETINGS

Lectures, field meetings, courses, and conferences have always had a high profile in the Society's programme, for many members this is what they join for. In the early years there were typically 10–12 indoor meetings a year with about twice that number of field meetings. By the mid-70s both had crept up with almost double the number of indoor meetings and a more variable 30–40 field meetings. During the 80s and 90s the numbers have settled down to about 18–20 and 35–40 respectively.

In the first two seasons there were some particularly illustrious field-meeting leaders: the Duke of Bedford led a meeting around his Park, the eminent ecologist Sir Edward Salisbury took a meeting to Dedmansey Wood, south of Whipsnade, and the eminent Cambridge botanist Dr H. Godwin took a meeting at Flitwick Moor – where he recommended the felling of Folly Wood.

Until 1970 the Journal included a resumé of all meetings which now make interesting reading: several Red-backed Shrikes on Blows Down (1952); a Hoopoe on Flitwick Moor (April 1953) – missed by half the party; a meeting on the unopened M1 motorway (August 1959) to view the geology and look for fossils – photo of a deserted road with a lone pedestrian; and a complaint about the lack of Fritillary butterflies in Salcey Forest, Northants, 'due to aerial spraying of insecticide to kill Green Tortrix moths'.

Some events became regular items on the calendar. The first Fungus Foray was held in Kings Wood in 1949, then annually thereafter. The latest leader, Derek Reid took over in 1952 – 44 years ago! There were eight Bedfordshire Ornithological Conferences, a joint event with the British Trust for Ornithology, 150–200 delegates and most of the 'big-names' in ornithology among the speakers. A weekend in the Yorkshire Dales was a regular event for 12 years under Vic Arnold's leadership. The barbecue and all-night meeting in Maulden Wood began in 1974 and ran for 18 years. Film-shows were popular in the 60s and 70s, one or two a year – an audience of 600 attended a showing of Roger Tory Peterson's *Wild America*, with commentary by James Fisher. Coach trips to the coast were popular from the beginning until the 1970s. In the 1970s too, there was an active Students' Group, with its own programme. The annual one-day courses at Shuttleworth College, where we had the run of their laboratory and estate, continued for 14 years under Beryl Rands' guidance. The birders' one-upmanship evening, the 'Twitchers Evening', has been annual now for ten years. A more serious regular is Rosemary Brind's 'Current Affairs' evening. Pre-Christmas social evenings frequently featured on the programme over the years, and Mary Sheridan's well-timed Boxing Day walk in Woburn Park has been annual since 1990. Then there is the annual 'Mammal-thon' species-hunt, a hardy annual, joined in 1995 by a 'Butterfly-thon'.

There were also the one-offs, such as a pair of Theed Pearse Memorial Lectures, given by Peter Conder (RSPB) and Richard Mabey respectively; the 1957 lecture in a packed Bedford Corn Exchange by Field-Marshal Viscount Alanbrook; the 10th Anniversary Dinner at the Swan Hotel in Bedford – tables decorated with wild foliage, fruits and fungi; and the 700th Ordinary Meeting (indoor meeting) in 1994.

The next fifty years have much to live up to!

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METEOROLOGY
Report of the Recorder

The first winter period of the year was generally mild but wet. However, April saw the start of a run of dry months not broken until September. During this period temperatures were mostly above average, particularly by day, with sunshine totals also well above average in most months. Following an extremely wet September the rest of the autumn period was again relatively dry and mild, but December brought markedly colder weather, wetter than normal and very dull. Despite the dry period from April through to August, and below average rainfall in some other months, the year's total rainfall was a little above the long term average, largely due to the very wet months of January and September.

The dryness through the spring and summer months was related to the above average sunshine during this period, and the effects of this can be seen in the temperatures for this period. These were consistently higher by day, but relative warmth was much less pronounced by night where clear skies led to greater cooling. For the year as a whole daytime temperatures were 1.5°C above the long term average, but by night precisely average.

Summarising the year as a whole gives an overview of the weather during the twelve months but hides many variations. The main features of the weather on a month by month basis are given below.

January
The first day of the month saw a covering of snow in Bedfordshire which was present for three days with severe night frosts, but the rest of the month was generally changeable and particularly wet from 17th–21st. Overall it was the wettest January since records began at Silsoe (in 1951) with 230% of the average. It was also rather dull.

February
The month was very mild, temperatures by day 3.2°C above average, with very few frosty nights. It was wetter than normal (166% of the average) but also a little sunnier than expected.

March
March 1995 was a very sunny month with nearly twice the normal sunshine. It was also showery and the showers were wintry at times with a period of heavier snow on the evening of the 2nd. The first half of the month was the colder, but frosts were frequent throughout the month. Overall, daytime temperatures were above average, but below average by night. The month was again wetter than normal.

April
This month marked the start of a run of generally warm and dry months. The 1st April saw the warmest day of the month, with a maximum of 19.7°C, and the first half

of the month was warmer and drier (in fact no measurable precipitation at all until 16th April) than the second half. Again, daytime temperatures were significantly above average, but near to average by night.

May

The first week of May was notably hot, with maximum temperatures above 25°C on three days. After a cooler period with some night frosts, warmer weather returned for the last two weeks. Daytime temperatures were again well above normal, but below normal by night. It was also, relatively, dry and sunny.

June

Although very dry, temperatures were very close to average overall and it was often cloudy with less sunshine than usual. Low temperatures and cloudy conditions predominated in the first half of the month. In the last two weeks temperatures rose significantly, particularly towards the month end when 30°C was exceeded on the last day of the month.

July

The month was dry, warm and sunny throughout. If anything these conditions became more pronounced as the month proceeded with the hottest days at the end of the month. Overall temperatures were very similar to those in 1994.

August

This was a record breaking month with day time temperatures 5.0°C above average. It was also very sunny (56% above average) and very dry (14% of average). This makes August 1995 the warmest August on record, and (at Silsoe) equal to the warmest month ever, July 1983, though the latter was warmer by night and hence warmer overall. It was hottest at the start of the month, continuing the hot spell which started in July, and coolest at the end of the month with a few days with temperatures below 20°C.

September

The cooler temperatures at the very end of August were typical of those which, in contrast, persisted through September, and the last week of the month was particularly cool. Generally temperatures and sunshine were a little below average, but it was a very wet month with rainfall 270% of the long term average, and the wettest September at Silsoe since records began at this site in 1951. The 10th was the wettest day with just over 30mm (approximately 1") and it was also very wet mid-month.

October

In contrast, October provided an 'Indian summer' with a particularly warm and dry spell in the middle two weeks. Temperatures were well above average, particularly by day, and it was sunnier and drier (rainfall 52.4% of the average) than normal. The first frost of the year occurred towards the month end.

November

This was another mild autumn month, particularly by day, just slightly drier and sunnier than usual for November. Some frosts occurred early and mid month. Most of the month's rainfall fell on four days making the month seem drier than it was.

December

The last month of the year was the first with temperatures significantly below normal. At 3.8°C the mean maximum was 3.4°C below the long term average. Snow fell on several days, mostly light but with 5cm on the 20th. It was misty and foggy at times, and there was very thick rime and hoar frost at the end of the month with the temperature continuously below freezing for three days. On the 30th freezing drizzle falling in very cold air onto frozen ground caused hazardous conditions, though not as pronounced as in the southwest of the country where the M4 was closed as a consequence of the icy conditions. The lowest temperature of the year also occurred in December (-10.6°C on the 29th). December 1995 was the coldest December since 1981, though not as snowy as that particularly extreme month.

I am appreciative of the provision of weather data from Silsoe College (reproduced in Table 1) and from Silsoe Research Institute (where records were again interrupted for lengthy periods). I am also grateful to Mrs Betty Chambers and Errol Newman for copies of their own weather records at Meppershall and Gamlingay respectively.

M.C.WILLIAMS

	Mean Max °C	Mean Min °C	Highest Temp °C	Lowest Temp °C	Rainfall mm	Sunshine hours	Air Frost days	Ground Frost days
January	8.0	0.6	13.5	-7.1	106.3	47.7	11	17
February	9.7	3.0	12.4	-1.9	59.5	79.8	4	9
March	10.3	0.5	16.1	-6.8	56.0	204.6	18	*
April	14.0	3.9	19.7	-4.3	14.2	180.3	5	*
May	17.7	5.0	26.0	-1.2	32.8	226.1	2	*
June	19.0	8.9	30.8	5.2	11.8	173.1	0	1
July	24.2	12.4	31.2	6.7	24.6	248.6	0	0
August	25.8	11.6	32.8	5.0	8.4	265.0	0	0
September	18.1	8.6	22.0	0.8	121.3	137.6	0	2
October	17.6	8.0	24.0	-0.9	24.5	135.7	2	6
November	11.1	3.8	14.0	-4.8	45.2	66.8	7	15
December	3.8	-1.1	12.1	-10.6	89.0	22.7	18	21
Year	14.9	5.4	32.8	-10.6	593.6	1788.0	67	*

Table 1. Summary of the weather for 1995 recorded at the Silsoe College
In the absence of relevant data from Silsoe College, records of ground frost are based on figures from Silsoe Research Institute (* no data available from this site).

GEOLOGY AND PALAEONTOLOGY
Report of the Recorder

Disappointingly, the Jurassic limestone exposed in the temporary ditch section between Pavenham and Felmersham (SP998565), referred to in the 1994 Report, failed to yield the hoped-for Zone ammonites and the Recorder obtained only a few fossils that could be determined. Unfortunately, these could only be ascribed to the Upper Bathonian Stage as, without Zonal ammonites, the rock could not be identified due to the wide stratigraphical range of the species recorded.

Specimens collected from the locality included the brachiopod *Epithyris* sp. and bivalves '*Lopha*' *marshi* (J. Sowerby), *Modiolus imbricatus* (J. Sowerby), *Plagiostoma* sp., *Pleuromya* sp. and *Thracia depressa* (J. de C. Sowerby). The absence of the ammonites *Macrocephalites macrocephalus* and *Clydoniceras discus*, Zone ammonites of the Upper and Lower Cornbrash respectively, suggest that the formation lies within the Great Oolite (Blisworth Limestone) that has been quarried extensively in the area for building stone and, indeed, the total absence of any cephalopods tends to support this hypothesis. This limestone section was the only Jurassic exposure investigated, all other field work being concentrated on the Cretaceous in the south of the county.

Three visits were made to Arlesey brick-works (TL188348) during the year although no additional excavating had been carried out, the brick-works still being closed down. Fossils were rare in both the Upper Gault *Stoliczkaia dispar* Zone and the Lower Chalk *Mantelliceras mantelli* Zone, a single partly phosphatised brachiopod *Moutonithyris dutempleana* (d'Orbigny) occurring *in-situ* near the base of the Gault face on the southern side of the quarry. The Lower Chalk (Chalk Marl) of the *M. mantelli* Zone, although well weathered since the 1994 visits, proved to be very disappointing and few fossils were noted, all previously recorded with the commonest being '*Inoceramus*' *crippsi* Mantell. The Cambridge Greensand did, however, yield one interesting specimen on the last visit of the year – a partial rib bone of the ichthyosaur *Platypterygius campylodon* (Carter), a species which has been recorded from the Lower Gault of Leighton Buzzard (Smart 1993). Other fossils discovered in the Cambridge Greensand, predominantly small teeth of the sharks *Cretolamna woodwardi* Herman and *Scapanorhynchus* sp. have been recorded previously. It is of concern that the closure of the brick-works and cessation of the excavating of the Gault is now allowing vegetation to encroach on the Gault slopes and overlying exposures of the Cambridge Greensand, in addition to which the rubbish tipping continues to fill the western part of the quarry. A close watch will be kept on events along the eastern side which is now the only complete succession that is accessible.

Although fossils (apart from microfossils such as Foraminifera and other members of the Protozoa which are outside the scope of this annual report) are uncommon as uncrushed specimens in both the Upper Gault and Lower Chalk, it will be a disastrous loss to palaeontology should the Arlesey section be annihilated as has happened to so many exposures in recent times. The Cambridge Greensand in this quarry is the most westerly available for study, and the descriptions given by Chatwin (1961) of the bed in the vicinity of Cambridge make interesting reading. Chatwin's most westerly location is given as Harlington, Arlesey being a strange omission as the brick-works were in

existence long before. Unfortunately, his descriptions of sections were reproduced from early publications that bore little resemblance to conditions existing in 1961 (Penning & Jukes-Browne 1881; Jukes-Browne & Hill 1903) and the Recorder has no knowledge of an open quarry exposing the Cambridge Greensand at Harlington, although an abandoned Chalk Marl quarry did exist in the 1950s on the east side of the Harlington–Sundon Road and which yielded *Schloenbachia subvarians* from loose rubbly chalk at the base of the face. There was, however, no visible evidence of the Cambridge Greensand, the entire quarry being very overgrown and wooded (Smart 1957).

There is also a considerable difference between the fauna of the bed in the Cambridge area and that at Arlesey. Although deposition was similar throughout the 50 mile tract between Soham and Harlington, for example erosion of the Upper Gault beds accompanied by rolling and redeposition of the fossils, the Cambridge bed contains much not recorded from Arlesey. Many bones "representing almost all classes of animals....including pterodactyls, saurians and crocodiles" and "Ammonites are very common and represent two Zones" (Chatwin 1961). The numerous species of ammonites, brachiopods and other molluscs mentioned bear little resemblance to the recorded Arlesey fauna but, despite this, an interesting assemblage of invertebrates do occur and would certainly warrant preservation of part of the section now exposed.

It had been hoped, as the Lower Chalk (Chalk Marl) at Arlesey was poorly fossiliferous this year, to re-visit some higher beds in the Lower Chalk at Sundon. This quarry, disused for many years, was last visited by the Recorder in the late 1980s (Smart 1987), a considerable time after Sundon Cement Works had closed down. Several short visits had not yielded many fossils, the lower quarry being completely overgrown with vegetation and the upper quarry (TL043275) having the remaining exposures much obscured by accumulated detritus. An application to Blue Circle for consent to visit was therefore made, unfortunately with no response. However, a further attempt will be made in 1996 to obtain a permit to study the few remaining sections of the *Acanthoceras rhotomagense* Zone of the upper quarry before they are obliterated either by vegetation or development of the site.

The only other Cenomanian exposure visited during the year was that of the Totternhoe Lime & Stone Company at Totternhoe (SP982221). A single tooth of the shark *Scapanorhynchus rhaphiodon* (Agassiz), previously recorded, was discovered in a block of Totternhoe Stone. Apart from this specimen, which was complete with root, other small shark teeth were represented by incomplete crowns and separated cusps only, and were of negligible scientific interest. However, as several large blocks of the Totternhoe Stone had been excavated from the lowest horizon and incorporated the basal nodule bed, samples were collected for acid digestion as in previous years.

Before leaving the Chalk, a specimen was received during the year from Mr T. Peterkin, a BNHS member, for identification. This bore a strong resemblance to a large tooth or claw, and had been discovered on the surface in the Barton Hills area. Unfortunately, the resemblance was superficial, microscopic examination indicating that it was a fossil sponge in flint and the "claw" shape caused possibly by the tapering basal stem of a sponge such as *Pachinion* sp., *Stichophyma* sp. or *Siphonia* sp. among others.

Flints are extremely common in some Chalk horizons and also occur in large quantities in glacial deposits such as Boulder Clay. Many resemble bones, teeth or claws and can be spherical, elongated or branched. Some can be of considerable size, a flint "nodule" being noted in the Upper Chalk in Land Park Wood quarry near Kensworth (TL016184) several years ago (Smart 1990) that measured 68cm in length, 41cm in width and 35cm in height, a solid irregular mass of cavities and excrescences far too heavy to lift.

Whatever the shape or size of such nodules, they are largely due to the presence of sponges and sponge spicules, the siliceous remains of these small animals frequently being surrounded by a later deposition of secondary silica after the rock such as Chalk was formed. In addition to sponges and spicules, many flints contain other fossils particularly Echinoids, and both *Micraster* sp. and *Echinocorys* sp. have been found in flints. Nevertheless, as other fossils are not infrequently within or attached to flint nodules, it is certainly not impossible for a tooth or other vertebrate remnant to be discovered. In this particular instance, unfortunately, it was not so.

Moving on to the Lower Cretaceous beds of the Leighton Buzzard area, in contrast to the Chalk the field work on the Albian sections resulted in one of the most successful years since the Recorder commenced these studies over forty years ago. Of the specimens obtained, twenty-one were important enough to be requested by the Natural History Museum, all of which were donated after the relevant data was recorded and drawings completed. These included the assemblage of *Notorynchus aptiensis* teeth described by the writer (Smart 1995); five ammonites, one of which had never been obtained from the area and which provided evidence of a previously unconfirmed Subzone in the Leighton Buzzard Middle Albian and, possibly the most important, the braincase of a clupeomorph fish – only the second such braincase to be discovered in the UK Gault this century. In addition to these, a partial dentition of a very large shark was discovered and an isolated tooth of the shark *Paraisurus macrorhiza* Pictet & Campiche from the same locality, this latter not previously recorded from the Leighton Buzzard Lower Cretaceous.

These discoveries stemmed partly from new quarry extensions that continued from last year in the three main localities that expose the most satisfactory sections, Billington Road (Pratt's) quarry being extended along the southern side for some 250 metres, Chamberlains Barn quarry in the south-east corner and along the eastern side northwards for approximately 150 metres, and Mundays Hill quarry along both the south-west side and the north-east corner areas.

Billington Road quarry (SP930241), which was cut back a further 10 to 15 metres during the autumn, was searched on several occasions. Fish remains were very rare in the lower *Hoplites spathi* Subzone and no new records were made, the only specimens obtained being isolated teeth of *Cretolamna woodwardi* Herman, all with damaged crowns. Although some ammonites were noted none were additions to the 1994 list with regard to the Lower Gault. The Lower Albian junction bed did however yield a number of fossils from the newly exposed section, including crushed *Leymeriella* sp. from several of the gritty phosphatic nodules and, unusual at Billington Road, a single *Beudanticeras newtoni* Casey although the exact horizon within the succession listed by Owen (1972) could not be determined. This species, although uncommon, has been

recorded by the writer on rare occasions in the mid-1970s when three specimens were donated to the Geological Museum, and also by other workers including Casey (1961) and Owen (1972). However, although the extension had revealed a fresh exposure of the Gault-Woburn Sands junction beds, the succession was not as good as that of 1993 and was much obscured by downwash and slip of the overlying Lower Gault.

Chamberlains Barn quarry (SP929265) was also visited several times throughout the year, excavating work in the south-east corner and northwards along the eastern side commencing in January. The first survey in February yielded a number of fine ammonites from the newly exposed Gault-Woburn Sands junction beds, including *Douvilleiceras mammillatum* (Schlotheim), *D. pustulosum* Casey and *D. scabrosum* Casey. Many specimens of these latter two species were originally known as *D. mammillatum*, the genus being entirely revised by Casey (1962) and a number of new species described. Also determined was a specimen of *D. mammillatum* (Schlotheim) var. *praecox* Casey, a varietal form as recognised by Casey originally included in *D. mammillatum*. Without doubt, more individuals will be changed under Casey's revised nomenclature.

Of interest also was the discovery of a single *D. mammillatum* macroconch from the newly exposed junction beds some 100 metres north of the south-east corner. Ammonites are sexually dimorphic (Callomon 1963, 1980: Kennedy & Cobban 1975). A species therefore includes two dimorphs and mature individuals can vary by as much as a third in diameter. Taking extant cephalopods as examples it is possible that large forms were female, small forms male. However, as this is *non-proven* with regard to ammonites which could well differ in sexual characteristics, the terms macro and micro are used to differentiate between mature specimens of large and small size respectively.

Plate 1. *Douvilleiceras mammillatum* (Schlotheim). Macroconch from the Lower Albian junction beds, *Douvilleiceras mammillatum* Zone, Chamberlains Barn quarry, Leighton Buzzard. PJS Coll. 15552M.
Photo: Richard Revels

The macroconch, shown in Plate 1, measures 168mm in diameter although incomplete. A microconch in perfect condition from the same bed measured 92mm in diameter, the majority of specimens of *D. mammillatum* being between 50mm and 100mm in diameter with the smaller ones frequently missing much of the outer whorl.

Several large specimens of *Beudanticeras newtoni* Casey were also collected from the junction beds, the species being not uncommon in this locality compared to Billington Road, and incomplete specimens are regularly recorded. Four of them this year, however, were in such an excellent state of preservation that they were subsequently presented to the Natural History Museum.

Two other ammonites were also discovered that made this an exceptional year. A small whorl section of *Cleoniceras (Cleoniceras) floridum* Casey was found in newly exposed clay approximately 120 metres north of the south-east corner, the first record by the Recorder. This specimen occurred in a bed of loamy clay with pebbles, corresponding to Owen's description (1972 p305) of a bed immediately above "Bed 2" of his succession which contains indigenous ammonites of probable *Cleoniceras floridum* Subzone age. The specimen was donated to the Natural History Museum later in the year, Register number BMNH CA 307 under the new numbering scheme, to join another such specimen from the same bed in Chamberlains Barn quarry that was obtained in the 1970s by H.G. Owen (Personal communication 1995).

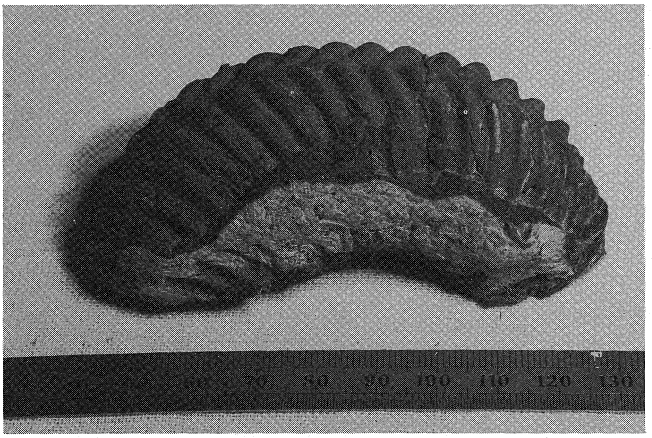


Plate 2. *Hoplites pseudodeluci* Spath. Indigenous ammonite from the *Hoplites dentatus* Zone, *Lyelliceras lyelli* Subzone, Chamberlains Barn quarry, Leighton Buzzard. BMNH CA 306.
Photo: Richard Revels

The second ammonite, found approximately 75 metres north of the south-east corner and shown in Plate 2, is of much greater importance. It was discovered in greyish sandy clay above the junction beds and was unknown to the Recorder, no other specimen having been seen with this pattern of ribbing.

It was subsequently taken up to the Natural History Museum where it was determined as *Hoplites pseudodeluci* Spath, an ammonite indigenous to the *Lyelliceras*

lyelli Subzone. This was not only the first record of this species occurring in the Leighton Buzzard Gault, but it proved the existence of the *L. lyelli* Subzone between the *Hoplites* (*Isohoplites*) *eodentatus* Subzone that rests directly on the Lower Albian junction beds, and the lower *Hoplites spathi* Subzone. This bed has to date been "of uncertain age" due to absence of Subzone fossils (Owen 1972) and was omitted entirely from the Chamberlains Barn sequence (Eyers 1991). The revised stratigraphical succession of the eastern side of Chamberlains Barn quarry is illustrated in Figure 1, Section (A) being recorded while searching for Hexanchid shark teeth in 1988. Section (B) is from Owen (1972), the bed shown as *Lyelliceras lyelli* Subzone being the bed "of uncertain age". Section (C) is the location of the *Hoplites pseudodeluci* specimen that was discovered in February 1995 and subsequently presented to the Natural History Museum, Register number BMNH CA 306.

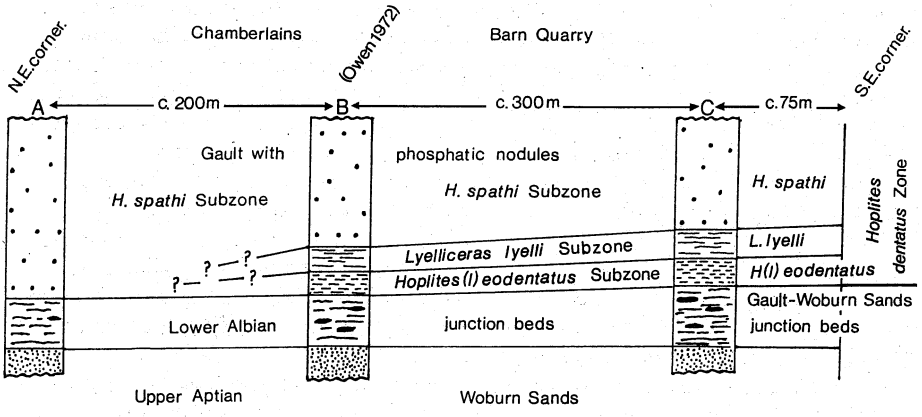


Figure 1. Stratigraphical succession of Lower Cretaceous Albian sediments exposed along eastern side of Chamberlains Barn quarry (SP929265) 1995. Not to scale either horizontally or vertically.

A: Section recorded by the writer in 1988. The *H. spathi* Subzone in this area yielded teeth of *Notorynchus aptiensis* (Smart 1995) and appears to rest directly upon the Lower Albian junction beds.

B: Section recorded by Owen (1972) showing the *Hoplites* (*Isohoplites*) *eodentatus* Subzone, but the overlying bed is the "bed of uncertain age" and now confirmed as the *Lyelliceras lyelli* Subzone.

C: Section recorded by the writer in 1995 at the location where the specimen of *Hoplites pseudodeluci* Spath was discovered.

At the time of recording Section (A) the junction beds were thinner and the *H. spathi* Subzone appeared to rest directly upon them (Smart 1994). Owen recorded the *Hoplites* (*Isohoplites*) *eodentatus* Subzone as 0.07 – 0.12 metres thick, and the overlying "bed of uncertain age" as 0.30 metres thick, in Section (B). Both Subzones, and the underlying junction beds, thicken southwards and at Section (C) the junction beds are approximately twice as thick than at Section (B). The *H(I) eodentatus* and *L. lyelli* Subzones also thicken and the *H. spathi* Subzone thins at this southern end as indicated, *not* to scale either horizontally or vertically, in Figure 1.

It is significant to note that the gradual thinning of the junction beds northwards is also accompanied by a change in lithology. In New Trees quarry (SP930275), some 750 metres north of Section (A) and roughly in line with the eastern side of Chamberlains Barn, the *H. spathi* Subzone which is several metres thick in the north-east corner (A) is reduced to a mere 0.3 metres of gritty clay in New Trees, and the underlying junction beds reduced to approximately 0.7 metres of uncertain age consisting of a basal ferruginous sand (0.3 – 0.45 metres thick); a pebbly ferruginous loam (0.12 metres) and a top bed of conglomerate (0.25 metres thick) on which the *H. spathi* Subzone rests (Owen 1972 p296).

It is to be hoped that excavations along the eastern side of Chamberlains Barn quarry will extend northwards to beyond Section (B) and eventually reach (A) in the north-east corner. The *H. spathi* Subzone proved to be more fossiliferous as regards vertebrate remains north of Section (B). Why this should be so is difficult to determine but the whole Leighton Buzzard Lower Cretaceous was subjected to considerable erosion during Cretaceous times and some Subzones have been partially or entirely eroded over quite short linear distances. The lithology in the north-east corner certainly differs greatly from that in the south-east corner, and a new exposure for the full length of the quarry would be of considerable importance in clarifying the position – the northerly part of the present exposure being completely overgrown with vegetation.

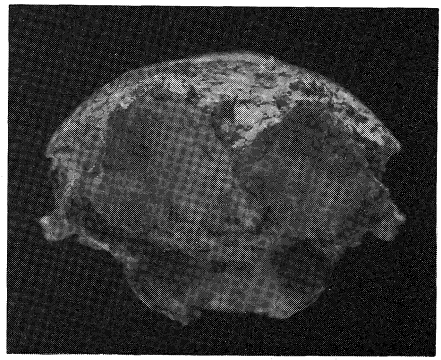
Mundays Hill quarry (SP936279) was visited on numerous occasions with very interesting results. Excavation work in the south-west corner area proved to be disappointing, however, what appeared from a distance to be an exposure of Shenley Limestone at the base of the Gault being, in fact, a layer of wind-blown silver sand. However, some limestone had been uncovered, but the deposit was mainly in the form of streaks and lenses and only one small lenticle of reworked material was obtained which, as it turned out, was completely unfossiliferous.

The north-east corner extension including some 150 metres southwards along the eastern side of the quarry was considerably more interesting, and over the year some valuable records were achieved. The most important discovery was made during the summer, and consisted of a small teleost skull that occurred towards the top of the *Euhoplites loricatus* Zone, *Anahoplites intermedius* Subzone. No such fossil had been found by the Recorder in over forty years field work in these localities, and it was taken up to the Natural History Museum later in the year, where it aroused considerable interest. It was determined by Dr Patterson as the braincase of the clupeomorph fish *Spratticeps gaultinus* Patterson, and was only the sixth such braincase recorded from the UK Gault clays.

Clupeomorphs are herrings and their relatives, a group of about 350 living species. *Spratticeps gaultinus* was described (Patterson 1970) from three braincases in the then British Museum (Natural History) and one braincase in the Institute of Geological Sciences, where they had remained unidentified and undescribed in the collections since the 19th century. These four specimens had been collected from the *Euhoplites lautus* Zone of the Lower Gault of Folkestone, a Zone absent from Leighton Buzzard due to erosion during Lower Cretaceous times. A fifth braincase was discovered in 1972 in the Gault clay of Naccolt, Kent, with the Leighton Buzzard specimen appearing in 1995 as the first record from the south-central England area.

5mm

Plate 3. *Spratticeps gaultinus* Patterson.
Dorsal view of braincase from the Lower Gault *Euhoplites loricatus* Zone, *Anahoplites intermedius* Subzone, Mundays Hill quarry BMNH P. 64019
Photo: The Natural History Museum



5mm

Plate 4. *Spratticeps gaultinus* Patterson.
Anterior view of braincase BMNH P. 64019
Photo: The Natural History Museum

The specimen – BMNH P. 64019 – has been donated to the Natural History Museum and is shown in Plates 3 and 4.

Two other notable discoveries were made in the new exposure along the eastern side of the quarry, both in the lower *Euhoplites loricatus* Zone, *Anahoplites intermedius* Subzone. A small grinding tooth of the Hybodont shark *Lissodus levis* (Woodward) was found shortly after excavating was completed. This had not previously been recorded, and a comparison with other crushing/grinding teeth in the Recorder's reference collection revealed one other specimen. Both were later confirmed at the Natural History Museum. The other specimen, again a shark tooth, was a remarkable find. It was collected as a single cusp, without roots, as are the majority of Gault teeth. The subsequent removal of adhering matrix, however, revealed part of a root not previously observed in any shark tooth, being compressed mesio-distally and very stout lingually. It was determined to genus status in Cappetta (1987), almost certainly from his description as *Paraisurus macrorhiza* Pictet & Campiche, and this was confirmed at the Natural History Museum.

P. macrorhiza is localised in the Lower Cretaceous Albian sediments, very rare indeed in the UK, the Holotype being from the Albian of Ste-Croix, Switzerland and described in 1858. It is a very peculiar genus, seeming to possess a homodont dentition; all the collected teeth have a similar morphology and it does not seem that distinctive differences occur between anterior and lateral teeth (Cappetta 1987). The Leighton Buzzard tooth, the only specimen of this species ever discovered by the writer is, so far as is known, the only record from the Albian of the Leighton Buzzard district. It is illustrated in Figure 2 (c) and (d), Figure 2 (a) and (b) being the tooth

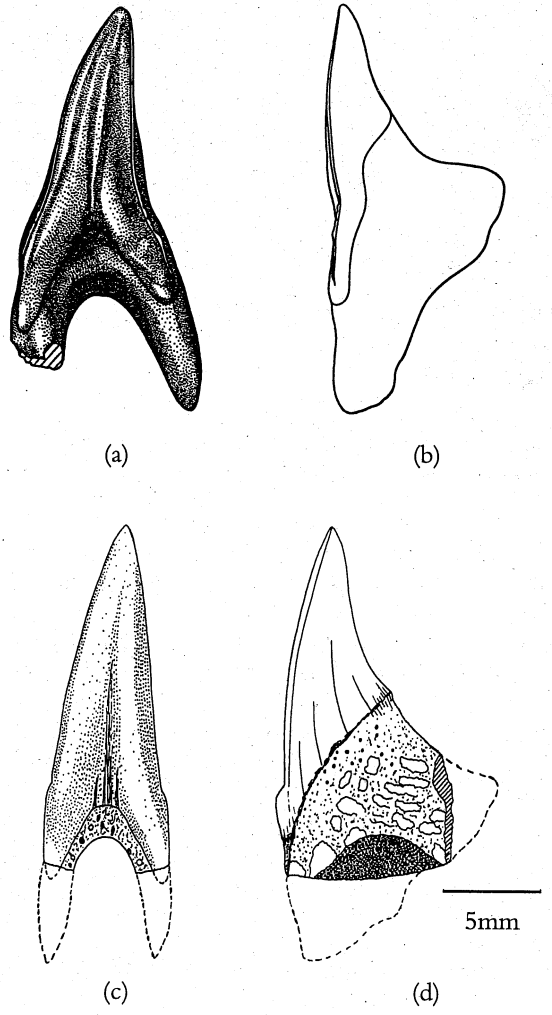


Figure 2. *Paraisurus macrorhiza* Pictet & Campiche.

(a) & (b) Tooth illustrated in Cappetta (1987)
(c) & (d) Tooth from the Lower Gault *Euhoplites loricatus* Zone, *Anahoplites intermedius* Subzone, Mundays Hill quarry, Leighton Buzzard. PJS Coll. 15539 M

(a) & (c) labial view, (b) & (d) profile, scale bar 5mm.

described in Cappetta and included in this report for comparison, the basal root of the Mundays Hill specimen being partially eroded.

Finally, mention can be made of an associated group of five large teeth of *Cretolamna woodwardi* Herman that was found at the base of the Upper Gault *Mortoniceras inflatum* Zone, *Dipoloceras cristatum* Subzone in Mundays Hill quarry. Small teeth and very rare larger ones of this species have been recorded previously always, however, as isolated specimens. This group of five, occurring in the same position, indicated a partial dentition of a very large shark as all teeth – one anterior and four laterals – were in excess of 20mm high. The single anterior tooth measured 30.2mm in height and, based on the dentition of extant species, would have been from an upper jaw of a shark, possibly a female, between four and five metres in length. A short article accompanied by an illustration of this associated group of teeth will appear in the Spring issue of the *Bedfordshire Magazine*.

ACKNOWLEDGEMENTS

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My sincere appreciation as always to CAMAS Aggregates (Garside's Sands), Eastern Way Works, Heath & Reach, Leighton Buzzard; Hepworth Minerals Ltd (Arnold's) Eastern Way, Heath & Reach, Leighton Buzzard; Mr R.A. Bates and Mr Bruce Rogers, Totternhoe Lime and Stone Co. Ltd, Totternhoe, and Messrs Shanks and McEwan Ltd, Arlesey Landfill site, Arlesey, and their staff who are invariably considerate and helpful.

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P.J. SMART

MAMMALS
Report of the Recorder

Review of 1995

1995 was a very good year with 29 species recorded by 99 observers. The only species seen in recent years but not in 1995 were Polecat and Sika Deer. A five year plan to map all the mammals of Bedfordshire started well and by the end of the year over 1,350 tetrad records were mapped. An excellent beginning. If we can continue this excellent start we will have a good idea of Bedfordshire mammal distribution by the end of the century.

Tetrad records came from a variety of sources hence the large number of contributors listed. The autumn Mammal-thon that was resurrected in 1995 was adapted to give extra tetrad records. Six teams took part and my congratulations go to the J.T.R.Sharrock/B.Nightingale and Chris Watts/Jane Adams teams that tied in first place with ten species seen. John Adams and Dave Parsons however had the most tetrads with 16 tetrads mapped.

Small mammals are always difficult to monitor so the erection of over 200 dormouse nesting boxes during the year will help us find out more about dormice numbers and distribution. Dormice took to the boxes straight away as did the ubiquitous Wood Mouse. In neighbouring Northamptonshire dormouse nestboxes are used by shrews, voles, and even bats, providing useful accommodation for a wide variety of species. The programme is to continue over the next few years significantly increasing the number of boxes in Bedfordshire.

Another way to find out what small mammals occur in your garden is to monitor domestic cat kills. Barry Nightingale regularly tables the small mammals caught by his cats. By checking all the Wood Mice caught he identified Yellow-necked Mouse in April. This was the first record in the west of the county, although there is still a lot to be learnt about the distribution of this rare mouse in Bedfordshire.

Two other surprises were uncovered by cat kills. A Dormouse caught by a cat in Studham astounded the owner who did not realise they occurred in her garden. Equally unexpected was the discovery of a Water Shrew at Whipsnade which was caught by a cat several kilometres from its nearest known location and was a first record for the area.

Road casualties are another way to find out more about the distribution of Bedfordshire mammals with many of the tetrad records coming from this source. Better reporting has led to the total of 57 badgers killed on the county's roads being logged. Hopefully all the animals that are killed are now being reported. Road deaths are distressing enough but to hear that an incidence of badger digging took place early in the year was terrible news. It is extremely disappointing to think that this cruel practice has once again happened in Bedfordshire.

An event that was unique for Bedfordshire and of great benefit to the local Otter population was the release of four captive bred Otters in the county as part of a joint English Nature/Otter Trust re-introduction programme. Initial reports suggest they have settled in well. This is a most positive step and one that will hopefully see a permanent otter presence on Bedfordshire's waterways in the future.

To finish the review I would like to return to the tetrad mapping survey. Although too early to comment a great deal from the first year's results, it can be seen that concern about the hare decline caused by European Brown Hare Syndrome (EBHS) was probably overstated. Hares were the the fourth most commonly recorded species with good numbers still present in several areas of the county. On the other hand it does seem that the Water Vole is in desperate trouble in Bedfordshire with records only received from eight tetrads. The Water Vole populations are now being fragmented in contrast to the continuous distribution on the waterways only ten years ago. We need to monitor these changes in distribution not just for Water Voles but for all mammal species. To this end we need every record whether it be of a Grey Squirrel in your garden or a Fallow Deer in a local wood.

SYSTEMATIC LIST FOR 1995

Red-necked Wallaby *Macropus rufogriseus*

The only record was of one seen on Whipsnade Golf Course (TL01D) from April to December (PI, CT).

Mole *Talpa europaea*

This was the second most recorded mammal during 1995 with 179 tetrad records received. As is usual with this subterranean mammal the majority of records were of the diagnostic molehills. The other records were of dead animals found above ground during the very dry summer and autumn.

Hedgehog *Erinaceus europaeus*

The first record of the year was of a half-grown animal in Luton on 24th January (VA). The last record was also from Luton on 19th November (BC). With records from 143 tetrads it was the third commonest mammal recorded. Not surprisingly, the majority of records were from road casualties.

Common Shrew *Sorex araneus*

Only 24 tetrad records were received of this common and widespread small insectivore.

Pygmy Shrew *Sorex minutus*

Very much under-recorded as are all the small mammals. Only recorded from six tetrads. At Woburn (SP93L) six animals were caught by cats during the year (BN). Four were caught in August and singles in September and November. The other tetrad records were from Whipsnade (TL01D), Dunstable (TL02F), Priory Country Park (TL04U), Biggleswade (TL14X) and Eyeworth (TL24S).

Water Shrew *Neomys fodiens*

Only three tetrad records were received. The most unusual was the record of one caught by a cat at Whipsnade (TL01D) in February (AC). Water Shrew had not been recorded in this vicinity previously with the nearest known populations several kilometres from this site. A more typical record was from Dunstable Sewage Treatment Works (TL02C) where a Grey Heron *Ardea cinerea* was seen to catch and eat one in July (CT). The remaining record was from Priory Country Park (TL04U).

Rabbit *Oryctolagus cuniculus*

The most widespread mammal recorded with 210 tetrad records. Black animals were seen near Bromham (SP95Q) and Whipsnade (SP91Y). In the Barton Hills area (TL02Z) as many as eight white animals were seen throughout the year (MP, TP).

Brown Hare *Lepus capensis*

This was the fourth most commonly recorded species with 122 tetrad records. Numbers were particularly high in the Chicksands area (TL14A) with over 20 counted in late March (JA). Nearby at Haynes (TL04W) 60 were shot during the year on one farm (DP).

Dormouse *Muscardinus avellanarius*

Intensive survey work and the erection of 150 nestboxes led to six tetrads yielding positive records (TL01B, TL01C, TL01D, TL01G, TL01H and TL01I). The success of the nestbox scheme was almost instant with one box occupied by a family of dormice only a month after erection. The mild autumn led to the discovery of a male still using a nestbox on 29th November. It weighed 18 grammes which is borderline hibernation survival weight. It had left the box three days later, after a light snowfall, hopefully to hibernate. One dormouse became a victim of a cat during the summer (Mr & Mrs L).

Fat Dormouse *Glis glis*

Recorded from three tetrads. During the summer six animals were trapped in a loft of a house at Studham (TL01H). Another small group were trapped at Whipsnade (TL01D). Also recorded in SP91Z.

Bank Vole *Clethrionomys glareolus*

This common and widespread species was under-recorded with only ten tetrad records.

Short-tailed Vole *Microtus agrestis*

Like the previous species under-recorded with only fourteen tetrad records. A total of 23 were caught by cats at Woburn (SP93L) after a negative catch in 1994 (BN).

Water Vole *Arvicola terrestris*

Despite observers visiting most of the suitable habitat in the county they were only recorded in eight tetrads. Regular observations indicated that the population on the River Lea at Luton (TL02S, TL02W) had a poor breeding season (BC, LJ). Also recorded at Edlesborough (SP91Z), Dunstable Sewage Treatment Works (TL02C), Chalton Sewage Treatment Works (TL02I), Meppershall (TL03N) and Stewartby Country Park (TL02A, TL02B).

The observer's pleasure of seeing one at Chalton Sewage Treatment Works, his first for several years, was curtailed when he watched as it was caught and killed by a Stoat (BN).

Harvest Mouse *Micromys minutus*

The only record was from Aspley Guise (SP93I) where one was caught in a newt trap (Mr & Mrs P. Clarke).

House Mouse *Mus musculus*

Records were only received from fourteen tetrads.

Yellow-necked Mouse *Apodemus flavicollis*

Records were received from two tetrads. The identifying of all the small mammals caught by his cats at Woburn (SP93L) led Barry Nightingale to find this species, the first record for the west of the county. The only other record was from Priory Country Park (TL04U).

Wood Mouse *Apodemus sylvaticus*

There were 20 tetrad records of this common small mammal. It has readily moved into several of the nestboxes which have been put up for dormice.

Brown Rat *Rattus norvegicus*

There were 47 tetrad records of this widespread and common mammal. Over half of the tetrad records came from road casualties.

Grey Squirrel *Sciurus carolinensis*

This was the fifth most recorded mammal in the county in 1995 with 116 tetrad records. The black colour phase of the Grey Squirrel was recorded from twelve tetrads: Whipsnade (SP91Y), Charle Wood (SP93G), Woburn (SP93L), Milton Bryan (SP93Q), Woburn Abbey (SP93R), Studham (TL01I), Kensworth (TL01J), South Dunstable (TL02F), Henlow (TL13Z), Chicksands (TL14A) and Sandy (TL14Y, TL14Z). An all white squirrel seen at Milton Bryan on 11 December was a very unusual sighting (BN).

Fox *Vulpes vulpes*

This was by far the commonest predator in the county with 110 tetrad records. The majority of records were of animals seen crossing roads at night. There were also a few records of bold animals seen hunting in daylight. There were 22 records of road casualties.

Badger *Meles meles*

Records were received from 69 tetrads. The majority of records came from road casualties with 57 deaths reported. Monthly totals are as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	13	5	8	4	8	1	3	9	1	3	1

The total of road deaths in the county was much higher than expected but the continuing healthy state of the badger population, which is considered to be increasing, shows an ability to cope with these losses. However, the dry summer and autumn of 1995, which caused food shortages, as well as the continued illegal persecution puts extra pressure on the population. The Bedfordshire Badger Group will monitor numbers of cubs born in 1996 to see if they are affected by the restricted food availability of 1995.

Otter *Lutra lutra*

The first re-introduction of a mammal into Bedfordshire took place in April and May when two pairs of Otter were released in the county as part of an English Nature and Otter Trust re-introduction programme. Spraints were recorded until the end of the year which suggests that the project is progressing well. Otter signs pre-dating the release were also encouraging but unfortunately a sick Otter was found which later died. Details of this animal are still awaited but it was thought to be an old animal and not one of the re-introduced ones.

Ferret *Mustela furo*

Recorded in four tetrads. A polecat-type was a road casualty at Studham (TL01C) in May (CT). At the opposite end of the county an albino-type was seen hunting by a road at Tempsford (TL15R) in June (EN). Also in June one of unknown type was seen crossing a road at Dunstable (TL02F). Finally two dead polecat-type were found on the road at Pegsdon (TL15F) in July (KW).

Polecat *Mustela putorius*

No records were received during 1995 which is rather surprising considering the three road casualties reported during 1994. It will be interesting to see if any are seen in 1996.

Mink *Mustela vison*

Recorded from 21 tetrads with eight of the records road casualties. The records come from several different areas of the county showing a widespread distribution.

Stoat *Mustela erminea*

This widely but thinly distributed carnivore was recorded from 37 tetrads. An almost all white animal was killed on a road at Shefford whilst carrying its rabbit prey across

the road (DP). In the Woodland Bird Walk at Whipsnade Wild Animal Park one gave a climbing exhibition that rivalled a squirrel. It was watched as it ran vertically up an oak trunk to a height of at least twenty-five feet (CT).

Weasel *Mustela nivalis*

Like the previous species, this small predator was recorded from 37 tetrads widely spread around the county.

Chinese Water Deer *Hydropotes inermis*

Records were received from 26 tetrads. The highest number seen together were groups of three animals at Milton Bryan (SP93Q) and Potsgrove (SP93K) (DC). Animals were seen frequently in the winter periods licking salt from roads in the early morning (BN). There were also records from Dunstable, Toddington and Totternhoe indicating a spread in distribution from the species' Woburn area stronghold.

Fallow Deer *Dama dama*

Recorded from fourteen tetrads. At Kingshoe Wood (SP93X) in March seven hinds were seen together (BN). The highest count during the year however was a herd of both black and spotted Fallow numbering fifteen at Hudnall Corner (TL01B) in January (CT).

Muntjac Deer *Muntiacus reevesi*

This was the sixth most common mammal recorded in 1995 with 111 tetrad records. It was by far the commonest species of deer recorded in the county with records from gardens and parks in Bedford, Dunstable and Luton as well as most of the wooded areas in Bedfordshire.

ACKNOWLEDGEMENTS

J. Adams, N. Agar, P. Almond, D. Anderson, K. Anderson, V. Arnold, Beds Badger Group, M. Best, D. Bodily, L. Bull, P. Cannings, L. Carmen, A. Catchpole, J. Childs, M. Clark, M. Clarke, Mr and Mrs P. Clarke, B.M. Clutten, Mrs K. Coote, R.G. Cornes, D. Crawley, N. Culling, R. Culling, V. Curzon, A. Cutts, R. Davies, L. Davies, N. Dawson, Mrs Demby, T. Donnelly, R. Downs, Mrs J. Fischer, D. Fisher, Mrs A. Fitzgerald, E. Flach, A. Fleckney, S. Fleet, D. Harlow, A. Hartley, P. Harvey, R. Hutton, P. Irving, D. Green, J. Green, L. Jarrett, C. Jones, Mrs King, Mr & Mrs Lavery, C. Layman, N. Lindsay, B. Madgett, P. Madgett, M. Maidment, D. Manning, A. Marshall, M. McCarrick, Mrs M. McKenna, M. McKenzie, A. Muir-Howie, H. Muir-Howie, E. Newman, B. Nightingale, D. Odell, K. Oldfield, E.R. Paine, M. Paine, D. Parsons, T. Peterkin, B. Philpot, J. Powell, W. Powell, A. Proud, A. Reeve, C.W. Ridge, M. Russell, M. Shadbolt, K. Sharpe, J.T.R. Sharrock, S. Shattock, T. Smith, B. Squires, A. Tack, C. Tack, K. Taylor, J. Trew, P. Trodd, P. Tyler, L. Waterhouse, H. Watkins, C. Watts, K. Wharton, C. White, J. Whinnet, M. Williams, K. Winder, H. Winter, S. Winter, R. Woodall and R. Woolnough.

My sincerest thanks go to these 99 observers. Their numerous contributions have enabled such a comprehensive report to be published.

CLIFF TACK

DORMICE IN HEDGES: BEDFORDSHIRE DORMOUSE PROJECT

by Michelle Edwards and Cliff Tack

In the beginning

At the end of the nineteenth century dormice were known from three separate areas:

- Charle and Lowes Wood, Woburn and Milton Wood, Milton Bryan. (The Zoologist 1885)
- The woods around Leighton Buzzard (Steele-Elliot, The Victorian County History of Bedfordshire).
- Woods and hedgerows in the Whipsnade and Studham area (Vevers in Bedfordshire Naturalist No.1).

With the decline in population and distribution throughout England it was thought to have become extinct in Bedfordshire with no records for over forty years. However, the distribution of Bedfordshire mammals 1971–1985 (Anderson, 1986) showed two records from the early 1970s which proved a continuing presence but much reduced distribution in the county. There was almost a twenty year gap until the winter of 1993/94, when a thorough search of the southern woods by Cliff Tack, the County Mammal Recorder, produced 23 new records.

The Great Nut Hunt of 1993 encouraged people all over the country to search for dormouse nibbled nuts. The north-west of Bedfordshire was searched during this time but did not produce any further records.

The discovery of new records for dormice in the county, and their vulnerability, inspired the creation of the Bedfordshire Dormouse Project. It is a partnership between the Wildlife Trust for Bedfordshire and the Bedfordshire Natural History Society, funded by the Bass Wildlife Action Fund and English Nature Species Recovery Programme. The project was set up to find out more about the population of dormice in Bedfordshire, where their habitat is, how large the population may be and the management needed to maintain it.

Surveys

An increasing number of positive records gathered from hazel nuts were being obtained from hedgerows in the parishes of Whipsnade and Studham. Many of these records are in overgrown hazel hedges, common in this area of the county. The parishes of Whipsnade and Studham are considered as an area of "ancient countryside" with a high proportion of very diverse hedgerows. Most of the woodlands have been coniferised but dormice have been found in the hardwood margins. A comprehensive survey was required to find out exactly the nature of the habitat and discover the quality and extent of the hedgerows. The Hedgerow Survey 1995 used a 1:10 000 scale map of the two parishes and all hedgerows were surveyed using the Hedgerow Evaluation and Grading System (HEGS) survey sheets. Each hedge was given a number to aid identification and analysed using the HEGS system. The grade is assigned by looking at a combination of features; structure, connectivity to other hedges and woods, diversity of species, and any associated features such as banks and ditches.

Hedges along the boundaries of coniferised woods were surveyed where present, as were garden hedges consisting of native species. Relict hedges with very little structure, less than 20%, were surveyed but not graded. Hedges consisting of mainly exotic species were not included in the survey. The area north of the B4540 road in Whipsnade was not surveyed due to restrictions of time, but no signs of dormice have yet been found. This produces a grade for the hedge from -4 to +1, grade 4 being a poor hedge and grade 1 a good hedge. All hedgerows were drawn onto a master map and colour coded. This produced a map showing the grades and distribution of all hedges in the area. By comparing the grades of hedge where signs of dormice have been found in the last two years, it is then possible to see if a particular grade of hedge is used more frequently. Knowledge of other hedges of similar qualities and the areas in which they are found enables the identification of the extent of potential dormouse habitat, and the best areas to search for them. Over half the hedgerows in the area surveyed were grade 1 hedges. The distribution of dormouse records showed that all except one was to be found in grade 1 hedges. This exception was found in a grade 2 roadside hedge.

The hedgerows where signs of dormice have been found have, in general, a number of features in common.

(a) They are usually overgrown, being very tall and wide. Often they have a large number of standard trees present, though these may or may not be important for dormice. Hedges of this kind provide plenty of cover when foraging and material for nest building.

(b) The hedges are well connected either to other hedges of a similar quality and or to areas of woodland. Good connectivity would allow individuals access to other habitats of a similar quality if their local area becomes unsuitable, for example, if the hedge is destroyed or coppiced.

(c) They are usually diverse, containing a large variety of woody species, hazel in particular usually being abundant. This diversity provides a wide range of foods to sustain the dormouse through periods of activity. If one particular species of shrub failed to fruit well, alternative food sources could be found.

It is possible that not all grade 1 hedges will necessarily be suitable for dormice. Some hedges may be too heavily trimmed, recently layed or coppiced or may be too isolated from other suitable habitat. Some of the better grade 2 hedges may be valuable if they are well grown, have a reasonable mix of species and especially if they are well connected to known dormouse habitat.

The grade 2 roadside hedge may only be this grade because it was over trimmed and gappy. If one or both of these problems was addressed the hedge could be grade 1. A number of other grade 2 hedges could also be upgraded if the cutting regime was relaxed, being diverse enough but not having the structure. Grade 3 and 4 hedges seem unlikely to support dormice as they are usually dominated by only one or two species, in particular, hawthorn or blackthorn. These hedges are relatively recent enclosure hedges such as those on intensively farmed land around Studham Common. The distribution of grade 1 hedges can be used to locate the most promising areas to search for dormice.

Following the hedgerow survey, the discovery of dormice in hedges created a problem in terms of how to manage the hedgerows for the benefit of dormice. Dormice in hedges are particularly vulnerable. Traditional forms of management are known to be detrimental for dormice "approved" management of hedgerows; coppicing, laying and flailing can destroy dormouse habitat for up to 5 years. Any cutting of a hedge can destroy the food sources and shelter available for the dormice. The literature on dormice tends to concentrate upon woodlands and gives few details about dormice which live in hedgerows. Much of the suitable habitat has been destroyed and due to the complex ecology of the dormouse more information is required. The Project has been in regular contact with the experts Pat Morris and Paul Bright to discover more about our dormice which live in hedges. As little is known about hedges and dormice our work is very important as we try to discover more about their ecology.

The Project's work

All the records we have for dormice in Bedfordshire have been confined to a small area in the south of the county. Many of these are in small strips of suitable habitat around the edges of coniferised woodland and in hedges. More detailed information was required about the nature of the habitat in which the dormice was living. From August to October 1994, a habitat survey was undertaken for all sites which had dormouse records. The survey looked at species composition and structure of the vegetation in an attempt to find common features which made them suitable for dormice. The survey found that all sites contained hazel and had a wide diversity of food sources. The diverse, mature hedges surveyed seemed to be a particular feature of the area and the small woodland sites were connected to good sections of hedge. This survey uncovered valuable information about the habitat of the dormouse in the area, but did not show the extent of the population. The survey did however identify areas for further survey work.

Landowners of the sites with dormice records were identified, contacted and informed of the need to protect dormice on their land. As part of Biodiversity Challenge which originated from the Rio Summit in 1992, a Species Biodiversity Action Plan was written for dormice. This Action Plan detailed the history of the dormouse, its present situation, both nationally and locally, threats to its population, habitat management, targets for the species and the action needed to achieve them. Since it was written early on in the project a number of the targets have been achieved and a three year plan written to direct the project had to be re-written after the discovery of dormice in hedgerows. Since then work has been done to discover why the hedgerows in this area of the county are important for the dormouse.

Few people have ever seen a dormouse and even fewer know anything about them. The Project has organised and run a number of workshops to raise awareness of this rare species, to encourage people to look for dormice and help protect suitable habitat.

The first "dormouse" workshop was held in November 1994 in Studham. Forty people from all over the county listened to a talk on dormice and searched local woodlands for signs of dormice.

During December, project newsletters and recent habitat survey information was sent to all landowners with dormouse records. A second workshop was held in March 1995 in Sharnbrook to survey West Wood, a large area of apparently suitable habitat in the north of the county. Signs of dormice were not found on the day but nestboxes were erected at a later date to confirm the result.

A children's dormouse day was organised at Whipsnade Wild Animal Park as part of their Saturday Club. The children listened to a talk on dormice and then built nest-boxes which have since been erected at sites around the Park's perimeter.

A third dormouse day was organised in October 1995. This included an update on the activities being carried out in the three counties Northamptonshire, Cambridge-shire and Bedfordshire, followed by a survey of Brampton Wood in Cambridgeshire to find signs of dormice and check boxes.

Since March 1995, over 100 nestboxes have been erected in woods within the known range. Recently another 100 boxes have been built and erected in hedgerows in Whipsnade and Studham. These have been put in a range of different hedges to assess the relevance of the following in relation to dormouse distribution; the diversity of shrub species, the structure and management of the hedge, seasonality of use of a hedge and the importance of connectivity to other suitable habitat. This additional information will help determine the factors that explain the existence of dormice in hedgerows and provide more detailed information on population size and viability to allow effective monitoring.

Dormice hibernate on the ground but in their active periods they seem to like these ready made homes, even using them to breed in. Nestboxes are an useful tool when surveying for dormice. Hazel nuts are an obvious clue to the presence of dormice but, in the absence of hazel, nestboxes can show if dormice are in residence in the area.

A number of records from box checks in 1995 have been collated. Out of 100 boxes checked, 43 had been used. Twenty-eight had been used by birds, four had dormice in, another six had woven nests in most likely to be dormice and the remaining 57 were empty apart from droppings which were likely to be from small mammals.

Landowner liaison

Working with landowners is an important part of the Project's work. Without their co-operation, allowing access onto their land and providing invaluable information on hedgerow management past and present, the project could not operate.

A meeting was held in March 1996 for the landowners of Whipsnade and Studham. The progress of the project was reported upon and vital information about hedgerow management was gained. Permission was also granted to put up nestboxes in a range of hedgerows in the area. At present there is no advice available to landowners on how to manage their hedgerows for the benefit of dormice. This meeting attempted to gain information about the needs of the farmer in terms of management. It is uneconomic to expect a farmer to leave a hedge for 10 years or so before any management. In general the preferred management was to flail the sides of a hedge regularly, every one to two years and coppice every 10 to 15 years on a rotational basis. Methods of management vary from farm to farm but it is clear that previous management has supported a population of dormice. The question is how to maintain it in the future.

The best we can ask is for the farmers to continue managing their hedgerows, ask them not to drastically change their management and perhaps think about dormice as they are doing so. There is likely to be conflict between managing for a species such as the dormouse and the needs of the farmer. Financial incentives may be the answer to plant new hedgerows and improve those that exist.

The future

The re-introduction of dormice into suitable habitat has been successful in some areas. In Bedfordshire, work has focused on finding information on the range of the population in the county and how existing habitat can be maintained and enhanced.

Further survey and landowner liaison is required to discover more about the ecology of the dormice in Bedfordshire's hedgerows. The flexible nature of the project and its ability to adapt will help it in the future to improve the habitat for dormice and come up with the answers to our questions.

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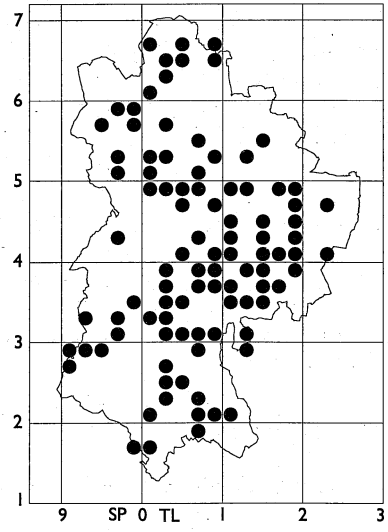
IRVING, P. *Bedfordshire Dormouse Project – Hedgerow Survey 1995*, The Wildlife Trust for Bedfordshire August 1995

Address: Michelle Edwards, The Wildlife Trust for Bedfordshire, Priory Country Park, Barkers Lane, Bedford MK41 9SH.
Cliff Tack, 1 Gate Cottage, Whipsnade Wild Animal Park, Dunstable LU6 2LF.

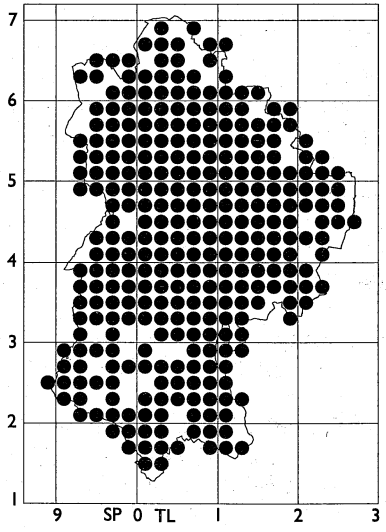
MAMMALS – BATS
Report of the Recorders

Introduction

In 1995 bats were recorded in 96 tetrads. This is comparable with previous years: 1994 – 94, 1993 – 88, 1992 – 88, 1991 – 101 and 1990 – 98 tetrads. 1995's records are evenly spread across the county.



Bat records for 1995



Bat records from 1987 to 1995

Distribution of bat records

Earliest active bat record

11 January — An unconfirmed Brown Long-eared Bat was seen flying at The Lodge, Sandy TL1846 by Andy Thorpe.

Latest active bat record

2 December — An unconfirmed Pipistrelle was seen flying at Priory Country Park TL0648 by David Kramer.

Unidentified bats

There were 35 records of unidentified bats from around the county. Twenty-one of these were flying bats, eight were roosts, three were bats flying in buildings, two were grounded bats, and one was a large bat caught in a mist net by a bird ringer.

Daubenton's Bat *Myotis daubentonii* (Kuhl, 1819)
Confirmed records: 4 maternity roosts, 2 hibernation sites
Unconfirmed records: 3 sightings of flying bats
Earliest active bat: 3 April
Latest active bat: 25 September
Hibernating bats: January and December

The originally discovered roost at Stockgrove Country Park, SP916288, peaked at 67 bats on 15 May. The following week the bats had all moved to the low roost SP917288 where 83 bats were counted out. The bats were not recorded in the low roost again, but returned to the original roost. Young were recorded in this roost on 12 June. A few bats were also reported from a third roost SP920293 on 22 July. The fourth confirmed maternity roost was at The Lodge, Sandy TL190481. Two dead babies were found below this roost on 15 June. All four roosts were in ex-woodpecker holes in oak trees.

Bats were found hibernating in Woburn ice-house and Old Warden Tunnel. Only single bats were seen.

The three records of flying bats were all over water.

Natterer's Bat *Myotis nattereri* (Kuhl, 1818)
Confirmed records: 9 hibernation sites
Unconfirmed roosts: 2 maternity roosts
Hibernating bats: January, February and December

The two maternity sites were both in churches: Edworth Church, TL222406 and Pavenham Church SP991560.

Hibernating Natterer's Bats were identified in Moggerhanger ice-house, Silsoe ice-house, Woburn ice-house, Woburn rockery tunnel, Woburn culvert, Linslade wine cellar, Barton lime-kiln tunnel, Southill ice-house and Old Warden Tunnel. The maximum number seen together was 10 in Silsoe ice-house.

Although this species is uncommonly found in the summer, it is the commonest species recorded in the winter.

Noctule *Nyctalus noctula* (Schreber, 1774)
Confirmed records: 1 roost
Unconfirmed records: 4 sightings of flying bats
Earliest active bat: 17 April
Latest active bat: 16 September

Noctules were reported in the Scot's Pine roost at Stockgrove Country Park SP916290 between 12 June and 19 June. They peaked at nine on 14 June. Flying bats were also monitored over the lake at Stockgrove where they were recorded between 17 April and 11 September. A maximum of seven were seen in flight.

All the flight records were of single bats flying at dusk over water.

Pipistrelle *Pipistrellus pipistrellus* (Schreber, 1774)

Wherever possible, pipistrelles were identified to 'bandit' or 'brown' type. Bats were identified using criteria established by Bristol University.

'Bandit' Pipistrelle

Confirmed records: 4 summer roosts, 15 sightings
Unconfirmed records: 10 sightings

The four roosts were: under boardings on a house in Haynes peaking at 59, in a house in Ampthill (28 emerged), in Cardington Church, and bats found when work was done on a house in Milton Bryan in March.

The confirmed sightings were all of injured bats, except for two bats mist-netted at Stockgrove Country Park on 1 May.

The 10 unconfirmed records were all of bats identified in flight.

'Brown' Pipistrelle

Confirmed records: 2 summer roosts, 6 sightings
Unconfirmed records: 4 sightings

One roost was found in a house in Oakley TL010533, and two bats were seen in a bat box at Priory Country Park, Bedford.

Four bats were found injured: one was found on the radiator grille of a lorry and released, and three were mist-netted at Stockgrove Country Park on 1 May.

Bats were identified in flight at four sites.

Pipistrelles not identified to type

Confirmed records: 5 summer roosts, 4 sightings
Unconfirmed records: 15 summer roosts, 2 winter roosts, 11 sightings

Summer roosts

Most of the summer roosts were in houses – usually under the eaves, but also in other places, such as over the door. The following counts were made:

29 May	50+	Vicarage Close, Langford
10 Jul	204	High Street, Sharnbrook
13 Jul	250+	Becher Close, Renhold
25 Jul	100+	Sycamore Road, Houghton Regis
1 Aug	12–15	Alton Road, Luton

Other summer roosts were in churches (nine) including bats found roosting behind a large wooden noticeboard in a church porch, in a farm building and in a mobile home.

Winter roosts

Two winter roosts were discovered when the soffit boards on houses were removed.

Sightings of bats

Nine were of flying bats, four of grounded, injured or dead bats, and two were reports of bats found inside houses.

Nathusius' Pipistrelle *Pipistrellus nathusii* (Keyserling and Blasius, 1839)

Confirmed record: 1 dead bat

A dead female Nathusius' Pipistrelle was found by Vivien Bayley at her house on Lower Shelton Road, Marston Moretaine SP994416 in April. She found the bat in her back garden and sent it to Joan Childs because she thought it looked a little bigger than the bats her cat normally brought home. The identification was confirmed by Tony Hutson of The Bat Conservation Trust. This is the first bat of this species for Bedfordshire.

Brown Long-eared Bat *Plecotus auritus* (Linnaeus, 1758)
Confirmed records: 4 summer roosts, 6 winter roosts, 8 sightings
Unconfirmed records: 10 roosts, 2 flying bats
Hibernating bats: January, February and December

The 14 summer roosts were in churches (6), loft spaces of houses (3), barns (2), the loft of a manor house, a farm, and a window beneath a known roost site in the loft of a gatehouse.

The six winter roosts were in Moggerhanger ice-house, Southill ice-house, Silsoe ice-house, Old Warden Tunnel, Whipsnade bear pit (a new site in a specially-made fan-shaped hibernation box) and a dead bat found under a known summer roost, where presumably it had been hibernating.

The sightings were seven dead, injured or grounded bats, two seen in flight and one bat caught in a mist net at Eaton Bray by bird ringer Graham Buss on 30 July.

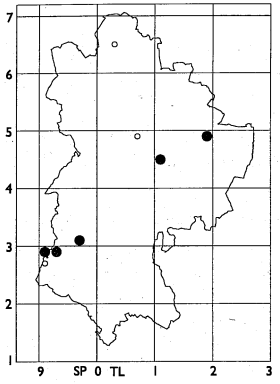
Barbastelle *Barbastella barbastellus* (Schreber, 1774)
Confirmed record: 1 hibernation site

One hibernating Barbastelle spent the whole winter 1995/96 hibernating in Old Warden Tunnel TL113447, a new site for this species. This is only the sixth record for Bedfordshire this century.

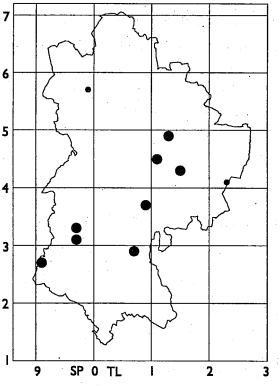
JOAN CHILDS and TONY ALDHOUS

Key for species distribution maps

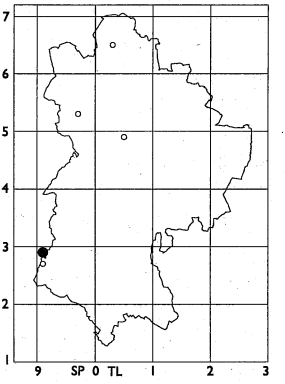
- ● Confirmed roost
- ⊙ Confirmed bat and unconfirmed roost
- ◎ Confirmed bat
- · Unconfirmed roost
- ◦ Unconfirmed bat



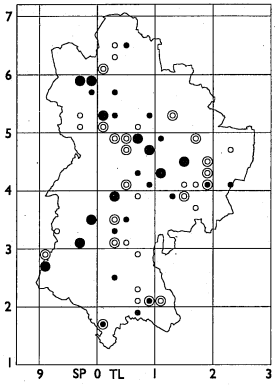
Daubenton's Bat



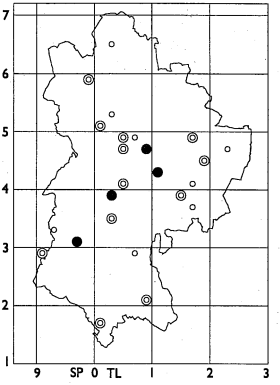
Natterer's Bat



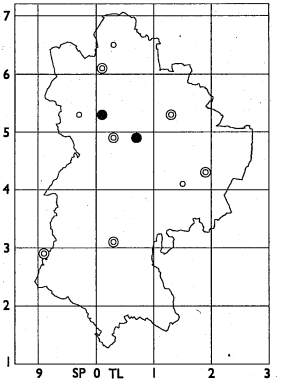
Noctule



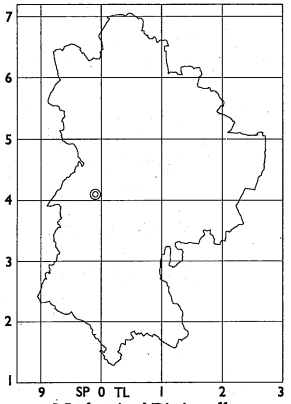
Pipistrelle



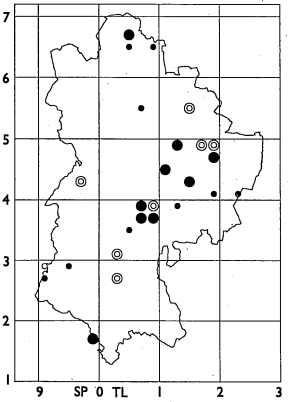
'Bandit' Pipistrelle



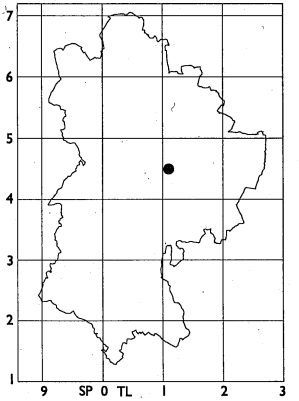
'Brown' Pipistrelle



Nathusius' Pipistrelle



Brown Long-eared Bat



Barbastelle

FISH
Report of the Recorder

This report for the year 1995 includes reviews of the River Ouzel and the upstream stretches of the Great Ouse from Turvey to Bedford followed by additional notes of several species of particular interest and a listing of new tetrad records obtained during the year. Following what has become established practice scientific names will only be given with the initial mention of each species, established common names being otherwise used throughout.

THE RIVER OUZEL

Only a comparatively short stretch of the River Ouzel is within Bedfordshire and actually forms the county boundary at one point. This constitutes a stretch of the river well upstream and to the source which lies within our county and as such does not support the diversity of fish species to be found further downstream, especially towards the confluence with the Great Ouse at Newport Pagnell in Buckinghamshire.

Recent National Rivers Authority (NRA) surveys of the river have shown chemical water quality to be moderate to good and biological quality to be good to excellent at all sites.

Overall the Roach, *Rutilus rutilus*, is the dominant species numerically in the Ouzel and remains so in the Leighton Buzzard area although a significant decline in numbers is apparent when compared to the previous survey of 1987.

Further upstream towards Billington the Gudgeon, *Gobio gobio*, is numerically dominant followed by the Dace, *Leuciscus leuciscus*, although the Pike, *Esox lucius*, contributes the greatest percentage by weight to total fish biomass in the Bedfordshire Ouzel; overall the Chub, *Leuciscus cephalus*, is the dominant species by weight but is not found in the Bedfordshire stretch of the river.

The Dace is usually associated with swiftly flowing water and fish from all year classes since 1988 were noted although fewer in number than would normally be expected which is in line with the general decline suffered by this species in recent years.

An interesting first record from this site is of the Brown Trout, *Salmo trutta*, referred to in greater detail in 'Additional Notes'.

A total of eleven fish species were recorded from this site this year as follows: Pike, Roach, Gudgeon, Dace, Brown Trout, Perch *Perca fluviatilis*, Minnow *Phoxinus phoxinus*, Bullhead *Cottus gobio*, Stone Loach *Noemacheilus barbatulus*, Three-Spined Stickleback *Gasterosteus aculeatus*, Tench *Tinca tinca*.

THE RIVER GREAT OUSE FROM TURVEY TO BEDFORD

The meandering course of the upstream stretch of the River Great Ouse from Turvey where it enters our county to Bedford may be regarded as our most important site where the wide range of habitat type provided supports a great diversity of fish species; a total of 21 of the 29 species recorded from the county are to be found in this stretch of the river.

Recent NRA surveys show water quality to be good to excellent at this site and since the first routine fish survey of this stretch of the river was undertaken in 1985 total fish biomass has increased from 17.7gm^2 to 22.5gm^2 with an associated increase in fish density.

The Roach remains numerically the dominant species and has increased in recent years now recording a figure of 56% of total fish density. Roach together with Pike, Perch and Chub are found all along the river from Turvey to Bedford with the last three species maintaining a constant level of density for several years past. Chub are particularly well represented at Turvey and Oakley where conditions are most suitable with some fish from the 1976 year class still present.

Common Bream, *Abramis brama*, were located at 50% of sites sampled this year and it is pleasing to be able to record that the recent resurgence of this species appears to be continuing.

The Barbel, *Barbus barbus*, must be accounted the most successful species in recent years and has now achieved the highest population level ever recorded for this species at this site now accounting for 19% of total fish biomass. Fish from every year class since 1981 are included showing continuous spawning success and some very large individuals have been noted at Turvey and Radwell. The species is now represented all along the river from Turvey with occasional specimens found as far downstream as Kempston Mill and Bedford. Below Bedford the habitat may prove to be less suitable although a large number of juvenile fish have been recently introduced.

As noted last year there has been some general decline in the number of Gudgeon although this small species is still present almost throughout this stretch of the river. The previous survey of 1992 showed the species to contribute 8% towards total fish density but numbers have now reduced to record a negligible figure.

It is pleasant to note that the Silver Bream, *Blicca bjoerkna*, was recorded this year from 5 out of 13 sites sampled which also provided four new tetrad records. This species has always been considered to be more common downstream from Bedford where the water tends to be slower and deeper but these new records show an equality upstream and downstream although numbers remain insignificant everywhere. The Silver Bream is mentioned again in 'Additional Notes'.

Dace and Bleak, *Alburnus alburnus*, are two species generally requiring somewhat different conditions, the former usually preferring faster flowing water and the latter slow moving deeper water. Numbers of Dace are generally low in line with an overall decline in recent years but the species was recorded from 11 out of 13 sites sampled.

The Bleak was found at 8 out of 13 sites sampled and although only recording a small percentage of total fish biomass the species is often prolific where conditions are suitable.

Interestingly, although both Rudd, *Scardinius erythrophthalmus*, and Common Carp, *Cyprinus carpio*, have been recorded in the past from several locations along this stretch of the river none were found this year.

A total of 15 species and one hybrid were recorded at this site this year as follows: Roach, Pike, Tench, Perch, Gudgeon, Chub, Dace, Stone Loach, Barbel, Bullhead, Common Bream, Silver Bream, Bleak, Ruffe *Gymnocephalus cernua*, Eel *Anguilla anguilla*, Roach/Common Bream hybrid.

ADDITIONAL NOTES OF SPECIES OF INTEREST

In addition to earlier comments, several species merit additional mention this year.

Three-Spined Stickleback and Ten-Spined Stickleback

In the past these two species have frequently been referred to as under-recorded which is undoubtedly the case.

The Three-Spined Stickleback has been found at a number of sites this year and has provided six new tetrad records. There is no doubt that this species is common in the county and further searching should provide evidence of widespread distribution. The closely related and similar Ten-Spined Stickleback, *Pungitius pungitius*, has once again proved elusive and there are no reports for this year. However, we still feel that this is due to under-recording rather than scarcity, although this species is probably less widespread than the former species.

Rainbow Trout

The Rainbow Trout, *Salmo gairdneri,* is an introduced North American species which seldom establishes a self-sustaining population in this country and can therefore be present at a site for several years before fading away, unless re-introduced.

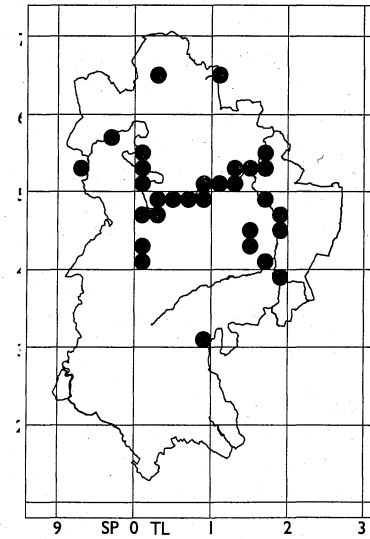
Although the species has now been recorded from eleven tetrads in the county, there is only one known current site, apart from commercial establishments, which is that found for the first time this year at a small stream near Shillington.

The species' presence can probably be accounted for by that stream flowing through a lake in a private estate a few miles away which has recently been stocked. It appears that some escapees have made their way along the stream for several miles although at points there is hardly sufficient depth of water to harbour fish of such size.

Eel

The Eel is confined to the northern half of the county as far as is known with the exception of a single record obtained this year of a specimen seen at Rectory moat in Barton le Clay.

There are many small streams in this area which rise at the foot of the chalk downland running across the south of the county and which are accessible eventually from the River Great Ouse via its tributaries. None the less this fish must have followed a devious route to reach Barton le Clay. A glance at the tetrad map will show the species' association with the Great Ouse so that any record away from the usual area is of particular interest.

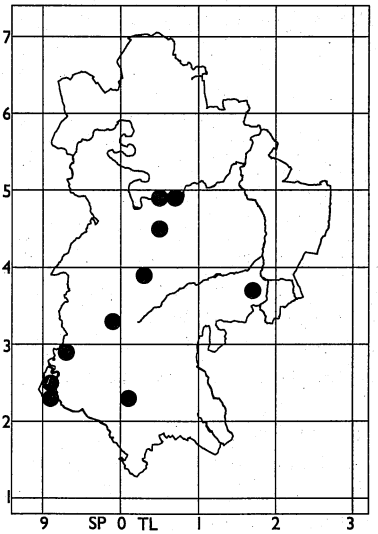


The above tetrad map indicates the close association of the Eel *Anguilla anguilla* with the Great Ouse and its tributories with the exception of one record in TL03V

Wels or Danubian Catfish

The Wels, *Silurus glanis*, was first introduced into this country via lakes within the Woburn Abbey estate about the end of the last century and since that time the species has been widely introduced throughout the country to provide angling sport interest.

This year our county has provided an exceptional fish which has been accepted as a new British rod-caught record for this species; this was a specimen of 57lb 8oz in weight taken from a pool near Henlow. Although this fish is unusually large for this country, several specimens exceeding 50lb in weight were found when a lake at Woburn was drained during November 1947. In central and eastern Europe, where the species is a native of large rivers and still water, fish exceeding 300kg in weight are known to occur.



The above tetrad map indicates all recorded sites for the Wels *Silurus glanis* correct at 31 December 1995

The tetrad map shows all known sites for the Wels in the county, but there is no doubt that small numbers of fish have been introduced into many other still water sites for angling purposes and as yet are unrecorded.

Stone Loach and Spined Loach

The report of last year mentioned a particular requirement to record the two loach species and this year the Stone Loach has been recorded from widely differing sites providing three new tetrad records for the species. Although rarely seen unless searched for we feel that this species is in fact widely distributed in the county and very much under-recorded.

Once again there were no reports of the Spined Loach, *Cobitis taenia*, which continues to be the scarcest of species native to this county. Although undoubtedly the Spined Loach will prove to be under-recorded, we are equally certain that this is truly a rare species with a very limited distribution in the county although possibly numerous where it does occur as often appears to be the case with species considered scarce.

Bullhead

The Bullhead is another small species which has always been regarded as very much under-recorded in the county and the nine new records obtained this year increase the recorded distribution of the species by almost 50%. Although often considered to be a species typical of small fast flowing streams we believe it to be equally common in our larger rivers with four of this year's records being from the Great Ouse, Ivel and Ouzel, although, as the Bullhead is of no angling value, it is rarely noticed in that type of habitat unless purposely searched for.

Silver Bream

The Silver Bream is a comparatively scarce species in this country and of particular interest as the Great Ouse river system throughout the East Anglian region is a major stronghold. The Silver Bream has been recorded from the short Bedfordshire stretch of the River Ouzel many years ago but the most recent survey unfortunately revealed the species at only one site close to the confluence with the Great Ouse in Buckinghamshire. This should not necessarily be taken as an indication of the loss of the species in the Bedfordshire Ouzel as the two bream species shoal and are subject to considerable movement within a habitat thus rendering the fish notoriously difficult to locate and accurately assess.

Elsewhere the species has been recorded this year from the River Great Ouse where some increase in distribution is apparent as previously described and also two specimens were taken from the main lake at Priory Country Park, Bedford, a still water site and as such a little unusual for this species.

Brown Trout

As mentioned earlier the Brown Trout has been recorded this year for the first time from a site on the River Ouzel at Billington; none were found further downstream. The only other known locations for the species in the general area is the River Great Ouse at two sites in Buckinghamshire well upstream from Newport Pagnell where self-sustaining populations exist. Access is possible to the upper reaches of the Ouzel from the Great Ouse but it is somewhat difficult to account for this new record.

Mention was made in the 1993 report of several specimens seen in the Great Ouse below Bedford but there have been no further sightings since that time suggesting that the species failed to establish at that site as might be expected.

It is unlikely that the species has ever been truly native to our county and nowadays the Rainbow Trout is the preferred species at commercial fish farms and private fisheries in our area with the result that Billington is presently the only known location for the Brown Trout in Bedfordshire.

Zander or Pike Perch

One Zander, *Stizostedion lucioperca*, of approximately 5lb in weight was taken this year from the main lake at Priory Country Park, Bedford. The Zander was first recorded at this site last year together with several specimens from the River Ivel which may indicate the spread of the species into Bedfordshire from Cambridgeshire by way of the Great Ouse, although access would be difficult due to water flow obstructions. All other known sites for the Zander in the county are lakes or flooded pits.

The species is a voracious predator and can cause problems if uncontrolled, as has happened in the Fenland areas of East Anglia, and so this development may not be entirely welcome.

Brook Lamprey

There are eight species of freshwater lampreys, Petromyzonidae, native to Europe of which three, including the anadromous Sea Lamprey, *Petromyzon marinus*, are found in Britain. These are strange fishes which undergo a metamorphosis during their lives. All

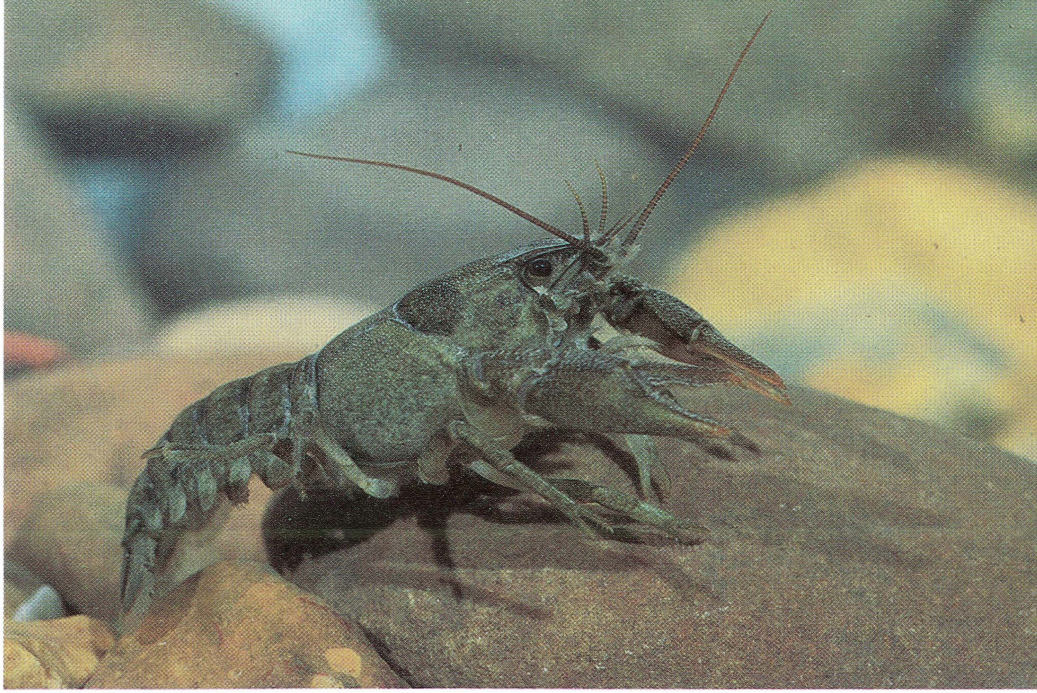
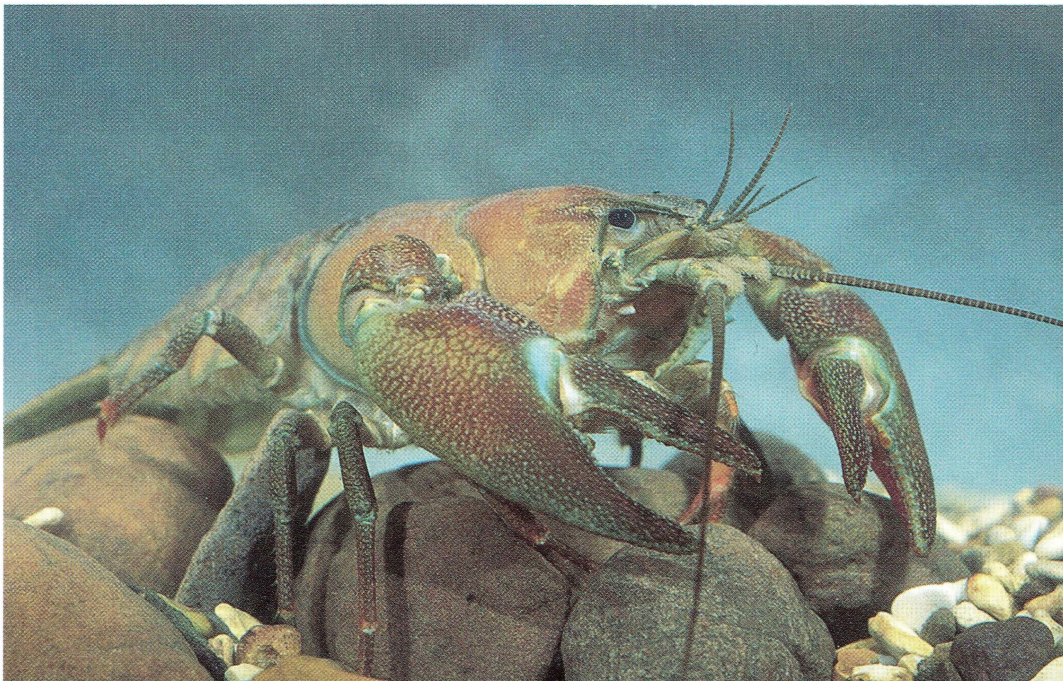


Plate 1: The White-clawed or Atlantic Stream Crayfish, *Austopotomobius pallipes*, our only native British crayfish is a threatened species. It is protected under the Wildlife and Countryside Act 1985, Schedule 5. (p. 52)
Plate 2: The Signal Crayfish, *Pacifastacus leniusculus*, is a North American species that has succeeded in establishing wild populations in Britain. It is now illegal to introduce them without a licence, or to allow them to escape into the wild. (p. 52)
Photos: Richard Revels



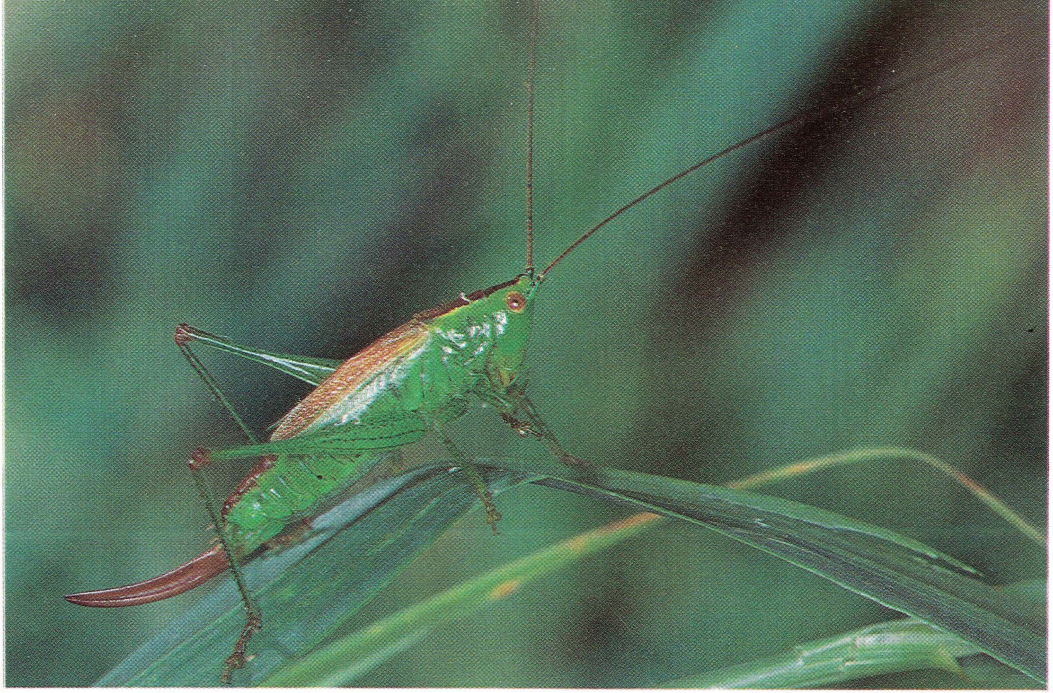


Plate 3: A female Short-winged Cone-head, *Conocephalus dorsalis*, Flitton Moor, 30th July 1995. Previously only recorded in the county at Flitwick Moor, they have now extended their range along the River Flit to Flitton Moor. (p. 55)
Plate 4: Flitton Moor TL056360, 30th July 1995. Purchased in 1987, this area of former agricultural land is managed by the County Council as a Nature Reserve. Ponds were excavated and the existing ditch system dammed to raise the water table. (p. 55) *Photos: Richard Revels*

other European fishes have mouth parts with a fixed upper and a hinged lower jaw, but the lampreys possess no lower jaw; the whole mouth is surrounded by a sucking disc which, in the adult form, is furnished with rasping teeth. Lampreys are all characteristically eel-like in appearance and have no paired fins or scales on the body; there are no bones and the skeleton is made up of flexible cartilage.

In the adult form some species are parasitic on other fishes, attaching themselves by the sucking mouth parts, and can cause great damage to commercial fisheries, but the Brook Lamprey, *Lampetra planeri*, does not feed in the adult form dying soon after spawning.

After hatching the young larvae, known as ammocoetes, burrow into the river silt where they remain for three to five years living on filtered organic material as they have undeveloped mouth parts and teeth and are blind. In this state they are wormlike and difficult to find. Eventually the final form develops, metamorphosis taking just a few weeks, and the fish is then able to swim and has full vision.

A reference was made in the conclusion of the 1994 report to the possibility of recording the Brook Lamprey in the county. This has not yet materialised, but the NRA reports the species to be present this year at two sites on the River Great Ouse upstream from Newport Pagnell. As the location is so close to our county the species may yet be encountered in the Bedfordshire stretch of the river, the area from Turvey to Odell being most probable.

Following is a list of all species for which a new tetrad record has been obtained this year. The figure in brackets shows the total number of tetrads recorded for that species, correct as at 31 December 1995.

Wels TL04U, TL13T, SP92J (10)
Stone Loach TL13H, SP95M, TL14X (21)
Rainbow Trout TL13H (11)
Barbel TL05B, TL04I (12)
Dace SP95M, SP92K, SP92C (37)
Common Bream SP95N, TL04I, TL04M (54)
Silver Bream SP95N, TL05C, TL05G, TL04I (14)
Bullhead SP95M, TL03R, TL24K, SP95G, TL13G, TL13H, TL14X, TL24S, SP92C (28)
Common Carp TL03Z, TL05K, TL05F, TL04M (46)
Roach TL03Z (73)
Rudd TL03Z, TL05K, TL04M, TL03K (52)
Perch TL03Z, TL04M, SP95N (71)
Three-Spined Stickleback TL13F, TL24K, TL13G, TL14U, TL24S, SP92K (44)
Eel TL03V, TL05C (30)
Minnow SP92C, SP92K (21)
Brown Trout SP92K (3)
Ruffe SP95M (25)
Pike SP95N (58)
Tench TL05B, TL04I (54)
Chub SP95N (36)
Crucian Carp *Carassius carassius* TL02P (16)

CONCLUSION

This year has proved particularly successful from a recording point of view with 57 new tetrad records obtained for various species . In addition there were several new site records within tetrads for which a record already exists together with a large number of confirmatory records.

Regarding our linear water, stocks of Cyprinid species remain high with the increasing numbers of Barbel especially noteworthy. This species in particular is highly regarded and sought after by anglers, and the upstream stretch of the Bedfordshire Great Ouse must now rank as one of the foremost Barbel waters in the country.

Generally the condition of linear and enclosed water in the county remains good and unless there is a major pollution incident or other problem, possibly linked to climatic conditions, it is reasonable to take an optimistic view of the future of our fish species.

ACKNOWLEDGEMENTS

Thanks to the following individuals for their help, information and permission to enter private land:
R. Bates, Mr and Mrs Beachener, G. Bellamy, M. Clarke, Ms T. Game, Lady Hanbury, P. Madgett, Mr and Mrs Moore, E. Newman, H. Oliver, N. Perkins, A. Peterkin, R. Revels, Mr and Mrs Rust, R. Spendlove, A, Taylor, T. Thomas, J. Wilson, E. Winter, and the Environmental Agency.

HARVEY R. WINTER

FRESHWATER CRAYFISH
Report of the Recorder

INTRODUCTION

The few years following the decision to record freshwater crayfish in the county on a systematic basis proved largely unfruitful but this year, 1995, has witnessed the positive identification of two alien species and, most importantly, the discovery of the White-clawed or Atlantic Stream Crayfish, our only native species.

The initial report for 1992 outlined the reasons for the perceived need to record crayfish but it will be well to reiterate briefly the facts here.

The introduced North American species, principally the Signal Crayfish, although apparently immune themselves, are carriers of the fungus which causes a virulent disease known as Crayfish Plague which, if transmitted, invariably proves fatal to our native species. In addition, the fungus spores are easily spread by contaminated equipment, muddy boots, nets etc. which can aggravate the situation.

The Signal Crayfish in particular is a highly fertile, aggressive species which is able to advance its range rapidly to the detriment of the native species. The alien species, of which there are four at present, were originally introduced principally as a commercial crop to satisfy the demands of the restaurant trade. It is now illegal to introduce any of these without a licence or allow them to escape into the wild. In addition, the native species is considered threatened and is protected (Wildlife and Countryside Act 1981, Schedule 5), a licence being required to take or handle it in Britain.

SITES SURVEYED DURING 1995

During the year a number of sites were examined for which historical records of crayfish exist (referable to the White-clawed species) together with some new sites following recent information.

The River Great Ouse at Turvey and several locations on the River Ivel were visited and the infant River Rhee or Cam near Biggleswade received particular attention together with several small stream sites in the general area of Barton le Clay.

THE RIVER GREAT OUSE

It was thought that the site on the Great Ouse at Turvey might well prove productive as a comparatively recent record exists from that area of an unconfirmed species and also the Signal Crayfish is reported by the National Rivers Authority (NRA) to be present this year further upstream in Buckinghamshire.

No crayfish of any species were found during this survey.

THE RIVER IVEL

Records secured early in this decade show crayfish of an unidentified species to have been present in the River Ivel at Blunham and Biggleswade at that time but although this stretch of the river was searched at several locations this year no trace of crayfish was found.

Of course, the negative results at the Great Ouse and Ivel sites this year are not conclusive and should not be taken as an assertion that crayfish are absent but simply that none were found.

THE RIVER RHEE OR CAM

The River Rhee which rises at Ashwell and actually forms the county boundary for a short distance was considered a promising location for the native species but extensive enquiries with landowners and a search of the river itself failed to show any positive results.

In this instance it is with some confidence that we report no crayfish to be present at this site within our county although several populations of the native White-clawed species are known a little further downstream in Cambridgeshire.

THE BARTON LE CLAY AREA

The two small stream sites near Barton le Clay and Pegsdon, where positive records of the native species exist from comparatively recent years, were searched but no trace of any crayfish was found.

It was disappointing to see that the condition of the stream at Barton le Clay must have deteriorated since the old record was obtained and it was no surprise to find the loss of the species at this site in its present condition.

Several other small streams in the general area were inspected which in two instances were found to be completely dried up, no doubt due to the drought conditions experienced this summer.

A reliable source reported the presence of good numbers of crayfish in a pond close to Barton village but as this site is situated on private property it has not yet proved possible to identify the species.

There is a network of small streams which rise at the foot of the chalk hills in the south of the county and which run the few miles to connect with the Rivers Flit and Ivel, and thus eventually the Great Ouse; all three crayfish species recorded this year were found within this area and are detailed below.

White-clawed or Atlantic Stream Crayfish *Austopotamobius pallipes*

The White-clawed is the only crayfish species native to the British Isles. Although widespread in England it is absent from the western counties, west Wales and parts of Ireland and is not found in Scotland although areas of suitable water do exist. Comparatively hard or alkaline water is generally preferred with some shelter available, such as rocks or tree roots. The animal will also burrow if the bank side proves suitable.

One adult female specimen was found this year at a small stream site a few miles from Barton le Clay and this constitutes the only confirmed recent record. We feel the species maintains only a precarious presence at this site and as the Signal Crayfish is present in a connected stream the native population may have a limited survival time. It is difficult to visualise any assistance that can be given to protect or support this colony at this location. (Plate 1)

Signal Crayfish *Pacifastacus leniusculus*

The Signal is often referred to as the French Crayfish but it is in fact a native of North America and attains a considerably larger adult size than *A. pallipes*; that is about 15cm. This species was found to be present in large numbers ranging from juveniles to adults at a small stream site near Shillington. At one spot some individuals proved extremely bold and could be seen rising to the surface of the water to seize floating bread.

This site was visited again several weeks later and there then appeared to be a reduction of numbers possibly attributable to the attentions of a Grey Heron which had been observed fishing the stream for several days previously. (Plate 2)

Red Swamp Crayfish *Procambarus clarkii*

One crayfish of some exotic species was picked up from the A6 north of Barton le Clay and taken to Bedford. This was subsequently traced and identified as Red Swamp Crayfish. The species is sometimes offered for sale by the aquarist trade named 'Red Lobsters' and as there is a stream running close beside the roadway where the specimen was found it is very probable that this was an unwanted aquarium pet released into the wild and which subsequently made its way onto the road.

The Red Swamp Crayfish is another large North American species which in the wild has a preference for still water conditions and has a burrowing habit. It has been introduced on a large scale world-wide and has caused environmental damage in some countries. The species can and does survive in the wild in this country and has become established at a few locations although as yet there is no evidence of successful breeding activity.

NOTES OF UNCONFIRMED RECORDS DURING 1995

A report was received of crayfish currently present in the Grand Union Canal at Leighton Buzzard although once again the species was unknown. During the 1950s and '60s the native species was common in the canal both north and south from Leighton Buzzard but it is probable that at such a site the Signal Crayfish will be widespread if it has not entirely replaced the native species.

It is also reported that crayfish exist in large numbers at an enclosed still water site near Henlow but there, once again, the species will probably prove to be Signal.

Finally. an interesting item of information was received concerning the River Lea in the extreme south of the county. This site has long been associated with crayfish and in recent times the native species was present in the short stretch of river as it exits from the Luton Hoo estate until flowing into Hertfordshire.

This year the Signal Crayfish has been found a short distance downstream at Batford, just out of our county. Being so close it is very probable that this population has already or will shortly extend its range to include the Bedfordshire stretch of the river, where the native species was only recently eliminated by sewage discharge, and may thus be recorded in due course.

OTHER INTRODUCED SPECIES

Two further introduced species have succeeded in establishing populations in the wild in this country, namely the Noble Crayfish, *Astacus astacus*, and the Narrow-clawed or Turkish Crayfish, *Astacus leptodactylus*, both natives of mainland Europe. The Noble Crayfish is established at a number of still water sites and there are expanding populations of the Turkish Crayfish in the London area although neither species has yet ben discovered in Bedfordshire.

CONCLUSION

The spread of the Signal Crayfish appears destined to continue within the county together with the continuing decline of the White-clawed Crayfish, and it is entirely possible that one of the other introduced species may yet be encountered. We consider that isolated communities of *A. pallipes* remain to be discovered but although it is included in the European Habitats and Species Directive which requires designation of protected areas it is unclear how this can be achieved with the type of habitat probably involved within Bedfordshire. The immediate requirement remains to establish exactly where the various species exist and to record distribution before any further action can be considered or taken.

ACKNOWLEDGEMENTS

Thanks to the following individuals for their help and information and permission to enter private land, particularly to Richard Revels whose enthusiastic assistance with field work is much appreciated:
Mr and Mrs Beachener, G. Bellamy, Mr and Mrs Bunnage, S. Burns, T. Clough, J. Comont, P. Glenister, Lady Hanbury, Miss S. Hogarth, J. Leath, Mr and Mrs R. Moore, E. Newman, H. Oliver, A. Peterkin, R. Revels, M. Russell, R. Spendlove, A. Taylor, E. Winter, and the Environment Agency.

HARVEY R. WINTER

GRASSHOPPERS AND CRICKETS (Orthoptera)
Report of the Recorder

1995 was another very good year for new records for most species, especially Speckled and Dark Bush-cricket, Field and Meadow Grasshopper. Roesel's Bush-cricket had a brilliant year with 28 tetrads. It also saw the first records for Short-winged Cone-head outside Flitwick Moor and the return of a species, thought to be extinct in the county . . . Stripe-winged Grasshopper.

Oak Bush-cricket *Meconema thalassinum*

Recorded in 19 tetrads from 9th August to 29th September at TL02C, TL02K, TL03D, TL03E, TL03J, TL03T, TL03V, TL04J, TL04U, TL05A, TL06A, TL06B, TL06H, TL06I, TL06M, and with four previously unrecorded tetrads, which are:

TL04G	Coronation Pit, Stewartby
TL06C	Penn Wood, Melchbourne
TL06G	Worleys Wood, Melchbourne
SP95M	Carlton

Dark Bush-cricket *Pholidoptera griseoaptera*

Recorded in 36 tetrads from 20th July to 10th November at TL02N, TL02U, TL02Q, TL03D, TL03K, TL03M, TL03N, TL03P, TL03Q, TL03T, TL03V, TL04G, TL04F, TL02K, TL04U, TL06A, TL06B, TL06C, TL06G, TL06H, TL06I, TL06L, TL06M, TL14K, TL14Q, and with 11 previously unrecorded tetrads, which are:

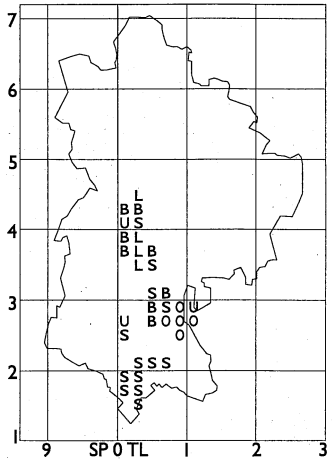
TL02C	Dunstable Sewage Works
TL02F	Blows Downs, Luton
TL02Z	Barton Hills
TL02S	Leagrave Marsh, Luton
TL02M	Sundon Park, Luton
TL03E	Millbrook
TL03J	Ampthill Park
TL04H	Chimney Corner, old brickwork site
TL06D	Yelden Spinney
TL14Q	Stanford Wood
TL15K	"The Fountains", Blunham

Roesel's Bush-cricket *Metrioptera roeselii*

The fifth year of this species in the county, and what a year, with records for 28 tetrads and with 18 previously unrecorded tetrads, from July to late September.

		No.	Form
TL01D	Whipsnade Zoo	4	Unknown
TL01E	Whipsnade Village	2	Short-winged
TL01G, TL01H, TL01I	Studham Village area	5	Short-winged
TL02C	Dunstable Sewage Works	7	Short-winged
TL02D	Dropshort Marsh	6+	Unknown
TL02F, TL02K, TL02Q	Blows Downs, Dunstable	7+	Short-winged
TL02P	Sundon Road, Sundon Hills and area	8	Both
TL02N	Sundon Quarry, Lower Sundon and area	12	Both
TL02U	Sharpenhoe Clappers and Streatley	13	Short-winged
TL12E	Pegsdon Hills	1	Unknown
TL03K	Grange Farm, Sharpenhoe area	2	Long-winged

TL03Q	Sharpenhoe village area	9	Both
TL03H	Steppingley Road, Flitwick	2	Long-winged
TL03M	Flitwick Moor	3	Short-winged
TL03N	Flitton Moor	3, 1 female	Both
TL03P	Fordfield Farm area	10, 1 female	Both
TL03E	Lower Farm area, Millbrook	3	Both
TL03I	Ampthill By-pass	2	Long-winged
TL03J	Ampthill Park	4	Long-winged
TL04A	Millbrook Test Track	3	Unknown
TL04F	Manor Farm, Stewartby	2	Short-winged
TL04G	Coronation Pit, Stewartby	23, 1 female	Both
TL04B	Stewartby Lake	15, 2 female	Both
TL04H	Chimney Corner, old brickwork site	5	Long-winged



Distribution of Roesel's Bush-cricket *Metrioptera roeselii* in Bedfordshire

KEY

S – Short-winged form
L – Long-winged form
U – Unknown
O – Old records
B – Both long and short-winged form

As you can see, the last couple of summers must have agreed with this species a lot. A total of 155 individuals were seen or heard, along with five females for the first time; one of them, a long-winged form, was full of eggs. Most of the records were found in rough grassy areas. The ones in TL02P, TL02N, TL02U area were killed in early August when the grass was cut right back to the hedge line.

Short-winged Cone-head *Conocephalus dorsalis*

Last year I stated that this species was "still only found in one tetrad within the county, TL03M, at Flitwick Moor". I was wrong; not only have they moved out or spread out to Flitton Moor in TL03M but beyond into TL03N, Flitton Moor. Over twenty individuals of both sexes were seen, but on down the River Flit into TL03T near Hollington two males and one female were found. This species could go even further if the rest of the River Flit flood plain was managed. (Plates 3, 4)

Speckled Bush-cricket *Leptophyes punctatissima*

Recorded in 31 tetrads from 9th August to 21st October at TL02C, TL02P, TL02S, TL02U, TL02Z, TL03D, TL03M, TL03N, TL03V, TL03J, TL04H, TL04U, TL05A, TL03E, TL06B, TL06C, TL06D, TL06H, TL14K, TL14Q and with 11 previously

unrecorded tetrads, which are:

SP94X Wootton Wood
TL02K, TL02Q Blows Downs, Luton
TL03K Harlington
TL03I Ampthill By-pass
TL03T River Flit
TL04A Rookery Pit
TL04F Stewartby
TL05F Bromham Lake
TL06A Temple Wood, Knotting Road
TL06L The Slipe and Flint's Wood

House Cricket *Acheta domesticus*

Recorded in two tetrads from July to September at TL01D, Whipsnade, and TL04H, Kempston Brickworks.

Slender Ground-hopper *Tetrix subulata*

Recorded in five tetrads from June to November at TL03M, and with four previously unrecorded tetrads, of:

TL03N Flitton Moor
TL04J Ampthill Park
TL04U Priory Park
TL06H Melchbourne Park

Common Ground-hopper *Tetrix undulata*

Recorded in three tetrads from June to October at TL03M and with two previously unrecorded tetrads of:

TL03N Flitton Moor
TL04H Chimney Corner, old brickwork site

Stripe-winged Grasshopper *Stenobothrus lineatus*

Recorded in one tetrad, on the 5th August at TL02Z, Barton Hills.

In 1953 it was reported as a "scarce and local species from the downs near Whipsnade and the chalk hills near Luton". From 1965 to 1969 it was recorded at Barton Hills by the Nature Conservancy Council in a survey of the site. Then for over thirty years there were no records till September 1991 when they were recorded again at Barton Hills by Graham Bellamy, the Warden. Then this year five were found on the hills again at Barton.

Common Green Grasshopper *Omocestus viridulus*

Recorded in 12 tetrads from 9th July to 23rd September at TL02P, TL02U, TL03K, TL03Q, TL03N, TL03V, TL04U and with five previously unrecorded tetrads of:

TL02F Blows Downs
TL02Z Barton Hills
TL03D Moneypot Hill
TL03J Ampthill Park
TL03T River Flit

Field Grasshopper *Chorthippus brunneus*

Recorded in 33 tetrads from 20th June to 2nd October at TL02C, TL02F, TL02P, TL02S, TL02Z, TL03D, TL03E, TL03G, TL03K, TL03M, TL03N, TL03P, TL03Q, TL03T, TL03V, TL04F, TL04H, TL04U, TL06A, TL06D, TL03I, TL0 , TL02N, TL14K, TL14Q and with eight previously unrecorded tetrads of:

TL02U Sharpenhoe Clappers
TL02M Sundon Park, Luton

TL02K Blows Downs
TL06C, TL06B Penn Wood
TL06G Worley Wood
TL06H Melchbourne Park
TL06I Grange Farm

Meadow Grasshopper *Chorthippus parallelus*

Recorded in 29 tetrads from 20th June to 10th September at TL02F, TL02K, TL02P, TL02U, TL02S, TL02Z, TL03D, TL03E, TL03M, TL03N, TL03V, TL02N, TL031, TL03V, TL04J, TL04G, TL06A, TL04F and with 11 previously unrecorded tetrads of:

TL02M Sundon Park, Luton
TL02Q Cardington, Luton
TL03K Harlington
TL03T River Flit
TL04H Chimney Corner
TL04U Priory Country Park and Fenlake Meadow
TL06B Knotting Wood
TL06H, TL06C Melchbourne Park
TL06D Yelden Spinney and Motte and Bailey
TL06G Worley Wood

Lesser Marsh Grasshopper *Chorthippus albomarginatus*

Recorded in 19 tetrads from 9th July to 23rd September at TL03E, TL03D, TL03M, TL03N, TL03T, TL04F, TL04H, TL04U, TL06I, TL14K, TL14Q, TL15A and with seven previously unrecorded tetrads of:

TL02P Sundon Hills
TL03J Ampthill Park
TL03K Harlington
TL06B Knotting Road
TL06D Yelden Motte and Bailey
TL06G Haring's Farm
TL06H Melchbourne Park

Mottled Grasshopper *Myrmeleotettix maculatus*

Recorded in two tetrads in August at TL03I and at a previously unrecorded tetrad of:

TL03J Ampthill Park

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K. M. SHARPE

50 YEARS OF ORTHOPTERA

A report on Grasshoppers and Crickets over the last 50 years and a look to the future by the Recorder

The first report appeared in 1947 and was by Ray Palmer. Although the article was short, he reported the numbers of grasshoppers and crickets as being 14 species:

"eight short-horn grasshoppers, five bush-crickets and one cricket."

It was not until 1953, when the next report and Ray Palmer's list was published, did we find out what the 14 species were, but by then it had grown to 15 species:

"TETRIGIDAE (Ground-hoppers)

Tetrix subulata L.

Not uncommon in marshy areas. I have found it at Flitwick Moor, Bakers Wood, Heath and Reach, and the wet parts of Wavendon Heath. Verdcourt records it from Fancott, Bramingham and Leighton Buzzard.

Tetrix vittata Zett.

Found mainly on dry ground. Common at Aspley Guise, Woburn, King's Wood, Heath and Reach, Rushmere Heath, Sandy and Potton.

ACRIDIDAE (Short-horn Grasshoppers)

Stenobothrus lineatus Panz.

A scarce and local species. I have specimens from the Downs near Whipsnade and Verdcourt records it from 'chalk hills near Luton'.

Omocestes viridulus L.

The commonest small green grasshopper. Abundant on chalk downs, grassy hillsides and fields.

Omocestes ventralis Zett.

A dark brown insect, with green elytra in the female. I have not taken it in the county, but Verdcourt records it from 'near Luton'.

Myrmeleotettix maculatus Thunberg

A little mottled brown grasshopper with clubbed antennae. It is found mainly on sandy soil and other open dry areas. Benson records it from King's Wood, Heath and Reach, and I have found it at Woburn, Aspley Guise, Leighton Buzzard, Flitwick, Ampthill, and in the Sandy and Potton area.

Chorthippus bicolor Charp.

A very variable species, though of a general brownish coloration. A most active insect, which flies readily when disturbed. By far the commonest grasshopper on agricultural land, and also abundant on heaths and downland.

Chorthippus parallelus Zett.

A green flightless insect with abbreviated wings. Very common on grassland.

Anacridium aegyptium L. (Mediterranean Locust) (Plate 2, Fig. 1)

This large locust occasionally gets introduced with produce from south-east Europe and North Africa. I have a specimen that was found in a house at Church Lane, Arlesey, in February 1952, probably having arrived with imported fruit.

TETTIGONIIDAE (Bush Crickets)

Leptophyes punctatissimi Bosc (Wingless Bush Cricket) (Plate 2, Fig. 2)

A bright green insect found on various trees and shrubs, and most often on privet hedges. Cranfield, 1937 (J. M. Brown); common at King's Wood, Heath and Reach, July 1944 (R. B. Benson); King's Wood 1947, Washers Wood 1948 (B. Verdcourt). I have found it on privet hedges, both at Flitwick and Aspley Guise.

Meconema thalassina De Geer (Tree Cricket)

A delicate pale green insect, with very long legs and antennae, found in large trees – particularly oaks – in the autumn. King's Wood, Heath and Reach; Leete Wood, Barton; Long Wood, Studham; Kidney Wood, Folly Wood, Caddington (B. Verdcourt). I have found it several times at Flitwick and Aspley Guise.

Pholidoptera griseoaptera De Geer (Bush Cheep)

The commonest species of this family. This is the insect that may be heard chirping along almost any hedgerow in late summer and autumn, as it lives among dense thorns and brambles.

Metrioptera brachyptera L. (Brown Bog Cricket)

A local species frequenting boggy heath land. I have not taken it in the county. Verdcourt records it from Aspley Heath, October 1944.

Conocephalus dorsalis Lat. (Green Bog Cricket)

A delicate green insect found in swamps and bogs. I have found it fairly abundant on parts of Flitwick Moor, and Verdcourt records it from Dyers Hall swamp, Harlington.

GRYLLIDAE (True Crickets)

Gryllus domesticus L. (House Cricket)

This is a not uncommon inmate of many old houses, stores and bakeries, where warmth and food are available. It also occasionally gets temporarily established in the open in rubbish dumps where there is warmth generated by decaying matter. Verdcourt records it from dumps at Luton and Fancott, and I have heard it in the open at Flitwick on summer nights in hot weather."

Mediterranean Locust *Anacridium aegyptium* or Egyptian Grasshopper as it is known now, was not recorded again until 1994 on the 23rd July when a male was found at Rookery Pit.

Now, sometime before 1961, we had another rare visitor to the county in the shape of a Mole Cricket *Gryllotalpa gryllotalpa*. Unfortunately I have no other information about it other than the fact that there was one. This record came from *Grasshoppers and Allied Insects* by J. A. Marshall and E. C. M. Haes. (If anyone has any information on this record, could they please send me a copy of it – thank you.)

In 1976 D. G. Rands took over the role as Recorder and started off by writing an article detailing the changes in the scientific names of some of the species and also comparing them with what was known about them in 1976:

"TETRIGIDAE (Ground-hoppers)

Tetrix undulata	*T. vittata*	Common Ground-hopper
Tetrix subulata		Slender Ground-hopper

ACRIDIDAE (Short-horn Grasshoppers)

Stenobothrus lineatus	Stripe-winged Grasshopper
Omocestus viridulus	Common Green Grasshopper

Omocestus rufipes	*O. ventralis*	Woodland Grasshopper
Myrmeleotettix maculatus		Mottled Grasshopper
Chorthippus brunneus	*C. bicolor*	Common Field Grasshopper
Chorthippus parallelus		Meadow Grasshopper

TETTIGONIIDAE (Bush Crickets)

Leptophyes punctatissima	Speckled Bush-cricket
Meconema thalassinum	Oak Bush-cricket
Pholidoptera griseoaptera	Dark Bush-cricket
Metrioptera brachyptera	Bog Bush-cricket
Conocephalus dorsalis	Short-winged Cone-head

GRYLLIDAE (True Crickets)

Acheta domesticus	*Gryllus domesticus*	House-cricket

Comparing this check list with the information known in 1976, three species of short-horn grasshoppers, i.e. Stripe-winged, Woodland and Mottled and one species of bush-cricket, i.e. Bog Bush, have not been recorded. However *Chorthippus albomarginatus* Lesser Marsh Grasshopper has been added to the list, having been found by me on a bank at the nature reserve end of Stewartby lake in September 1976.

The Woodland Grasshopper and the Bog Bush-cricket I feel may have disappeared from the county; the others should still be present."

The following year, another update was printed:

"Last year's report stated that the Mottled Grasshopper (*Myrmeleotettix maculatus*) was not recorded in 1976. I have since had 1976 records for Totternhoe Knolls and the old chalk workings at Sewell, Dunstable. Two further sites this year were Cooper's Hill, Ampthill and Stockgrove Park, Heath and Reach.

The Stripe-winged Grasshopper (*Stenobothrus lineatus*) has still not been rediscovered. A search was made on Dunstable Downs, Barton Hills and Noon Hill, Pegsdon.

The Short-winged Cone-head (*Conocephalus dorsalis*) was confirmed as still having a thriving colony on Flitwick Moor by B. S. Nau. This is the only known site in the county.

Four records of the House-cricket (*Acheta domesticus*) were received bringing the county total to eight. Three records of Common Ground-hopper (Tetrix undulata) brings the county total to seven. This I believe is a much overlooked species."

Also the same year, distribution maps and general information about the commoner species were published, quoting the number of tetrads they were recorded in. By 1990, Derek's last report, the numbers of tetrads for all the species have grown. To bring it up to date I have added 1995 figures:

	1976	1990	1995
Oak Bush-cricket	121	156	162
Dark Bush-cricket	159	174	195
Roesel's Bush-cricket	0	4	33
Speckled Bush-cricket	92	142	156

	1976	1990	1995
Common Ground-hopper	7	14	19
Slender Ground-hopper	7	17	24
Common Green Grasshopper	25	36	50
Lesser Marsh Grasshopper	38	147	155
Field Grasshopper	160	195	206
Meadow Grasshopper	99	126	149
Mottled Grasshopper	4	8	10
House Cricket	8	28	29

During the years in between, there were two other additions to the county list. The first was a well travelled Wart-biter in 1979:

"The highlight of the year was receiving a specimen of an adult female Wart-biter (*Decticus verrucivorus*) from Clive Banks. This Bush-cricket had been found at the bottom of a grassy bank inside the grounds of Electrolux Ltd., Luton, in early August.

The specimen is now in the British Museum (Natural History) who have confirmed its identification and from measurements believe it is of continental origin. The size was larger than British specimens. There is a remote possibility that eggs may have been laid. There are only five localities in the British Isles where it has been found.

The name 'Wart-biter' is derived from the fact that Swedish peasants have used them to bite off their warts. Electrolux is a Swedish firm."

and the second was Roesel's Bush-cricket:

"The hot summer of 1990 brought its reward for the first county record of Roesel's Bush-cricket, *Metrioptera roeselii* in the county on July 28th, followed by another record on August 4th and another on August 31st. The first two records were found by S. Cham at Sundon Quarry (TL042267) and near Harlington (TL050314) respectively. The third record was found by G. Bellamy near Sharpenhoe Clappers car park (TL066296). A further record on August 5th came from behind Galley Hill on the Icknield Way (TL099276) but this was just over the county boundary in Hertfordshire (pers. comm. J. Wigeon, Herts. Orthoptera Recorder).

This species was first known from the Thames area. In recent years there has been a rapid expansion of its range into Hertfordshire. It was expected that in time the species would be found in Bedfordshire.

All the present records were located by their song which means that all the specimens were male. They were also all macropterous f. *diluta* i.e. they all had fully developed wings. This form can occur in high numbers in very hot summers. This means that unless females were also present and laid eggs the species has not yet become fully established."

Before I end my review of 50 years of Orthoptera there are two species to go. The first is Short-winged Cone-head in 1946. It was found at Flitwick Moor and Dyers Hall Swamp, Harlington. By 1976 only the Flitwick Moor colony was left, and in 1995 they have spread out from Flitwick Moor to Flitton Moor and onto Hollington down

the River Flit. Now let's end on a happy note with the second species, Stripe-winged Grasshopper.

"In 1953 it was reported as a 'scarce and local species from the Downs near Whipsnade and the chalk hills near Luton'. From 1965 to '69 it was recorded at Barton Hills by the Nature Conservancy Council in a survey of the site. Then for over thirty years there were no records until September 1991 when they were recorded again at Barton Hills by Graham Bellamy, the Warden. Then this year (1994) five were found on the hills, again at Barton."

Looking to the future and the next 50 years, most of the bush-crickets and grasshoppers have reached their limit in range, due mostly to habitat, though there are probably still a few tetrads left to find. Dark Bush-cricket will spread south, while Roesel's Bush-cricket still has to conquer the county. Short-winged Cone-head could also still spread further down the River Flit. Ground-hoppers being small, are easily overlooked and could be found anywhere still. Out of the grasshoppers, Lesser Marsh Grasshopper has to cover the south and west of the county yet. House Cricket is the only one I think will stay the same if it does not decrease, while Stripe-winged Grasshopper may hang on at Barton Hills but I don't think they will spread. Also Woodland Grasshopper could make a comeback but I don't think so.

For new species, how about Long-winged Cone-head? They could colonise the county if they got here. At the moment they are found in Hertfordshire near the boundary in the Pegsdon area, so could 'hop' over at any time. As for any other new species, I don't think so (famous last words), but who knows.

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KEVIN M. SHARPE

SHIELD-BUGS IN BEDFORDSHIRE

by B.S.Nau

The shield-bugs are an attractive group of insects comprising several families of the 'True Bugs' (Heteroptera). They are insects of warm climates, numerous in the tropics and sub-tropics. This characteristic is reflected in their distribution in Britain. Like some of our rarer butterflies and orchids, they are noticeably more common in the extreme south of England and the status of shield-bug species given in the literature is often more appropriate south of the Thames than further north. This article is a guide to the status and identification of Bedfordshire species. Their distribution in the county is indicated by 10-km grid maps. Detailed literature references are not included as they have been listed previously in 'Reports of the Recorder (Heteroptera)'.

About fifty species are known from Britain, many more on the Continent, even just across The Channel. The exact total in Britain is uncertain as several species have not been seen for many decades; they were either vagrants, exceedingly rare or died out in Britain. In Bedfordshire 28 species have been recorded, mainly in the 1940–1950 period, when several entomologists were active in the county, or after I became Recorder in the 1970's. The status and habitat requirements in Bedfordshire are detailed below, beginning with the species most likely to be noticed.

To encourage readers to 'adopt' this attractive group I have given English names, some from Southwood and Leston's classic work on British bugs, others I invented. Do not expect entomologists elsewhere to recognise these names! An indication of the appearance of each species is given, the illustrations in "Collins guide to the insects of Britain and western Europe" (Chinnery 1986, publ. by Collins) may also be helpful.

How does one recognise a shield-bug? Heteroptera, in general, usually have a conspicuous triangular plate called the *scutellum* (i.e. 'shield'), pointing backwards from the hind edge of the thorax. In shield-bugs this scutellum is exceptionally large, extending back to the middle of the abdomen, or beyond, and in one family almost covering the wings. Viewed from above the outline of a shield-bug generally has a fanciful resemblance to an heraldic shield. They are relatively large, mostly in the range 5–15 mm in length. Immature stages of bugs are called 'nymphs' (as with dragonflies and grasshoppers) and undergo five moults. At the third moult wing-stubs appear, at the next they become larger, and at the last the insect becomes adult with full-size wings. The young nymphs of some shield-bugs are quite different to the adults in their coloration, notably the red and black ones of the Green Shield-bug and the black and white ones of the Woundwort Shield-bug.

Common, widely distributed species

Six Bedfordshire species are found widely in the county and are common where they occur.

Acanthosoma haemorrhoidale The 'Hawthorn Shield-bug' is our largest species (13–15 mm long) and the one most often presented for identification. It is bright green with a chestnut-brown band diagonally across each wing; nymphs are pale green with red markings. This bug is common everywhere in Bedfordshire and can be found on almost any hawthorn bearing haws in late summer.

Like most shield-bugs the adults hibernate and in their search for a dry sheltered place they may turn up almost anywhere. They return to lay eggs in May and June. Most of our shield-bugs have a similar life-cycle.

Elasmostethus interstinctus The 'Birch Shield-bug' is a smaller replica of the Hawthorn Shield-bug (8–10 mm) densely covered with fine black pores. It is the more numerous of our two birch species. It is common and widespread in Bedfordshire, being found on almost any birches bearing catkins or seeds.

Elasmucha grisea The 'Parent Bug' is our other birch species, on which it is almost as ubiquitous as the above, but usually less numerous. It is identified by black chequer marks along the margin of the abdomen. The general colour is a variable greyish brown. It is about 8 mm long. The bug is named for the way in which the female stands over its cluster of eggs, or small young, to guard them against predation. These family groups are seen on birch leaves in June.

Sehirus bicolor the 'Pied Shield-bug' is unmistakable – black with bold white markings, about 6–7 mm long. It is very common and most noticeable in warm spring sunshine on White Dead-nettle; it is also common on Black Horehound. In Bedfordshire it is found on almost any clump of these plants, although it seems to have given way to the next species in the stakes for 'most common shield-bug'. Like the preceding species this too guards its eggs, in a depression in the soil.

Eysarcoris fabricii The 'Woundwort Shield-bug' lives on Hedge Woundwort and is, if anything, more common than the Pied Shield-bug. It is a little smaller (5–6 mm long) and greyish-brown with metallic maroon scutellum. It may be found whenever the plant is in flower or seed. The young feed on the seeds and are often seen head-first in the 'trumpet' enclosing the seeds.

Pentatoma rufipes The 'Red-legged Shield-bug' is our commonest oak species, but occurs on Elm and other deciduous trees. It is large, 12–13 mm long, dark brown with conspicuous orange legs and an orange spot on the apex of the scutellum – characters it shares with the Spiked Shield-bug, which does not normally live on trees. The hind angles of the thorax form a broad flange with a *backward-facing* point (not side-facing as in the Spiked). The species is unusual as adults do not hibernate, they lay eggs in late summer and the emerging nymphs hibernate. The bug is widespread and common in Bedfordshire but seen less than previous species. It is most easily found by shaking oak foliage over a tray in July.

Less common or locally common species

This group of eight species are less widespread than the preceding but are common enough that they can usually be found when required, and may be numerous where they occur.

Elasmostethus tristriatus The 'Juniper Shield-bug' is commonly found on Lawson Cypress and other trees or shrubs of the Juniper family (Cupressaceae) – in gardens, cemeteries, parks etc. It resembles the Birch Bug in size and colour but is more slender, has green rather than black punctures, and is very shiny. Its length is about 10 mm. It is usually found on the unripe cones of its hostplant,

Plate 5: The Banded Shield-bug, *Troilus luridus* is named after the conspicuous pale band on the black antennae. Immature stages of bugs, which undergo five moults, are often quite different in colour from the adult; on the left is an adult, on the right an immature in the 5th instar. (p. 65) *Photos: Richard Revels*

Plate 6: The Yellow-winged Darter, *Sympetrum flaveolum*, was first recorded in the county in 1995 in a damp meadow at Willington. This photograph, taken at Willington on 3rd August 1995, shows the dragonfly pointing its tail skywards in a form of temperature control, reducing the sun's impact on its body on a hot day. (p. 73)

Plate 7: The Convolvulus Hawk-moth, *Agrius convolvuli*, found at Colmworth on 9th July 1995. (p. 88) *Arthur Keech*

Plate 8: Proliferous Pink, *Petrorhagia prolifera*, Potton, September 1996. This plant was rediscovered during 1995 on the edge of a sand quarry at Potton. (p. 108) *Richard Revels*

which it matches closely. It may be numerous where found but absent from other 'ideal' trees. The first county record was in October 1976, when Steve Cham found one in Maulden Wood.

Legnotus limbosus The 'Bedstraw Shield-bug' is a close relative of the Pied Shield-bug, but inconspicuous and much less common, probably overlooked. It is smaller, about 4 mm long, and black except for a narrow white border to the wing which extends from the thorax almost to the membrane; the membrane of the forewing is whitish. It is associated with bedstraws and occurs mainly on the warm soils of the Greensand, the sandy verges of the lane past Potton Church has long been a reliable site (in 1992 Jim Ashby caught 25 in pitfall traps here). It has also been found at Stagsden and Sundon.

Picromerus bidens In size (12–13 mm) and colour the 'Spiked Shield-bug' resembles the Red-legged Shield-bug but it is easily distinguished as each side of the thorax forms a long slender outward-pointing (not back-curved) spike. It is carnivorous, unlike most of our Shield-bugs, and has a curious mixture of habitat preferences – marshes,chalk downland, heather. It is also unusual in that it is the eggs which overwinter.

Piezodorus lituratus The 'Gorse Shield-bug' is common and widespread where its host plants are found, gorse and broom. Adults overwinter and emerge to sunbathe on sunny days in winter. It is a large handsome insect (10–12 mm long) purplish-grey becoming greener in spring. It can be separated from the Green Shield-bug by the narrow white side margins of its thorax and by having, underneath, a large spine which extends forward from the front of the abdomen to the middle legs.

Podops inuncta The 'Rough Shield-bug' is rather small, about 6 mm long, light-brown and usually found in dry hedgerow-litter, in which it is well camouflaged. It has a unique identification character, a forward-pointing lobe at each front corner of the thorax, beside the eye. It is easily over-looked unless a special search is made. However, again, Jim Ashby caught six in pitfalls on Potton Church bank in 1992. It seems more or less restricted to the Chalk and Greensand.

Troilus luridus The 'Banded Shield-bug', named for the conspicuous pale band on the black antennae, it has a dark brown appearance but is actually straw-coloured with dense fine black spots. The black antennae have a distinctive whitish-orange band at the apex of the penultimate segment. At 10–12 mm in length it is almost the same size as the Red-legged Shield-bug, it differs in being predaceous rather than herbivorous. There are several old records from 1946–1948 but I have the impression that it has become more common in the last five years, I rarely met it in the 70's and 80's but now find it quite frequently when beating oak foliage in late summer and autumn. (Plate 5)

Coreus marginatus The rusty-brown 'Dock Bug' is not a Shield-bug, although it 'ought' to be since it looks like one. In fact it is the most shield-bug-like member of the family Coreidae. In Bedfordshire it is near the northern limit of its range and is most likely to be encountered on docks (*Rumex* spp.) in warm sheltered spots on the Greensand. I have the impression that numbers vary from year to year, being higher perhaps after warmer drier summers. Adults often sun

themselves on bramble leaves but its hosts are docks, Knotgrass (*Polygonum aviculare* agg.) and others of the dock family. The bug is 14–15 mm long, the colour matches the seed heads of docks, until it opens its wings to fly and reveals a bright red abdomen.

Coriomerus denticulatus The 'Trefoil Bug' is a smaller version (7–8 mm long) of the previous species, and the only other Coreid known from the county until 1996. It is a less rusty brown and has a diagnostic fringe of small white teeth along the side margins of the thorax. Its host plants are various trefoils and it is most likely to be found by sweeping or grubbing amongst trefoils in sand-pits or sandy road-verges on the Greensand. It has been found on the chalk north of Dunstable and I found numbers in Sundon Quarry in 1993, swept from grasses and Leguminosae revegetating gravelly-soil.

Scarce or very local species

This group of six species were all uncommon or very local before I began writing this article. But during the warm dry seasons of 1995–96 all except *Rhacognathus* have increased and spread to the point where they could be promoted to the category above.

Dolycoris baccarum The 'Hairy Shield-bug' seems to be a recent arrival in the county, first recorded in August and September 1986, at Fox Corner and Shire Oak Heath (Heath & Reach). On 26th September 1993 there were a dozen or more on Scots Pine saplings on Shire Oak Heath. Now I find it frequently at sites on the the Greensand from Maulden Woods westwards. This attractive insect is unlikely to have been overlooked by such active field workers as Bernard Verdcourt and Vic Chambers had it been established in the county in the 1940's and 50's. Also, I was working quite intensively in the county for some years before my first encounter. By contrast, in the East Anglian Brecks this bug has long been common on dry flowery road-verges. It is 11–12 mm long, its colour varies from yellowish-brown to brownish-purple but the black-banded antennae are distinctive, the margins of the abdomen are similarly banded. Both adults and nymphs have many long hairs.

Aelia acuminata The 'Bishop's Mitre Shield-bug' is a very different-looking shield-bug, tapered at both ends, hence the English name. It is 8–9 mm long, straw coloured with darker longitudinal banding, matching the dry grasses on which it lives. It is one of several species of bug common on the East Anglian Brecks but for long seemed unable to flourish in Bedfordshire. It was not uncommon on the Greensand between Sandy and Potton, the first county record was 17th August 1977 when Derek Rands found one on a lane verge at Potton. It was unknown elsewhere until in 1995 I found it breeding in Maulden Woods, in unmown grass at the edge of a new plantation; it was even more common here in 1996, when it had spread west to Stockgrove Park and north to Bedford. It occurs in Scandinavia, north to Finland, so is unlikely to be affected by low temperature; perhaps humidity is more critical.

Neottiglossa pusilla Like the previous species, the 'Small Grass Shield-bug' lives on

grasses, but is only 4.5 mm long. It is well camouflaged, shiny dusky-straw with dark punctures; the abdomen is bronze beneath; a pale mid-line runs over head, thorax and scutellum; like *Aelia* the head is pointed in front and strongly down-curved. I have found it, usually singly, by sweeping tall grasses such as Oat-grass (*Arrhenatherum*) in dry places on Chalk or Greensand, but in 1995 it was in similar habitat on the Boulder Clay near Sharnbrook. There were few records until recently, but it is easily overlooked if low-down. In 1995, and even more so in 1996, it was common in dry grassland around Maulden Wood

Palomena prasina The 'Green Shield-bug' is one of our largest species, 12–13 mm long and rather broad. It is found by scanning Bramble leaves in late summer sun. It is probably a recent arrival in the county. In June 1983 I saw a small nymph, probably this species, but the first definite record was 25th September 1988 when I saw five 5th-instar nymphs on Brambles in Stockgrove Park. On 26th August 1990 nymphs were fairly numerous in the damp meadow by Wavendon Heath Ponds, and on 2nd August 1992 at College Wood (Northill) I swept two 3rd instar nymphs from a grassy ride. In 1995 it was more frequent than ever before and had reached Maulden Wood, a year later it had reached most parts of the county. It is extremely unlikely that such a large brightly coloured insect would have been overlooked by Verdcourt and Chambers in the 1940's, or by me in the 70's–80's.

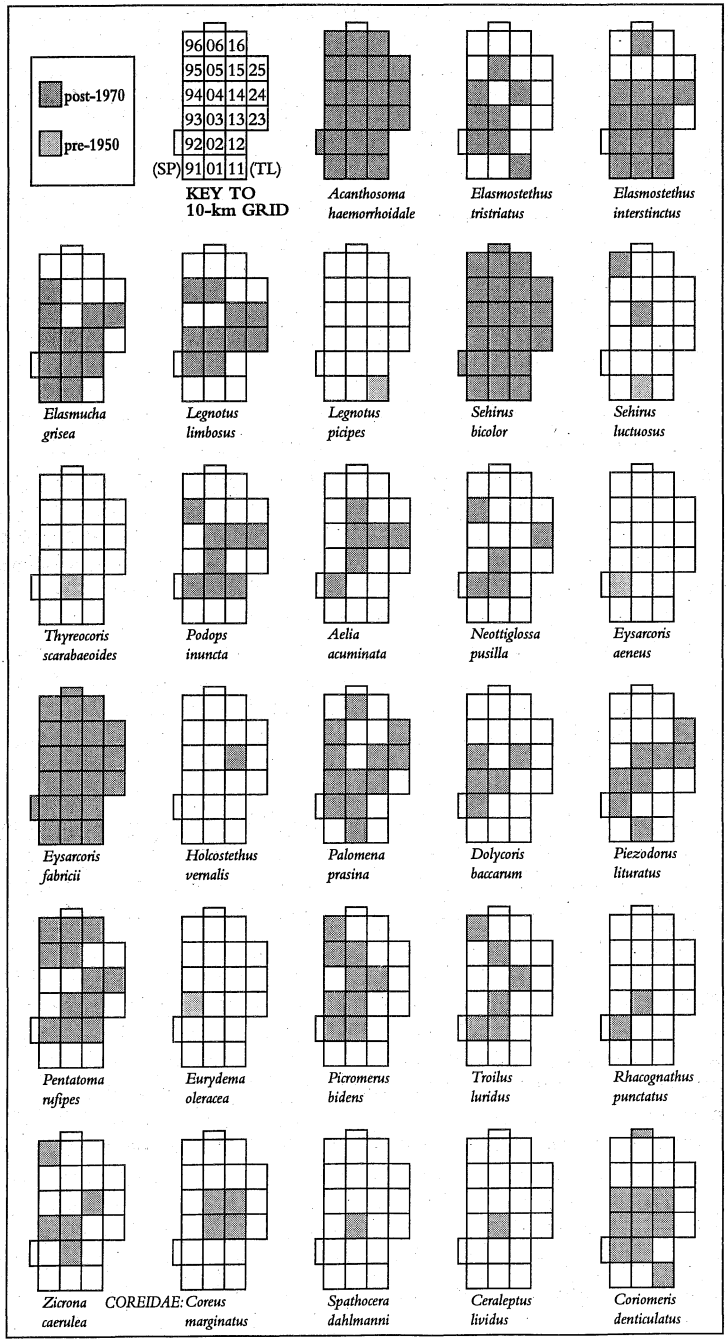
Rhacognathus punctatus The 'Heather Shield-bug' has an extremely restricted distribution in the county, being dependent on heather. It is predaceous, apparently feeding on larvae of the Heather Beetle (*Lochmaea suturalis*), among other things. I have only seen it at Coopers Hill (Ampthill), in small numbers, and one on Shire Oak Heath (Heath &Reach). Vic Chambers found it on Aspley Heath on 1947. It is about 8 mm long with legs banded black and cream, the upper-parts are brown with a metallic purple or green hue. Do not confuse it with *Picromerus bidens* which also occurs on heather.

Zicrona caerulea The 'Blue Shield-bug' is a pretty metallic bug, its colour varying from blue to green, 6–7mm long. It is probably overlooked despite its conspicuous colouration as it occurs low in grass tussocks or other litter, usually singly. It has been seen in diverse habitats in diverse parts of the county, e.g. a clear-felled conifer plantation on Wavendon Heath, and Dropshort Marsh, Toddington. However in 1995,in warm September sun after heavy rain, there were numbers of individuals on dock leaves in a low-lying 'set-aside' field near Flitton.

Rarities

These eight species have at most three Bedfordshire records each. Four have not been seen since before 1950, and the last two (again Coreidae rather than true shield-bugs) were only discovered whilst this paper was in preparation!

Eysarcoris aeneus The 'St John's-wort Shield-bug' resembles the Woundwort Shield-bug and Small Grass Shield-bug in general colour. It shares the latter's shiny cream spot at the front corners of the scutellum, but lacks its longitudinal pale centreline. The present species has a bronze sheen to the dark head and the two


post-1970
pre-1950
96 06 16
95 05 15 25
94 04 14 24
93 03 13 23
92 02 12
(SP) 91 01 11 (TL)
KEY TO
10-km GRID
Acanthosoma haemorrhoidale
Elasmostethus tristriatus
Elasmostethus interstinctus
Elasmucha grisea
Legnotus limbosus
Legnotus picipes
Sehirus bicolor
Sehirus luctuosus
Thyreocoris scarabaeoides
Podops inuncta
Aelia acuminata
Neottiglossa pusilla
Eysarcoris aeneus
Eysarcoris fabricii
Holcostethus vernalis
Palomena prasina
Dolycoris baccarum
Piezodorus lituratus
Pentatoma rufipes
Eurydema oleracea
Picromerus bidens
Troilus luridus
Rhacognathus punctatus
Zicrona caerulea
COREIDAE: Coreus marginatus
Spathocera dahlmanni
Ceraleptus lividus
Coriomeris denticulatus

dark patches near the front of the thorax. The host plant, Slender St John's-wort (*Hypericum pulchrum*), is scarce in the county. There is one record of the bug in Bedfordshire, Vic Chambers found it in Baker's Wood (Heath & Reach) on 16th May 1948. The host plant occurs in adjoining Kings Wood, where I have searched for the bug without success. The only established locality in Britain is a site in The New Forest, where it has been known since before 1865. This is a Red Data Book 'Category 3 (Rare)' species.

Legnotus picipes The 'Lesser Bedstraw Shield-bug' is a small mostly black ground-dwelling bug, 3–4 mm long. It is easily passed over as *Legnotus limbosus* but its white wing-border is limited to the base; also its 'nose' is as long as the enclosing 'cheeks', instead of being shorter as in the commoner species. The one Bedfordshire record was 1921 when H. H. Fryer found it in a 'roadside pit' on the county boundary between Luton and Harpenden. This is a Red Data Book 'Notable B' species.

Sehirus luctuosus The 'Forget-me-not Shield-bug' is also a ground-dwelling species, it feeds on forget-me-nots and is found in loose soil near these plants. It is shiny black, the antennae has the basal two and a half segments pale and the membrane of the forewings is whitish. There are few county records; Verdcourt found it in moss in a Studham copse in August 1945. More recently, I saw nymphs near Field Forget-me-not in a fallow field by Wilstead Wood, three weeks later the field had been ploughed! On 29th May 1995 I found an adult on the railway bank at Sharnbrook Summit among Field Forget-me-nots.

Thyreocoris scarabaeoides The 'Negro Shield-bug' is a small (3–4 mm) all-black ground-dwelling bug with enlarged scutellum and spiny legs. It lives in warm dry places, on chalk or sand, amongst dry litter or moss. Hairy Violet and Field Pansy are probable hosts. There is a record of one at Sundon refuse dump in September 1944. I have been searching around Hairy Violet without success to date.

Eurydema oleracea The 'Radish Shield-bug' is extremely variable in colour, ranging from dark metallic green to blue or black, with various whitish spots and stripes. Its length is 6–7 mm. The legs are distinctively black with middle and hind tibiae having a white central band. Our only record is one at Flitwick Plantation in May 1948. There are few recent British records but it used to be 'widespread and locally common' in Kent, especially on Wild Radish (*Raphanus raphanistrum*). In N. France I have seen it in late summer on Sea Radish, numerous and conspicuous on the flowers and seed-pods so unlikely to be overlooked.

Holcostethus vernalis The 'Vernal Shield-bug' is the epitome of a shield-bug yet mainly recognisable by a lack of really striking features. It resembles the drab winter form of *Palomena*; it is about 9 mm long, with sides of the thorax slightly concave, a diagnostic character; the upper-side is dark yellowish-brown; antennae mainly straw or reddish-straw but the two apical segments are black except at base (broadly) and apex (narrowly). It is probably arboreal and predatory, but little is known of its ecology. One was recorded in Bedfordshire on larch in Rowney Warren, October 1993. In Britain, apart from stray individuals, it has only been found in Kent and Sussex. It is Red Data Book 'Category 3 (Rare)'.

Spathocera dahlmanni The 'Sorrel Bug' , 5.0–6.5 mm long, is a smaller version of the Trefoil Bug, but lacks the white teeth on the side margins of the thorax. Its host is Sheep's Sorrel and it occurs in warm dry sandy places with sparse vegetation; adults overwinter. I swept one in Barn Meadow at Maulden Wood on 2nd June 1996, in the second of two warm dry summers. Four days later, closer inspection revealed 14 adults in the same area, including a mating pair. They were on two ridges where Sheep's Sorrel grows amongst moss and lichen which cover the sandy soil (10-figure grid ref. TL07063/38635). The field has been a hay meadow for many years, though ploughed briefly in the 1940's. On 8th September 1996 four more were found on Sandy Heath Quarry. This bug is a Red Data Book 'Nationally Notable' species with a few modern records from Surrey to Dorset and a few old records from other south-eastern counties, usually single individuals; there is an old record from Staffordshire.

Ceraleptus lividus Like the preceding, the 'Striped Trefoil Bug' resembles the Trefoil Bug and lacks white teeth on the thorax; it is slightly larger than a Trefoil Bug and has a black stripe along each side of the head, visible on close inspection. Clovers and trefoils are hosts, the bug occurring in warm dry sites, adults overwinter. I swept a single specimen of this bug on 6th June 1996, a few hundred metres from the preceding species. It was among tallish dry grasses and annual weeds at the edge of a young conifer plantation, a former arable field on sandy soil (TL06923/38523). This is another south-eastern species, hardly less scarce than the preceding; there are a few records, mostly old, from Essex, Kent, Sussex, Surrey, Middlesex, Bucks and Berks.

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LACEWINGS
Report of the Recorder

I had already been interested in lacewing flies for about three years by the time the Society was formed in 1946, so it was natural I should have contributed a short article on the group to the first volume of the Journal published in 1947. This listed eleven species, about a fifth of the number recorded nationally. More species came to light in Luton than now possibly due to the fact that practically no insecticide was then used in gardens.

The very elegant monograph *British Neuroptera* by F.J. Killington, published by the Ray Society in two volumes in 1936 and 1937, listed only two species for the county, one very rare, the other common. The rare one, *Nothochrysa fulviceps* (Steph.) (under *Nathanica* in Killington) was collected by the great entomologist J.C. Dale in Clapham Park Wood as long ago as 2 June 1820. The specimen is still in the 'Hope Department of Entomology' at Oxford. The other record is of *Cunctochrysa albolineata* (Killington) (under *Chrysopa*), a quite widespread species. By the time I left for East Africa in 1949 the list stood at 20. This included *Wesmaelius ravus* (Withycombe) (then in *Kimminsia*) a rare species; at the time it was confirmed by Lt Col F.C. Fraser, then one of the few authorities on the group, but the records are now doubted and its inclusion needs confirmation (the localities were Luton, 1946 and Ravensdell Wood, 1948; C. Plant adds Sandy, 1973 as another doubtful record in the text of his provisional Atlas but includes none on his map). When I undertook to act as recorder again in 1977, I summarised all the available records and the list stood at 25 (out of 57 then recorded nationally). The list increased very slowly, 29 by 1981, 30 by 1986, 34 by 1987 (about 60% of the national list), 35 by 1990 and 36 by 1993. The addition for 1993 was *Sisyra fuscata* from by the River Ivel and River Ouse; I had suggested in 1947 that this ought to be found by the Ivel since the larvae feed on sponges but it has taken 46 years for it to turn up.

It would have been nice to be able to record some splendid rarity for the 50th anniversary but I am afraid virtually nothing has turned up. Nevertheless an atlas can only be built up from firm published records and they are listed below. The national list stands at 59 (including a dubious ant-lion) and we have about 61% in the county, two or three of which need confirmation. The list owes much to records made by J. Bratton, B. Nau, B. Rands and I. Woiwod since 1977. A non-resident recorder who visits the county only rarely is hardly likely to produce an exhaustive list. It is time a local person took over. The new Aidgap key by Colin Plant (in the testing stage from August 1945 to June 1996) may encourage someone to do so since it is an exhaustively illustrated aid with the key stages explained by diagrams.

Records for 1995

Conwentzia probably *psociformis* (Curtis) Melchbourne, Hillards Plantation, female, 15 August 1995, B. Verdcourt.

Chrysoperla carnea (Stephens) Melchbourne, Penn Wood, 15 August 1995, B. Verdcourt; Melchbourne, Coppice Wood, 13 August 1995, B. Verdcourt; Leighton Buzzard, Mardle Road, November 1995, P. Madgett.

Wesmaelius subnebulosus (Stephens) Stanford Plantation, 23 August 1995, B. Nau.

A List of Bedfordshire Lacewings

Coniopterygidae

Conwentzia psociformis (Curtis), TL06?, TL11?, TL14 (? = confirmatory male specimens needed)
Conwentzia pineticola Enderlein, TL13
Coniopteryx tineiformis Curtis, TL01, TL02?, TL13 (? = confirmatory male specimens needed)
Coniopteryx pygmaea Enderlein (*parthenia* Navas & Marcet), SP93, TL03? (? = confirmation needed)
Semidalis aleyrodiformis (Steph.), TL03

Sisyridae

Sisyra fuscata (Fabr.), TL05, TL13, TL14

Hemerobiidae

Micromus paganus (L.), TL01, TL14, TL24
Micromus variegatus (Fabr.), SP95, TL02, TL13, TL14, TL24
Hemerobius humulinus L., SP93, TL01, TL02, TL03, TL14, TL24
Hemerobius simulans Walk., TL01, TL03
Hemerobius stigma Steph., SP92, SP93, TL01, TL02, TL03, TL14, TL24
Hemerobius atrifrons McLachlan, TL01
Hemerobius pini Steph., TL03, TL24
Hemerobius contumax Tjeder, the record for this in TL24 was based on a mis-identification and must be deleted. The record relates to *H. pini*.
Hemerobius nitidulus Fabr., SP93, TL01, TL03, TL14
Hemerobius micans Ol., TL01, TL02, TL03, TL05?, TL14, TL24
Hemerobius lutescens L., SP93, TL01, TL02, TL03, TL06, TL14, TL24
Hemerobius marginatus Steph., SP93 (actually in Bucks, a few yards from the border)
Wesmaelius ravus (Withycombe) (*Kimminsia rava*), TL01, TL02, TL14 (all these records are considered dubious despite my early records from Luton and Ravensdell Wood having been checked by Fraser)
Wesmaelius nervosus (Fabr.) (*Kimminsia betulina*), TL01, TL14, TL15, TL24
Wesmaelius subnebulosus (Steph.) (*Kimminsia subnebulosa*), TL01, TL02, TL03, TL14, TL24, TL25
Wesmaelius concinnus (Steph.), SP93, TL03
Sympherobius elegans (Steph.), SP96, TL14, TL24
Sympherobius pygmaeus (Rambur), TL03
Sympherobius fuscescens (Wallengren), SP93, TL03
Drepanepteryx phalaenoides (L.), SP93, TL15

Chrysopidae

Nineta flava (Scop.) (*Chrysopa flava*), SP92, SP93, TL01, TL03, TL06, TL11, TL15
Nineta vittata (Wesmael) (*Chrysopa vittata*), SP92, TL01, TL02, TL03, TL11
Chrysopidia ciliata (Wesmael) (*Chrysopa ciliata*), SP92, TL01, TL03, TL14
Dichochrysa flavifrons (Brauer) (*Chrysopa flavifrons, Mallada flavifrons*), TL03, TL14, TL24
Dichochrysa ventralis (Curtis) (*Chrysopa ventralis ventralis, Mallada ventralis ventralis*), SP93, TL01, TL02, TL03, TL13, TL14, TL24
Dichochrysa prasina (Burm.) (*Chrysopa ventralis prasina, Mallada prasina*), TL01, TL03, TL14
Cunctochrysa albolineata (Killington) (*Chrysopa albolineata*), TL01, TL02, TL03, TL14, TL24

Chrysoperla carnea (Steph.) (*Chrysopa carnea*), SP92, SP93, SP95, TL01, TL02, TL03, TL04, TL06, TL13, TL14, TL15, TL24
Chrysopa pallens (Rambur) (*Chrysopa septempunctata* Wesmael), TL01, TL02, TL03, TL14
Chrysopa phyllochroma Wesmael, TL14, TL24 (dubious and needs confirmation, most probably the next species which was split off in 1965; Plant does not mention it for Beds. in his atlas)
Chrysopa commata Kis & Ujhelyi, TL03
Chrysopa perla L., SP93, SP94, SP96, TL01, TL02, TL03, TL04, TL11, TL14, TL24
Nothochrysa fulviceps (Steph.) (*Nathanica fulviceps*), TL05 (only record was in 1820)

B. VERDCOURT

DRAGONFLIES (Odonata)
Report of the Recorder

The year was a variable year for dragonflies. The low number of records for May and June reflect the variable conditions experienced during this period and the apparent inactivity of recorders. The heavy rainfall experienced during the society meeting to the River Ouse at St. Ives in early June made dragonfly observation very difficult.

As weather conditions improved in July and on into August the numbers of records of 'summer' species increased significantly. Hot, dry weather dominated these months and combined with easterly winds from continental Europe a large influx of migrant dragonflies was observed across the British Isles. This was the largest immigration ever recorded and included several species of which some were new to Britain. Yellow-winged darters *Sympetrum flaveolum* predominated, finding their way into Bedfordshire. The first county record for this species from a damp meadow at Willington occurred when several individuals were discovered during August by Nancy Dawson. Subsequent visits by several observers revealed at least 12 males, with females arriving at regular intervals. Pairs were observed 'in-cop' on a number of occasions with egg laying being observed both in areas of damp grass and in the nearby moat. In northern Europe it favours damp meadows in which to oviposit in anticipation of increasing water levels during the winter months. The meadow flooded during the winter of 1995/96 providing suitable conditions for larval development. Next summer will reveal if the life cycle can be completed at Willington. (Plate 6)

Several recorders provided new records from ponds in areas north of Bedford, which still remain the most under-recorded part of the county.

SYSTEMATIC LIST

Zygoptera (Damselflies)
Banded Demoiselle *Calopteryx splendens*
New tetrad records SP95V, TL04H, TL06X
Emerald Damselfly *Lestes sponsa*
New tetrad records TL04G, TL15A

Large red Damselfly *Pyrrhosoma nymphula*
New tetrad records SP95R, TL03T, TL04B, G
Blue-tailed Damselfly *Ischnura elegans*
New tetrad records TL02P, TL06X, TL14T
Common-blue Damselfly *Enallagma cyathigerum*
New tetrad records TL05H, K
Azure Damselfly *Coenagrion puella*
New tetrad records TL05K, TL14U

Anisoptera (Dragonflies)
Brown Hawker *Aeshna grandis*
New tetrad records SP94Z, TL02P, TL04C, TL05P,S, TL06C,T,X*

Southern Hawker *Aeshna cyanea*
New tetrad records SP94Z, SP95V, TL04G, TL05K, TL06T
Migrant Hawker *Aeshna mixta*
New tetrad record SP95V
Emperor Dragonfly *Anax imperator*
New tetrad records SP93H, TL06C*, TL14T, U
Four-spotted Chaser *Libellula quadrimaculata*
New tetrad records TL04G, H
Black-tailed Skimmer *Orthetrum cancellatum*
New tetrad record TL04G
Common Darter *Sympetrum striolatum*
New tetrad records SP94Z, SP95V, TL02P, TL05J, U,Y, TL06T, X, TL15C
Ruddy Darter *Sympetrum sanguineum*
New tetrad record TL03J, M, TL04E
Yellow-winged Darter *Sympetrum flaveolum*
New county record TL15A (Plate 6)
*New 10km record

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STEPHEN CHAM

BUTTERFLIES (Lepidoptera)
Report of the Recorder

General

March and April were unusually sunny and on 1st and 2nd April temperatures rose to over 20°C bringing a sudden rush of butterfly activity. The first week in May was warm and sunny but the rest of May and much of June was cool and often grey. The really hot weather started at the end of June and continued through July and August. The flight periods of many species were shortened and nectar plants were often in short supply. Larval foodplants showed signs of drying up and it will be interesting to see if any effect on butterfly numbers is detectable in 1996. A spell of east winds brought an unusual influx of migrants to Britain. The sight of Camberwell Beauty butterflies in Bedfordshire was perhaps the event of 1995.

Both the Bedfordshire Chalk Grasslands Butterfly Survey and the various transect walks continued to yield valuable information on the local distribution and numbers of many of the species found in the county. There still remains a great need for more such monitoring in other sites around the county. A new initiative in 1995 was the Woodland Butterfly Survey which grew out of a need to know more about the distribution and abundance of the Black Hairstreak in the county. Quite a number of people have joined in and some useful observations have been made.

All references to the Chalk Grasslands Butterfly Survey and to the Whipsnade Downs transect in the paragraphs that follow relate to the report by Herbert (1995) in which the results were set out in some detail.

The totals of sightings and number of species ( ) for the various transects were:

	1993	**1994**	**1995**	
Barton Hills	1825 (22)	1903 (25)	2822 (25)	(GB)
Blows Downs – east	–	–	1571 (25)	(EM and others)
Blows Downs – west	–	–	2057 (22)	(EM and others)
Dunstable Downs	3682 (24)	2219 (28)	1302 (20) ★	(EJM)
Galley & Warden Hills	–	–	1947 (21)	(MM)
Hill Rise, Bedford	226 (14)	443 (18)	579 (20)	(B&YA, TG)
Potton Wood	3769 (19)	3865 (20)	4112 (25)	(IW)
Priory Park, Bedford	1229 (20)	2162 (21)	2535 (20)	(RB & EN)
	(years are not comparable)			
Totternhoe Quarry	1162 (24)	2206 (25)	1793 (29)	(GH, AW)
Whipsnade Downs	3059 (26)	5128 (25)	4223 (28)	(GH and others)

★ – not comparable with previous years.

To save repetition, comments by named observers on individual species refer in general to areas as follows unless specific localities are mentioned: JA and DP – Chicksands Wood, AGD – Westoning and AS – north-west Bedfordshire.

Skippers

"A noteworthy site is the track north of Shelton, where hundreds of Essex Skippers were flying amongst similar numbers of Large Skippers, but only one Small Skipper positively identified". (AS)

Small Skipper *Thymelicus sylvestris*

"good year" (JA); "normal numbers and over a shorter flight period" (AS); Similar

numbers to 1994 on the Potton Wood transect, above the long-term average (IW); not distinguished from Essex Skipper in Chalk Grasslands Survey.

Essex Skipper *Thymelicus lineola*

"numbers normal" (JA); very common on some sites (CB); "normal numbers." (AS); not distinguished from Small Skipper in Chalk Grasslands Survey.

Large Skipper *Ochlodes venata*

Unusually common in many sites with some still on the wing as late as 15 August at Marston Thrift; "good year" (JA); "in exceptionally large numbers and widespread" (AS); 500+ at Bromham Lake NR on 2 July (JA); 100+ at Chicksands Wood on 9 July (JA); 50+ at Marston Thrift on 26 and 30 June (JA) and 45+ there on 9 July (GW); about average numbers in Potton Wood (IW); seen at 10 out of 15 sites in Chalk Grasslands Survey and the largest numbers yet on the Whipsnade and Barton Hills transects.

Dingy Skipper *Erynnis tages*

This species seems to have had another poor year possibly due to the cool and dull weather during much of the early part of the summer. Coronation and Rookery Pits (RN); Pegsdon (SP); It was seen at only 4 out of 15 sites in the Chalk Grasslands Survey, less than in previous years. One was seen on the Whipsnade transect but 10 on the Barton Hills transect, a considerable increase on 1994.

Grizzled Skipper *Pyrgus malvae*

There were welcome sightings at Elstow Storage Depot (SP), Coronation Pit (RN,AD) and Rookery Pit (RN) but Grizzled Skipper was very scarce elsewhere. "Seen at known sites but totalling single figures" (AS). It was reported as seen at only 4 out of 15 sites in the Chalk Grasslands Survey, namely Bison Hill, Blows Downs, Dunstable Downs and Totternhoe Quarry. Two were seen on the Whipsnade transect but only 6 on Dunstable Downs where 30 sightings were recorded in 1994. One was seen at Totternhoe Quarry on 1 September, a rare second brood individual.

Whites

Wood White *Leptidea sinapis*

This species was seen in Maulden Woods (BN), the first report for 5 years though C.Taylor of Forest Enterprise said that he had seen it in the intervening years. No reports were received from elsewhere in the county.

Clouded Yellow *Colias croceus*

None reported in 1995.

Brimstone *Gonepteryx rhamni*

Numbers of Brimstones appear to have been about average. Once again eggs could easily be found on some sites. "Normal numbers" (AS). Below average numbers overall and the lowest numbers in spring and autumn since 1991 on the Potton Wood transect (IW); seen at 13 sites in the Chalk Grasslands Survey and 66 were seen on the Barton Hills transect, the largest number since 1992, but numbers were slightly down on the Whipsnade transect.

Large White *Pieris brassicae*

Generally scarce but more in some sites than others; "numbers seemed normal" (JA); "Normal numbers" (AS).Very low numbers in both generations in Potton Wood, well below the 19-year average and the lowest total numbers since 1984 (IW); seen at all 15 sites in Chalk Grasslands Survey with less than half the 1994 sightings on the Whipsnade transect but slightly more than in 1994 on the Barton Hills transect.

Small White *Pieris rapae*

Following the exceptional abundance in the latter part of the 1994 season, Small

Whites were present in good numbers throughout much of the summer. "Normal numbers" (AS). In the late summer a number of small individuals were noticed (B&YA). Highest numbers since 1989 in Potton Wood; since recording began only 1986 and 1989 had higher totals. However in 1986 and 1989 the species was about twice as abundant there as in 1994 (IW). Seen at 14 out of 15 sites in the Chalk Grasslands Survey. Numbers were below those of 1994 on the Whipsnade transect but more than twice the 1994 total were seen on the Barton Hills transect.

Green-veined White *Pieris napi*

"appeared to be down on previous years" (JA); "Normal numbers" (AS). On the Potton Wood transect numbers in both generations were almost identical to the previous two years (IW); seen at only 12 out of 15 sites in the Chalk Grasslands Survey but only about two-thirds of the numbers seen in 1994 on the Whipsnade transect and only two were recorded on the Barton Hills transect.

Orange Tip *Anthocharis cardamines*

"did very well with a long flight period (14 April to 2 June) (JA); "Second successive good year" (AS). Similar to the two previous years but still below the 19-year average for the Potton Wood transect, (IW); seen at 11 out of 15 sites in the Chalk Grasslands Survey with almost the same numbers as in 1994 on the Whipsnade transect but an increase from 2 in 1994 to 13 in 1995 on the Barton Hills transect.

Hairstreaks

Green Hairstreak *Callophrys rubi*

Seen at 9 out of 15 sites in the Chalk Grasslands Survey; only about two-thirds of the 1994 numbers were seen on the Whipsnade transect but only 2 on the Barton Hills transect. New localities included Studham (CB) and Rookery Pit (RN). Despite much searching it was not found on the Greensand Ridge though it was seen a few hundred metres over the Buckinghamshire border near Stockgrove Park (AC). Still present at Elstow Storage Depot (SP).

Purple Hairstreak *Quercusia quercus*

Had a very good season. Although individual butterflies could be seen during the hot part of the day, they seemed to be most active in the morning and again in the evening. More than 10 were watched flying actively at 7.30 pm BST among oak trees along the edge of a wood in Studham and similar numbers were seen at about 7 pm around a Horse-chestnut tree beside Palmers Shrubs. In Marston Thrift on 3 August GW counted 29, mostly at ground level possibly because of the heat. "Did very well at both Chicksands and Wilstead Woods" (JA); more visible than usual in Potton Wood although only one was seen on a transect walk (IW); several new localities were added including Flitwick Moor (CB), Hanger Wood (PA), Pepperstock (DKA), Studham (CB), Sharpenhoe Clappers (DC).

White-letter Hairstreak *Satyrium w-album*

"numbers were low in Chicksands Wood" (JA). This follows several good years. Seen in King's Wood, Heath and Reach, for the first time for many years (CB). Eggs found on Wych Elm at Felmersham Nature Reserve (AS) and eggs and a larva in Chicksands Wood, also on Wych Elm (RR, JA). New localities were Barton Hills (GB), Cranfield (DA), Potton (TW), Salford (JAM), Sandy Station (GW), Turvey (JM) and Whipsnade (AMC).

Black Hairstreak *Satyrium pruni*

Numbers remained low in Marston Thrift (DA, JA, LC, GW) and plans are in hand to improve parts of the wood for this species by removing some of the trees that shade the blackthorn. Its old haunts at Putnoe Lane and Keysoepark Wood were searched

without success, though if numbers were low it could easily have been missed. One was seen in Wootton Wood so hopefully this may be a new site (CB).

Coppers, Blues and Metalmarks

Small Copper *Lycaena phlaeas*

Seemed to be about in many more sites than usual; "present in usual numbers" (JA); "as always, in low numbers but appeared in unexpected places" (AS); seen at 8 out of 15 sites in the Chalk Grasslands Survey. Rather more were seen on the Whipsnade transect than in recent years but only 2 were seen on the Barton Hills transect.

Small Blue *Cupido minimus*

Few reports for 1995; seen at 6 out of 15 sites in the Chalk Grasslands Survey; 23 were seen on Galley and Warden Hills (MM); none on the Whipsnade, Barton Hills, Blows Downs, Dunstable Downs and Sharpenhoe Clappers transects but 44 on the Totternhoe Quarry transect. Overall this suggests a decline as compared with 1994 on most sites, possibly due to desiccation of the Kidney Vetch in that dry summer.

Brown Argus *Aricia agestis*

The expansion in range seen in 1994 continued in 1995 with further reports from new localities. These included Bletsoe (PA), Bolnhurst (PA), Bromham Hospital (PA), Clapham (PA), Colmworth (PA), Hill Rise (Bedford, B&YA), Kempston (PA), King's Wood, Heath and Reach (CB & JBB), Little Staughton (CB & VA), Oldhill, Studham (CB), Ravensden (MD), Renhold (PA), Sheerhatch Wood (DT), Shorts Town (PA), Stagsden (PA), Turvey (JM), Willington (CB) and Wood End (PA). "Brown Argus again had an excellent year" (JA); "Smaller numbers than in 1994" (AS). R.C.Revels spent several hours patiently watching what plants Brown Argus were laying eggs on at sites away from the chalk downs. He observed eggs on Dove's-foot crane's-bill, Cut-leaved crane's-bill and Meadow crane's-bill. Again the form with white scales surrounding the discal spot on the forewing was seen by several observers. Seen at 9 out of 15 sites in the Chalk Grasslands Survey; about the same as in 1994 were seen on the Whipsnade transect but on the Barton Hills transect the number of sightings increased from 23 to 213. Outstanding numbers were seen in Potton Wood. Although never seen there before, it might have been missed in 1994. The total seen on the transect was 210, the largest total for any transect in the national Butterfly Monitoring Scheme.

Common Blue *Polyommatus icarus*

Good numbers of Common Blue were again present on most sites; "did very well in both generations" (JA); 200+ at Bromham Lake Nature Reserve on 2 July (JA); "fewer than in 1994" (AS); none of the first generation were seen in Potton Wood but reasonable numbers of the second generation (IW); Seen at 13 out of 15 sites in the Chalk Grasslands Survey; numbers were down to half those of 1994 on the Whipsnade transect but increased by a third on the Barton Hills transect.

Chalkhill Blue *Lysandra coridon*

This butterfly had a good year and was particularly abundant on Sharpenhoe Clappers. Seen at 10 out of 15 sites in the Chalk Grasslands Survey; numbers were also well up on 1994 on the Barton Hills transect but slightly down on the Whipsnade transect.

Holly Blue *Celastrina argiolus*

Showed signs of recovery from the population crash of the last few years. Adults were reported from some 19 sites: Ampthill (CB), Aspley Guise (P&PC, RN), Bedford (over 40 sightings in total, B&YA, P&GH), Biggleswade (often, RR), Box End (PA), Bromham (PA), Chicksands Wood (RR, K&MW)), Clapham Park Wood (DP,KP)East Hyde (MDR), Felmersham NR (PA), Ickwell Green (ND), Luton (LRJ, MDR),

Potton (IW), Putnoe Wood (PA), Ravensden (B&YA), Scald End (PA), Stagsden (PA), Toddington (BN) and Turvey (JM). Scattered autumn larvae could be found on ivy in the east of the county (RR). Seen at 4 out of 15 sites in the Chalk Grasslands Survey. For the third year running none were seen on the Potton Wood transect (IW).

Duke of Burgundy *Hamearis lucina*

Was present in increased numbers and more widespread on Whipsnade Downs than in 1994. Seen at only 2 of the other sites in the Chalk Grasslands Survey, Sewell Cutting and Totternhoe Quarry.

Nymphalids

Purple Emperor *Apatura iris*

One individual was seen in King's Wood, Heath and Reach on 19 July (CW). While it is possible that this was a released specimen, this species is a strong flier and King's Wood is only 20 km from its Buckinghamshire haunts where it was seen on the following day.

White Admiral *Ladoga camilla*

Appeared in good numbers despite the cool weather in May and early June which is said to prolong the larval stage and increase the likelihood of predation. "A good year" (AS). Localities where it was seen included Chicksands Wood (JA), King's Wood, Heath and Reach (EJS, AC, CW and others), Marston Thrift (DA and others), West Wood (P&GH) and Wilstead Wood (JA). The first one was seen in Potton Wood since regular recording began in 1994 (IW).

Red Admiral *Vanessa atalanta*

Was widespread in the county with individuals lingering on until well into November; "usual numbers" (JA); "good numbers in the autumn" (AS); very similar to the 1994 and 1995 numbers on the Potton Wood transect (IW); Seen at 9 out of 15 sites in the Chalk Grasslands Survey and in the highest numbers yet on the Whipsnade transect and more than in 1994 on the Barton Hills transect.

Painted Lady *Cynthia cardui*

A wave of immigrants appear to have passed through the county at the end of July and beginning of August as the following counts in a Bromham garden suggest: 29 July – 1, 30 July – 2, 31 July – 3, 1 August – 9, 2 August – 4 and none thereafter until 1 on 19 August (PA). There were also 5 in Stewartby on 1 August (PA). Only 7 were seen on the Potton Wood transect (IW). In the Chalk Grasslands Survey it was seen at 10 out of the 15 sites. Only 6 were seen on the Whipsnade transect, much the same as in 1994, and 2 on Barton Hills transect.

Small Tortoiseshell *Aglais urticae*

"has made a strong recovery" (JA); "made a slow comeback" (AS); continued to increase from the low level of 1993 in Potton Wood, although it is never particularly common there (IW); seen at 13 out of 15 sites in the Chalk Grasslands Survey, more than in 1994. Also up to 73% of the peak 1992 numbers on the Whipsnade transect with a smaller increase on the Barton Hills transect.

Camberwell Beauty *Nymphalis antiopa*

The butterfly-watching highlight of 1995 with reports of single individuals from Dunstable on 3 August (TB), Harrold on 21 August (NM), Shillington on 25 August (GB), Cople (via BBW) and 2 separate sightings in Luton; 21 September (FP), 8 October on Galley Hill (IB). A wing was found on 20 August under a Buddleia bush in Bedford (JB). Other less definite reports suggest that there may have been more sightings. These butterflies were part of a large westerly movement across Germany to the Netherlands and thence across the North Sea into East Anglia.

Peacock *Inachis io*

"good numbers at Chicksands", 200+ there on 23 July (JA); hibernating Peacocks were again found during surveys of ice-houses for bats (AA, JC); "had a worryingly bad year – 12 seen on 10 April having over-wintered but the summer brood appeared in very small numbers from late July and virtually none after 20 August" (AS); good numbers in Potton Wood, more than in 1994 (IW). Seen at 13 out of 15 sites in the Chalk Grasslands Survey. On the Whipsnade transect three times the 1994 numbers were seen but still not back to the 1992 peak. Still declining slightly on the Barton Hills transect.

Comma *Polygonia c-album*

Widely distributed though usually in small numbers. The warm weather at the beginning of April allowed early egg-laying so at the beginning of the next emergence most of the butterflies were the *hutchinsonii* form. "usual numbers" (JA); the third highest total for the Potton Wood transect and the most since 1986 (IW); seen at 11 out of 15 sites in the Chalk Grasslands Survey, a considerable increase on previous years. The largest numbers yet were seen on the Whipsnade transect, 2½ times the previous high and more than the previous 2 years on the Barton Hills.

Fritillaries

"Large fritillaries", not identified to species, were reported from Barton (SH). These may have been Dark Green Fritillaries but the possibility of Silver-washed cannot be ruled out – see below.

Dark Green Fritillary *Argynnis aglaja*

Single individuals were photographed on Bison Hill(DC) and in Totternhoe Quarry (AW). Two were seen on Dunstable Downs (EJM).

Silver-washed Fritillary *Argynnis paphia*

One definitely seen on Barton Hills on 9 July and another at Coronation Pit on 16 July (KS). A single male in Potton Wood on 22 July, the first since regular recording began in 1974 (IW) and one at Yelden (via AS). As in 1994, these sightings of odd individuals mostly away from typical habitats suggest that they were released. It is doubtful whether any wood in Bedfordshire is suitable for a breeding colony of this species at present.

Browns

Speckled Wood *Pararge aegeria*

Records from 121 new tetrads during the 1990s indicate the extent to which this species has spread. 19 of these records were in 1995. "Good year but not in the vast numbers seen some years" (JA); "down in numbers" (AS); seen at 12 out of 15 sites in the Chalk Grasslands Survey; rather fewer than in 1994 on the Whipsnade transect and less than half the 1994 number on the Barton Hills transect.

Wall Brown *Lasiommata megera*

Widely scattered but in small numbers; "very few seen" (JA); "down in numbers" (AS); seen at 11 out of 15 sites in the Chalk Grasslands Survey; many fewer than in 1994 on the Whipsnade transect; only 5 seen on the Barton Hills transect and none on Dunstable Downs.

Marbled White *Melanargia galathea*

Good numbers were seen on some sites. Less usual sightings were in King's Wood, Heath and Reach (AC, CW), Aspley Guise (P&PC), Coronation Pit (KS), Bromham Lake Nature Reserve (JA, PA) and Yelnow New Wood (I&SK); "did not see any at Chicksands Wood" (JA); one in Potton Wood on 22 July was the fourth new species for this wood in 1995 (IW); "in normal good numbers at their two strongholds" (AS); seen

at 11 out of 15 sites in the Chalk Grasslands Survey but many fewer than in 1994 on the Whipsnade transect, though more than previously on Barton Hills.

Gatekeeper *Pyronia tithonus*

"present in large numbers" (JA); "down in numbers" (AS); about double the 1994 total on the Potton Wood transect but still in relatively low numbers (IW); seen at 13 out of 15 sites in the Chalk Grasslands Survey; rather more than in 1994 on the Whipsnade and Barton Hills transects.

Meadow Brown *Maniola jurtina*

"present in large numbers" (JA); "emerging earlier, though in normal large numbers" (AS); the same numbers as in 1994 in Potton Wood, very common but not unusually so (IW); seen at 13 out of 15 sites in the Chalk Grasslands Survey; about two-thirds of the 1994 numbers on the Whipsnade transect but slightly up on the 1994 numbers on the Barton Hills transect.

Small Heath *Coenonympha pamphilus*

Good numbers in a few sites such as Bromham Lake Nature Reserve, near Carlton, Centenary Wood and Sharpenhoe Clappers. Seen at 11 out of 15 sites in the Chalk Grasslands Survey, almost the same as 1994 on the Whipsnade transect but increased on the Barton Hills transect to 369, the highest count since 1990.

Ringlet *Aphantopus hyperantus*

"excellent year – considerable numbers – more at Wilstead Wood than at Chicksands Wood" (JA); "had another good year" (AS); lowest numbers in Potton Wood since 1989. This was the fifth year of population reduction (IW); seen at 13 out of 15 sites in the Chalk Grasslands Survey; slightly down on the 1994 numbers on the Whipsnade transect but up on the Barton Hills transect.

Danaids

Monarch *Danaus plexippus*

One seen at Willington on 16 July (GHP). This sighting was well before the influx in September and is more likely to have been an escape than an immigrant from the Americas or Canary Islands. Nevertheless an exciting butterfly to see in Bedfordshire.

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CHARLES BAKER

Preliminary studies on the Gatekeeper butterfly *Pyronia tithonus* (Linn) (Lepidoptera: Satyrinae) at an urban site in Bedford

by B. Anderson

Introduction

The amount of research devoted to any particular British butterfly species often seems inversely proportional to its abundance; probably this is due to the prospect of a species imminent extinction generating a sense of urgency. There are exceptions: the Common Blue, *Polyommatus icarus* and Meadow Brown, *Maniola jurtina* have been studied quite extensively – Warren (1992) gives a useful summary of population and lifetime studies of British butterflies to date. One species where studies have been no more than partial is the Gatekeeper butterfly, *Pyronia tithonus*. Various investigations have been conducted into its emergence period, especially in relation to temperature and on the extension of its geographical range, but, so far as I can ascertain, no attempt has been made to measure its absolute population at any site, nor has there been any attempt to determine its mean or maximum residence time. Since a relatively isolated population exists at Hill Rise in Bedford, there was an opportunity to compare results with previous studies and also to determine, at least tentatively, some previously unexplored parameters of the ecology of the Gatekeeper.

The site

Hill Rise is a small (about 0.6 ha) site lying at the southern end of the Clapham Wildlife Corridor at TL046510. It is adjacent to Bedford Cemetery (a wide footpath, a wall and a hedge form the boundary) and is about 250m from Bedford Park (see fig. 1). A large derelict house occupied part of the site until 1986 when it was demolished, and the land remained vacant but allocated for housing development until 1990, when a group of local residents lobbied Bedford Borough Council and the site was handed over to a joint Council/resident committee for "wildlife management" as an area of

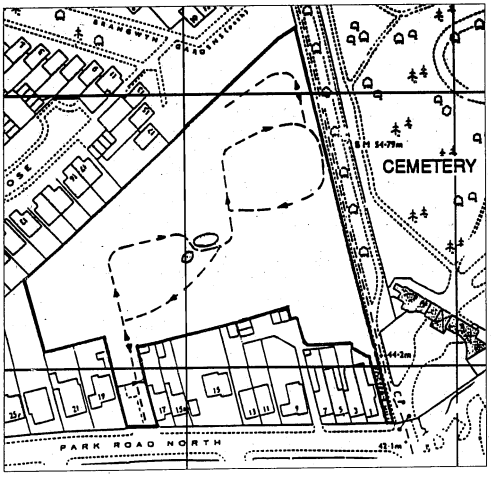

Figure 1: Hill Rise

nature conservation interest. Paths were marked, trees planted and a pond dug, but in general the site has been allowed to develop as a patchwork of tall grass and shrubs. Currently, most of the site is at seral stage 3 (i.e. shrubs, tall grasses and herbs), and represents an appropriate biotope for the Gatekeeper. Many of the preferred nectar plants (i.e. those with shallow nectaries) are extensively available, including Ragworts *Senecio* spp, Brambles *Rubus* spp, Thistles *Cirsium* spp and Privets *Ligustrum* spp. Larval foodplants (the grasses *Agrostis*, *Poa* and *Festuca* spp) are also common.

Temperature dependence of the mean flight date

Brakefield (1987) studied the temperature dependence of the mean flight date of the Gatekeeper and concluded that the higher the mean maximum June temperature, the earlier is the mean flight date for that year (see Note 1).

Another model, proposed by Pollard and Yates (1993) and derived from observations at Monks Wood, suggests that the mean flight date is advanced by 4.2 days for every °C rise in the mean June temperature. The data allows predictions only of changes over previous seasons (see Note 2).

Comprehensive transect data on butterfly numbers was available from Hill Rise for 1994 and was being collected for 1995, so information could be provided to test the two hypotheses. The mean flight date for each year was calculated using a mean date weighted by the counts, and the temperature data was provided by M. Williams (BNHS Meteorological Recorder) from readings at Silsoe and Wrest Park (note that Brakefield's study used temperature data equally remote from most of the recorded sites). The comparisons with the two models are tabulated below:

Prediction of mean flight date (Brakefield 1987)

Year	Mean max. June temperature °C	Predicted mean flight date	Measured mean flight date
1994	19.4	18th July	24th July
1995	19.0	21st July	29th July

The figure for 1994 is within the limits of Brakefield's analysis. For 1995, the figure is consistent with the 1976 data given.

Prediction of incremental change of mean flight date (Pollard and Yates 1993)

Year	Change in mean June temperature °C	Predicted change in mean flight date	Measured change in mean flight date
1994–95	-0.9	-3.8 days	-4.4 days

The total instantaneous population – estimating the population across a 2–day period

The first study of Lepidoptera populations using mark and release techniques was the classic work by Dowdswell *et al* (1940). It is essentially this technique that was used on Hill Rise. Initially, transect records were used to determine the date at which the population was both large and stable enough to justify a study. Over a period of two hours on 18th July 1995, an attempt was made to capture, mark and release all

Gatekeepers observed on the site. The marking was performed through the net onto the ventral surface of the hindwing; the number so marked was recorded. Exactly a day later, the exercise was repeated, this time counting not only the captured total but also the total recaptures of those marked on the previous day. Calculations based on these figures give a population figure of 296. Allowance has to be made for migration, emergence, death, non-uniformity of the sampling area and statistical error. Taking these errors into account the limits of the populations are established as 296^{+108}_{-119} (see Note 3).

Assuming that the transect records represent a fair estimate of changes in relative population size over the season, the population size remained numerically fairly constant over about 28 days with a weekly mean count of 43. Adding the tails of the flight period and assuming an adult residence time of 4 days, the total number of the Gatekeepers on the site over the season was between 1239 and 2828.

Adult residence time

Residence time refers to time spent on the site. It is not equivalent to lifetime as the studies cannot differentiate between loss from emigration and loss from death. Subsequent to the mark and release study on the 18th and 19th July, visits were made to the site and individuals captured and examined for previous marking. One individual was seen from the previously marked set on July 20th, and another on July 22nd. Although the numbers caught are far too low to permit the plotting of a residence time curve, it is fair to assume the adult residence time is ≥4 days. Studies on Meadow Brown give mean residence times varying between 3.3 and 12.0 days, and maximum residence times of up to 28 days (Warren 1992). Given the similarities of phenology, and despite the wider habitat preferences of Meadow Brown (Brakefield 1987), it is reasonable to expect the data on the Gatekeeper to be similar to that of the Meadow Brown.

Minimum area required to support a viable population

There are many references to the fact that the Gatekeeper is a sedentary species living in closed populations (e.g. Thomas and Lewington 1991). Warren (1992) gives the minimum area required to support a viable population as 1 – 2 ha. Hill Rise has an area of about 0.6 ha. The table below shows the indices of abundance (defined as the sum of the weekly means of counts for a given species over one season in a defined area [Pollard and Yates 1993]) and other data from 1992 to 1995 inclusive.

Year	Index of abundance	Comment
1992	n/a	"very common during July"
1993	121 (inferred)	
1994	117	
1995	205	

Thus, it is clear that a flourishing population has existed on the site for at least 4 years. The surveys external to the site (referred to above), together with additional surveys undertaken on all suitable and accessible areas within 500 metres of the site (visited during July and August 1995), show that if the group of Gatekeepers on Hill

Rise forms part of a metapopulation, it is by far the largest fraction of it. Clearly the species must have a degree of mobility, or the reported increase in its range could not have occurred (Pollard and Yates 1993 and, more generally, Shreeve 1992, 1995). However, this does not invalidate the inferences drawn here.

Discussion

It is clear that Hill Rise is a small site, which necessarily limits the numbers of Gatekeepers available for study, and that studies have been conducted over effectively no more than two seasons. Nevertheless, some tentative conclusions can be reached.

- The Pollard and Yates model for the temperature dependence of the mean flight of the Gatekeeper corresponds better with the data from Hill Rise than the Brakefield model.
- The length of the flight period, within the limits of the study, is not dependent on the July and August temperature.
- The population during the plateau of the flight period in 1995 was between 177 and 404, suggesting a total of around 2072 individuals over the season.
- The mean residence time of the adult is 4 days.

With rather more confidence, we can conclude that the published estimates of 1 – 2 ha being the minimum necessary area to support a viable population are incorrect, and that a self-sustaining population can be supported on an area of ≤0.6 ha, without any significant reinforcement. The establishment of a viable population was almost certainly due to the management regime, which created a suitable habitat from an initially suboptimal site.

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NOTES

1. The data given in Brakefield (1987) allows the derivation a formula predicting the mean flight date d (in days from July 1st) given the mean maximum June temperature t_1 (in °C):

$$d = 126.1 - 5.6t_1$$

Brakefield's data was collected from 20 sites between 1976 and 1985, and shows that t can account for 75 per cent of the variation of d ($r = 0.87$).

2. The data in Pollard and yates (1993) expresses as:

$$\Delta d = -4.2\Delta t_2$$

where t_2 is the °C rise in the mean June temperature.

3. If a = total number originally marked, n = total number in the second sample and r = total recaptured, the population P can be obtained from the Lincoln Index:

$$P = an/r \quad \text{(Lincoln 1930)}$$

However, if the recapture sample is fairly small (<20), a more accurate value is obtained from:

$$P = a(n + 1)/(r + 1) \quad \text{(Bailey 1951, 1952),}$$

which reduces the bias in P from a reciprocal to a negative exponential function. Substituting the values found, $a = 37$, $n = 39$, $r = 4$, we get:

$$P = 296$$

a) Errors of emergence, death and migration

Allowance must be made for emigration/immigration and for emergence/death. Regarding the first, a survey was conducted on 18th and 19th July along the boundary of the site, either directly adjacent or on the nearest road. On each day, 3 individuals were seen. None had been previously marked. All six individuals flew either along the boundary or re-entered the site. No other large populations of *P. tithonus* exist nearby, so there is a strong presumption that the individuals seen originated on the site. (Six transect surveys were conducted in the adjacent Bedford Cemetery over July 1994 and July 1995 – one individual was seen. About 200m of hedge, with a closest approach of 100m to Hill Rise was surveyed on July 19th 1995: 3 *P. tithonus* were seen.) Thus the worst case is that 3 out of 37 marked individuals left the site between capture sessions, leading to an overestimate of the population by 24. The error induced by emergence and death is estimated by assuming a mean adult lifetime of 4 days (see section on adult residence time). This would lead to the population being overestimated by 74.

b) Sampling area errors

There is an implicit assumption above that *P. tithonus* is uniformly distributed over the site and that there is an equal chance of capturing any individual. In fact, *Rubus* stands make some sections inaccessible, yet individuals can be distantly observed in them. Given the observed behaviour of this species in perching, or patrolling a limited area, it is likely that some sections of the population remained unsampled. The inaccessible area is estimated at about 20 per cent of the accessible, so the value of P may be underestimated by 59.

c) Statistical error

Binomial statistics apply, so given that the probability p of capturing a previously marked individual is 0.103, the error E is given by $\pm\sqrt{[np(1-p)]}$, where n = number of trials. In this case $E = \pm 0.304$, or ± 90 individuals.

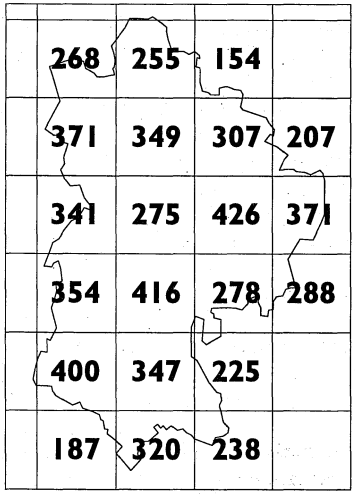
So, taking all errors in quadrature, we establish the limits of P as:

$$P = 296^{+108}_{-119}$$

Address: 3 Constable Hill, Bedford MK41 7LJ.

MACRO-MOTHS (Lepidoptera)
Report of the Recorder

The weather that is experienced each year has a very important part to play in moth recording. The early part of 1995 was the usual mixture of mild weather, but with a number of spring nights that were very cold. The latter part of the year was of a similar nature, but the redeeming factor for 1995 was the long hot summer. This allowed more field work to be undertaken than had been possible for several years. It was hoped that trapping could be done in every 10Km square during 1995 - this proved to be rather too ambitious, however, new species were recorded from every 10Km square. A mixture of locations were examined, some were sites that had either not been visited before, or for a very long time. Others were areas where moth trapping has been carried out over a number of years. As there were so many for 1995, I decided that it would be of interest to provide a list of them all, with the initials of those who provided the records.



Number of species recorded in each 10km square – as at 31/12/95

Moth Trapping Locations of 1995.

Holywell Close, Studham, (CB), TLO1I; Dell Farm, Whipsnade, (JK-G), TL01D; Elaine Gardens, Woodside, (PS), TL01U; Old Bedford Road, Luton, (NHB), TL02W; Maulden Woods, (VWA), TL03U; The Silver Birches, Kempston, (HW), TL04I; Kingswood, Houghton Conquest, (VWA, CB, DVM), TL04K; High Road, Cotton End (1994 records only) (MB, CTu), TL04X; Clapham Park Wood, Clapham, (VWA, DVM), TL05L; Queens Drive, Bedford, (JEC), TL05Q; Hillands Plantations, Melchbourne, (VWA, DVM), TL06H; Birchwood Cottages, Luton Hoo, (VWA), TL11D; Dellcote Close, Stopsley, (VWA), TL12B; Pegsdon Hills, (VWA, CB), TL12J; Chicken Hole, Pegsdon, (CB), TL13F; London Road, Biggleswade, (RR), TL14X; The Lodge, Sandy, (JEC), TL14Y; Spring Hill, Little Staughton, (VWA, DVM), TL16B; Whipsnade Wild Animal Park, (CB), SP91Y; Bison Hill, Whipsnade, (CB), SP91Z; RIS, Northall Close, Eaton Bray, (GBu), SP92Q; Green Timbers, Aspley Guise, (JBB), SP93H; Manor Close, Salford, (JAM), SP93J; Hanger Wood, Stagsden, (PA, VWA, CB, DVM), SP94Z; The Moor, Carlton, (HAS), SP95M; Barham House, Harrold, (HAS), SP95N; Salem Thrift, Bromham, (VWA, CB, DVM), SP95V; Glebe Rise, Sharnbrook, (DVM), SP95Z; Louse Acre Wood, Nr. Sharnbrook, (MH, SW), SP96Q; West Wood, Knotting, (MH, SW), SP96W; Whitecrofts, Stotfold, (BB, EB), TL23D; RIS, Cockayne Hatley, (IPW), TL24P (RIS = Rothamstead Insect Survey).

Records were also received from a number of people throughout the county, either from their gardens, or from casual observations. During 1995, two new macro-moths were recorded for the county and two species that had not been observed for many years also reappeared.

SPECIES LIST

The following list contains new species, comments on species of particular interest, and an update of the current status of some of the county records. All numbers and English names are as per *A Recorder's Log Book or Label List of British Butterflies and Moths* by J.D. Bradley and D.S. Fletcher (Curwen, London 1979). Species with an * are new county records.

380 **Red-Tipped Clearwing**
A specimen emerged from sallow, collected by W.J. Champkin, from a site near the River Ouse in Bedford, in July 1995.

1637 **Oak Eggar**
Mr & Mrs C. Baker recorded this moth, flying in bright sunshine from Wilden on 22nd July and Warren Wood, Clophill on 29th July. A.H. Smith took a female at light in Carlton on 25th July and a further specimen was reported from a R.I.S. trap at Cockayne Hatley on 23rd July 1995.

1680 **Maidens Blush**
A single specimen came to light at Kingswood, Houghton Conquest on 31st July 1995.

1735 **Ruddy Carpet**
A single specimen came to Mr & Mrs E. Bowskill's light trap in Stotfold on 15th July 1995. This is the first record for this species since 1911, when R.P.K. Rylands recorded it from Putnoe.

1789 **Scallop Shell**
One specimen was found in a flooded moth trap at Hillands Plantation, Melchbourne on the 15th July 1995.

1856 **Larch Pug**
At light, Birchwood Cottages, Luton Hoo on the 25th July 1995 and from a R.I.S. trap at Cockayne Hatley.

1870 **Chimney Sweeper**
Recorded from Aspley Guise, Shillington, Yeldon and Pulloxhill as well as its usual locations of Dunstable Downs and Bison Hill, Whipsnade.

1964 **The Annulet**
One specimen came to C. Baker's light trap on Bison Hill, Whipsnade on 16th August 1995. This species had not been recorded in the county since July 1964.

1972 **Convolvulus Hawk-moth**
Mr & Mrs Keech photographed a specimen of this migratory species on a telegraph pole in Colmworth on the 9th July 1995. B. Dickerson reported a further specimen from Wellington Street, Bedford on 12th September 1995. (Plate 7)

1973 **Death's-head Hawk-moth**
During 1995, Mrs N. Browne supplied me with two records for this species. Luton Museum grounds on 20th September 1964 and Kensworth Quarry on 7th September 1970.

1978 **Pine Hawk-moth**
This species was recorded at two new locations during 1995, Spring Hill, Little

Staughton and West Wood, Knotting. D. Tyler found a fully grown larvae at the Lodge, Sandy on 23rd September 1995 and a pupae at Stamford Pits, near Clifton.

1979 **Lime Hawk-moth**
I.P. Woiwod recorded larvae of this species feeding on a purple variety of Norway Maple in Cockayne Hatley during August 1995.

2033 **Black Arches**
Recorded from three new locations during 1995. Birchwood Cottages, Luton Hoo on 25th July 1995, Kingswood, Houghton Conquest on 31st July 1995 and Hanger Wood, Stagsden on 8th August 1995.

2057 **Garden Tiger**
Although this species was recorded from a variety of locations throughout the county in 1995, numbers seem to be much lower than in previous years.

2062 **Water Ermine**
This species was recorded from J.B. Barnwell's collection in error. Fresh documentation has revealed that the specimens came from Buckinghamshire.

2064 **Ruby Tiger**
A good year for this species. It was recorded from a variety of locations throughout the county.

2089 **Heart and Dart**
A very late specimen was recorded from The Lodge, Sandy on 18th October 1995.

2091 **Dark Sword Grass**
This species was recorded from a variety of locations throughout the county during 1995.

2153 **Bordered Gothic**
During 1995, R. Passley showed me a specimen of this uncommon moth in his collection, labelled "Stevington, 1964."

2159 **Dog's Tooth**
One specimen came to the R.I.S. trap at Cockayne Hatley on 7th August 1995. This species had not been recorded in the county since 1976.

2179 **Pine Beauty**
This species was recorded at three new sites during 1995, West Wood, Knotting; Glebe Rise, Sharnbrook and London Road, Biggleswade.

2185 **Lead-coloured Drab**
Recorded from Hillands Plantations, Melchbourne and London Road, Biggleswade.

2194* **White-point**
One specimen came to the R.I.S. trap at Cockayne Hatley on 3rd August 1995. A migrant species that could turn up anywhere in the county.

2211 **The Wormwood**
A specimen in the P.N. Crow collection in Glasgow is labelled "Eaton Bray 24th July 1963" which makes this the first county record.

2240 **Blair's Shoulder-knot**
This species has now been recorded in 12 out of 21 10Km squares in Bedfordshire.

2316 **Lesser-spotted Pinion**
At light, Green Timbers, Aspley Guise; Kingswood, Houghton Conquest on 31st July 1995 and at the R.I.S. trap at Cockayne Hatley on 14th August 1995.

2319 **Lunar-spotted Pinion**
At light, Kingswood, Houghton Conquest on 31st July 1995.

2375 **Large Wainscot**
At light, Glebe Rise, Sharnbrook and The Moor, Carlton. This species had not been recorded in the county since 1985.

2410 **Marbled White Spot**
A specimen of this uncommon moth came to light at Clapham Park Wood, Clapham on 10th July 1995.

2423 **Oak Nycteoline**
At light, Holywell Close, Studham on 6th May 1995.

2447* **Scarce Silver Y**
One specimen came to a light trap at Glebe Rise, Sharnbrook on 8th August 1995. This migratory species could turn up anywhere in the county.

2465 **The Four Spotted**
H.A. Smith recorded this species from the north-eastern corner of Yelnow New Wood on 21st June, 1995. A search for this moth at Sharnbrook Summit in early July failed to reveal this very attractive insect.

2470 **Small Purple-barred**
C. Baker recorded this uncommon moth from Bison Hill, Whipsnade on 18th May 1995. This moth had not been recorded in the county since 1985.

The following species have now been recorded from all of the 10Km squares in Bedfordshire.

14	Ghost Moth	2026	The Vapourer
1764	Common Marbled Carpet	2069	The Cinnabar
1768	Grey Pine Carpet	2334	Rustic Shoulder Knot
1921	Scalloped Oak	2340	Middle-barred Minor
1981	Poplar Hawk-moth	2381	The Uncertain
1984	Humming-bird Hawk-moth	2434	Burnished Brass
1994	Buff Tip	2469	The Herald

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V.W. ARNOLD

SOME HISTORICAL MOTH RECORDS FOR BEDFORDSHIRE PART 4

by V.W. Arnold

In the *Bedfordshire Naturalist* for 1994 (*Bedf. Nat.* **49** [Part 1] 66-70), I provided some information on both historical moth records and on some of the naturalists of the past who had studied or collected lepidoptera in Bedfordshire. This article is intended to provide some more information on this interesting, if frustrating, subject.

Margaret Emily Shore, 1819-1839

Miss Shore lived in Potton and then at Woodbury near Everton. She was mainly interested in birds, but her Journal, which was published in 1891, does contain a few useful references to moths.

William Bond-Smith, 1865-1949

W. Bond-Smith ran a grocery business in Potton and was a County Councillor. He owned a valuable collection of butterflies and moths, which he either caught or bred. The fate of this collection is not known.

Ralph Paul Kirklands Rylands, 1883-1926

Ralph Rylands' collection is in Bedford Museum. There are a number of specimens from Bedfordshire, as well as from a variety of places within the British Isles. Little information has been discovered about this man apart from the fact that all of his Bedfordshire specimens were collected between 1907 and 1911. Some have no data labels and some data labels have no specimens (due to pest damage over many years). It is still unknown why his collection remained in the museum and why he was in Bedford. The Rylands family owned a wire rope company in Warrington during the first half of the 19th Century. John and Martha Rylands lived at Bewsey House, Warrington in 1837. Two of their sons, Thomas Glazebrook and Peter were among the founder members of the Warrington Natural History Society in 1838. Thomas Glazebrook Rylands had two sons, John Paul and William Henry. Ralph Rylands was the son of John Paul. He attended Clifton College, near Bristol between September 1897 and July 1898, was in business with Pearson and Knowles, Coal and Iron Company of Wigan, and a member of the Lancashire and Cheshire Entomological Society between 1910 and 1920, with an address at 11, Alton Road, Birkenhead.

W. Temple

Rylands noted Temple's address as 80, Ampthill Road, Bedford, but apart from this, little information has been discovered about this entomologist. Part of his Bedfordshire collection [the Geometridae] is in the Colchester Museum, but the fate of the rest of his collection is not now known. He collected in Bedfordshire between 1906 and 1911 and as some of the dates match those from Rylands collection they obviously collected together. On the 12th January 1912, he gave a paper to the Bedford Amateur Natural History Society on moths. It is hoped that more information will eventually come to light on this enigmatic figure.

Species List

The following list contains new species (marked with an *) and comments on species of particular historical interest. It also contains species which were included in last year's Journal either in error, or with incorrect dates. These all came from the Kershaw collection, which has been re-examined by A.M. Riley and myself. All numbers and English names as per *A Recorder's Log Book or Label List of British Butterflies and Moths* by J.D. Bradley and D.S. Fletcher (Curwen, London 1979).

164 **Cistus Forester**
Specimens in the Kershaw collection are labelled "Barton Hills 1911 and Sharpenhoe 1948". There are also specimens in the Oxford Museum's Services collection in Standlake, Oxford, labelled "Bedford District 17th June 1909" and "Pegsdon 15th June 1917, W.G. Nash".

370 **Hornet Moth**
Recorded by M.E. Shore in her Journal as "16th May 1835, *Sphinx apiformis* seen." There are also specimens in the Kershaw collection labelled "Bedfordshire July 1924 and July 1930, W.G. Nash" and in B.B. West's collection labelled "Bedford 1st July 1924, W.G. Nash."

371 **Lunar Hornet Moth**
There is a data label in Bedford Museum, "Kempston, 1911, R.P.K. Rylands."

379 **Red-belted Clearwing**
A specimen in the Kershaw collection is labelled "Woburn Sands, 1933, G. Hawes." As no other location is given, this record could have come from Buckinghamshire.

380 **Red-tipped Clearwing**
There is a data label in Bedford Museum, "Kempston, R.P.K. Rylands" and a specimen in the Kershaw collection labelled "Woburn Sands, 1933, G. Hawes." As no other location is given, this record could have come from Buckinghamshire.

1634 **The Lackey**
M.E. Shore in her Journal for 23rd June 1832, wrote a very accurate description of the larvae of this species.

1667 **Blotched Emerald**
Specimens in Colchester Museum are labelled "Twin Woods, Bedford, 30th June 1906 and 5th July1906, W. Temple."

1676 **The Mocha**
Specimens in Colchester Museum are labelled "Twin Woods, Bedford, 16th June 1906, 17th June 1907 and 13th June 1909, W. Temple."

1679 **False Mocha**
A specimen in the Kershaw collection is labelled "Aspley Heath, 1939."

1686 **Lace Border**
Specimens in Colchester Museum are labelled "Barton, 22nd June 1906, 25th June 1906, 15th June 1909, 16th June 1909 and August, 1911, W. Temple."

1690 **Small Blood-vein**
Recorded in Dale's calendar from near Bedford, 15th July 1819.

1715 **Plain Wave**
Specimens in Colchester Museum are labelled "Near Shefford, 20th July 1908 and 16th August, 1909, W. Temple." ("Near Shefford" could refer to Rowney Warren as it is known that Temple used to visit this location.)

1719 **Oblique Carpet**
A specimen in Colchester Museum is labelled "Bedford, 11th June 1910, W. Temple."

1731 **Chalk Carpet**
There are 12 specimens in Colchester Museum all labelled "Barton, 24th August, 1909, W. Temple."

1735 **Ruddy Carpet**
Specimens in Colchester Museum are labelled "Putnoe, 16th June 1908, 29th June 1909 and 8th July 1909, W. Temple." A specimen in Bedford Museum is labelled "Putnoe, June 1911, R.P.K. Rylands."

1739 **Wood Carpet**
Specimens in Colchester Museum are labelled "Putnoe, 29th June 1909 and 8th July 1909, W. Temple." A data label in Bedford Museum reads "Putnoe, June 1911, R.P.K. Rylands."

1761 **Autumn Green Carpet**
Two specimens in Colchester Museum are labelled "Bedford, 28th October 1908, W. Temple."

1762 **Dark Marbled Carpet**
Specimens in Colchester Museum are labelled "Flitwick, 25th July 1908 and July 1911; near Shefford, 19th August, 1909; Twin Woods, 2nd June 1910; Putnoe 7th and 8th June 1910 and Bedford, 13th September 1910, W. Temple." A specimen in Bedford Museum is labelled "Twin Woods, R.P.K. Rylands", but no date is given. This species was not recorded in the *Victoria County History* (VCH) for Bedfordshire, so the records from Temple are historically important.

1778 **May Highflyer**
A specimen in Colchester Museum is labelled "Bedford, 11th June 1910, W. Temple."

1794 **Sharp-angled Carpet**
Specimens in Colchester Museum are labelled "Near Shefford, 20th and 24th July1908; 17th July and 13th August, 1909, W. Temple."

1796 **Pale November Carpet**
A specimen in the Kershaw collection is labelled "Aspley Heath, 30th October 1937." This appears to be the first county record for this species.

1798 **Autumnal Moth**
A specimen in Colchester Museum is labelled "Hanger Wood, 29th October. 1908, W. Temple."

1819 **Mottled Pug**
Specimens in Colchester Museum are labelled "Twin Woods, May 1909 and Putnoe, 8th June 1909, W. Temple." This species was not recorded in the VCH for Bedfordshire so these records are historically important.

1864 **The Streak**
Specimens in Colchester Museum are labelled "Bedford, 7th October 1908 and 18th October 1909, W. Temple."

1874 **Dingy Shell**
Specimens in Colchester Museum are labelled "Flitwick, 18th June 1908 and 13th July 1909, W. Temple," and in Bedford Museum "Flitwick 15th June 1908 and 20th July 1909, R.P.K. Rylands." These are the first records for the county.

1884 **The Magpie**
Recorded in the natural history notebooks of Rev. T. Orlebar Marsh F.L.S., "1798, Clapham and Biddenham."

1918 **Lunar Thorn**
A specimen in Colchester Museum is labelled "Bedford, 21st June 1909, W. Temple." This is the first county record for this species.

1925 **Small Brindled Beauty**
A specimen in Colchester Museum is labelled "Bedford, 9th March 1910, W. Temple." This is the first county record for this species.

1931 **Peppered Moth**
Specimens of the melanic form, *carbonaria*, are in Colchester Museum labelled "Bedford, 18th and 29th June 1906 and 11th June 1910, W. Temple." These are the first county records for this form so far discovered. Two specimens in the same collection are of the form *insularia*. These are labelled "Bedford, 12th and 16th July 1906, W. Temple."

1933 **Scarce Umber**
Two specimens in Colchester Museum are labelled "Hanger Wood, 9th and 11th November 1909, W. Temple." A specimen in Bedford Museum is labelled "Hanger Wood, 11th November 1909, R.P.K. Rylands." As this species was not recorded in the VCH, this makes these records historically important.

1937 **Willow Beauty**
Recorded in Dale's calendar "near Bedford, 15th July 1819."

1943 **Great Oak Beauty**
A specimen in the Kershaw collection is labelled "Aspley Heath, 25th May 1953."

1945 **Brussels Lace**
Recorded in Dale's calendar "near Bedford, 30th May 1820."

1950 **Brindled White Spot**
The correct details for this species are "Aspley Heath, 4th June 1937; 13th June 1939 and 11th June 1947" and not "Aspley Heath 1929."

1958 **Clouded Silver**
Recorded in both Dale's notebook and calendar for "Clapham Park Wood, 1st and 2nd June 1820."

1973 **Death's-head Hawk-moth**
The Luton News for 28th August, 1941, reported that two caterpillars of this species had been found in a garden in Talbot Road, Luton. W. Bond Smith reported an emergence of this species in October 1896, (Vol. 8 Ent. Record Page 244).

1980 **Eyed Hawk-moth**
This species is recorded in Dale's calendar "14th July 1819 by ye river Ouse" and from "Clapham Park Wood for 31st May 1820 and 1st June 1820."

1984 **Humming-bird Hawk-moth**
Recorded by M.E. Shore in her Journal for 21st July 1835.

1994 **Buff Tip**
Recorded from Abbot's notebook for 23rd September 1799, when Mrs Abbot found twenty larvae on a young lime tree in St. Pauls Churchyard, Bedford.

2030 **Yellow-tail**
Recorded by M.E. Shore in her Journal for 21st July 1835 as "Brown-tail" (*Porthesia auriflua*) "Tail is yellow-brown."

2035 **Round-winged Muslin**
B.O.C. Gardiner and J. Renouf recorded this moth from White Wood, Gamlingay on 30th June 1957. This appears to be the earliest county record for this species.

2047 **Scarce Footman**
Recorded in Dale's calendar for 15th July 1819. No location was shown.

2061 **Buff Ermine**
Dale recorded this species in his calendar as "1st June 1820, Clapham Park Wood."

★ 2068 **Scarlet Tiger**
Specimens in the Kershaw collection are labelled "Aspley Heath 20 and 24th

September 1953." These are the form *bimaculata* and come at the end of a series of specimens all labelled "Bred." These are obviously not Bedfordshire moths. They were, presumably, labelled incorrectly.

2117 **Autumnal Rustic**

A specimen in Bedford Museum labelled "Putnoe, R.P.K. Rylands (no date)" appears to be the first county record for this species. Kershaw's collection contains a further early specimen, labelled "Aspley Heath, 1936."

2121 **Barred Chestnut**

The correct details for this species are "Aspley Heath 27th August, 1946" and not "Aspley Heath, 12th June 1953."

2122 **Purple Clay**

A specimen in Bedford Museum labelled "Flitwick, R.P.K. Rylands (no date)' appears to be the first county record for this species. Kershaw's collection contains two more early specimens labelled "Aspley Heath, 1937 and 1953."

2157 **Light Brocade**

A specimen in Bedford Museum labelled "Flitwick, 13th July 1909, R.P.K. Rylands" appears to be the first county record.

* 2206 **Devonshire Wainscot**

A specimen in the Kershaw collection is labelled "Aspley Heath, 6th July 1933." This comes at the end of a series of specimens from Devon. This specimen was either bred, released or escaped, as it is obviously not a Bedfordshire moth.

2214 **Chamomile Shark**

A specimen in Bedford Museum labelled "Twin Woods, June 1911, R.P.K. Rylands" makes this the first county record.

2237 **Grey Shoulder Knot**

R.M. Craske recorded this species as "common in Bedford between 1918 and 1927", however, the first known specimen that still exists is in the Kershaw collection labelled "Aspley Heath, 1945."

2265 **Flounced Chestnut**

R.M. Craske recorded this species as "local at light in Bedford between 1918 and 1927."

2269 **Centre-barred Sallow**

R.M. Craske recorded this species as "common in Bedford between 1918 and 1927."

2298 **Svensson's Copper Underwing**

This species was only distinguished from The Copper Underwing (2297) in 1968. However, A.M. Riley discovered that the Kershaw collection contains specimens of this moth labelled "Aspley Heath, 26th July 1938 and 4th September 1946." These specimens are in a series labelled "Copper Underwing, Aspley Heath."

2314 **Dingy Shears**

R.M. Craske recorded this species as "local in Bedford between 1918 and 1928."

2315 **Heart Moth**

Recorded by B.O.C. Gardiner and J. Renouf from White Wood, near Gamlingay on 29th and 30th June 1957.

2331 **Small Clouded Brindle**

During a re-examination of the Kershaw collection in January 1996, A.M. Riley discovered a specimen of this moth labelled "Bedford 30th May 1933." (It is possible that this was from W.G. Nash's collection.)

2462 **Mother Shipton**

Recorded in Dale's calendar "1st June 1820, Clapham Park Wood."

2463 **Burnet Companion**
Recorded in Dale's calendar "1st June 1820, Clapham Park Wood."

2465 **The Four-spotted**
A specimen in Liverpool Museum is labelled "Hanger Wood, 8th June 1907." Collector unknown. R.M. Craske recorded this species from "Twin Wood Lane, Clapham and Sharpenhoe between 1918 and 1927."

2466 **The Blackneck**
R.M. Craske recorded this species as "local on chalk between 1918 and 1927."

2469 **The Herald**
Recorded in Abbot's notebook as "found in the garden in the fly state, 2nd September 1799."

2480 **Buttoned Snout**
Specimens in Liverpool Museum are labelled "Bedford, 6th September 1909" and "Hanger Wood, 29th September 1910". Collector unknown.

2484 **Pinion-streaked Snout**
Specimens in Liverpool Museum are labelled "Shefford 17th July 1909 and 7th July 1910" collector unknown. (The collectors for species 2465, 2480 and 2484 may have been Rylands or Temple as they were active in these locations during this period.)

2488 **Common Fanfoot**
Recorded in Dale's notebook as "Clapham Park Wood, 2nd June 1820."

The following species were all recorded in error from the Kershaw collection.

1701 Dotted Border Wave	1949 Square Spot	2336 Double Lobed
1711 Treble Brown Spot	2183 Blossom Underwing	2379 Small Rufous
1940 Satin Beauty		

The following species are all recorded in J.C. Dale's notebook as being in Rev. C. Abbot's collection. No dates are shown and the only location is given as "Bedford", "prope Bedfordiam" or "Bedfordia."

1690 Small Blood-vein	1979 Lime Hawk-moth	2252 Large Ranunculus
1707 Small Dusty Wave	1980 Eyed Hawk-moth	2267 Beaded Chestnut
1745 The Mallow	1981 Poplar Hawk-moth	2305 Small Angle Shades
1781 Small Waved Umber	1983 Broad-bordered Bee Hawk	2317 White-spotted Pinion
1875 Small White Wave	1997 Sallow Kitten	2337 Marbled Minor
1876 Small Yellow Wave	2011 Pale Prominent	2352 Dusky Sallow
1927 Brindled Beauty	2061 Buff Ermine	2364 Frosted Orange
1935 Mottled Umber	2163 Broom Moth	2443 Plain Golden Y
1951 Grey Birch	2221 The Mullein	2477 The Snout
1957 White-pinion Spotted	2248 Brindled Green	2488 Common Fanfoot
1962 Barred Red		

This list is not complete, but I hope to write a further article in the next Journal. The notebooks of Colonel S.H. Kershaw D.S.O. have now been discovered by C. Baker in Brighton Museum. It is hoped that more information on the moths of Bedfordshire can be obtained from this source during 1996.

I would like to thank the following for their help and assistance:
C. Baker, J. Bowdrey (Resource Centre, Colchester Museum), Miss R.A. Brind (Bedford Museum), Joyce Callard (Old Cliftonian Society), B.O.C. Gardiner, Miss J. Hatton (Entomology Section, Liverpool Museum), S.W. Humphrey, A. Leigh (Warrington Museum), A.M. Riley and I.P. Woiwod.

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MICRO-MOTHS (Lepidoptera)
Report of the Recorder

My report for 1995 includes the recording of fourteen species new to the county list. During 1994 and 1995 Charles Baker has visited museums and libraries seeking records made by early entomologists. His researches have brought to light our earliest reference to a micro-moth, *Tortrix viridana* (Linn.), by Revd. C. Abbott at Clapham Park Wood in July 1799. One new species for the county comes from J.C. Dale's diary for 1st June 1820 with a description of the larvae of a plume moth, *Pterophorus galactodactyla* ([D.& S.]), feeding on the leaves of Greater Burdock.

ADDITIONS TO THE BEDFORDSHIRE LIST

Yponomeutidae

Yponomeuta malinellus Zell., Sharnbrook (SP 95Z), 19 July

Coleophoridae

Coleophora hemerobiella (Scop.) Luton Hoo (TL 11D), 25 July
Coleophora adspersella Ben., Studham (TL 01I), 11 July

Oecophoridae

Agonopterix carduella (Hb.) Studham (TL 01I), 16 August

Tortricidae

Eucosma pupillana (Cl.) Biggleswade (TL 14X), 1 August
Cydia coniferana (Ratz.) Stockgrove Country Park (SP 92E), May 1995

Pyralidae

Thisanotia chrysonuchella (Scop.) recorded at Barton by W.G. Nash (Foster, 1934)
Margaritia sticticalis (Linn.) Cockayne Hatley (TL 24P), 31 July
Numonia suavella (Zinck.) Pegsdon Hills (TL 12J), 14 July

Pterophoridae

Amblyptilia acanthadactyla (Hb.) Sandy (TL 14Y), 10 July
Amblyptilia punctidactyla (Haw.) Studham (TL 01I), 17 July
Stenoptilia bipunctidactyla (Scop.) West Wood, Knotting (SP 96W), 14 August 1987
Pterophorus baliodactylus Zell. recorded at Barton by W.G. Nash (Foster, 1934)
Pterophorus galactodactyla ([D.& S.]) larvae recorded at Clapham Park Wood (TL 05H) by J.C. Dale, 1 June 1820

ACKNOWLEDGEMENTS

I would like to thank the following for records and assistance:
P. Almond, V. Arnold, C. Baker, Mrs B. Bowskill, Ms J.E. Childs, I.K. Dawson, B. Dickerson, P. Madgett, B.S. Nau, R. Revels, H.A. Smith, I. Woiwod.

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D.V. MANNING

SOCIAL WASPS
Report of the Recorder

1995 seems to have been a good year for at least three species of social wasps in Bedfordshire, with Common Wasp, *Vespula vulgaris*, the Median Wasp, *Dolichovespula media*, and the Hornet, *Vespa crabro*, being recorded widely within the county.

The Hornet seems to be well distributed in mid and north Bedfordshire, with records from more than 25 different localities. However, the only records from south Bedfordshire come from the Luton Hoo area. Please keep a look out for this impressive insect during 1996 in the southern half of Bedfordshire and let me have your records.

The Median Wasp, *D. media*, continues to thrive, with Pest Control officers Tom Thomas (Luton area) and J. & D. Hillyard (Ace Pest Control) working in mid and north Bedfordshire, reporting that they have dealt with between 20–50 nests each.

Of the scarcer species the Norwegian Wasp, *D. norvegica*, was only reported from Luton (Tom Thomas) and from my garden in Biggleswade.

The Saxon Wasp, *D. saxonica*, which was first recorded in the county last year, was only reported during 1995 from the RSPB at Sandy, where a dead worker was found in a light shade that was being cleaned out in the autumn by Ian Dawson.

If anyone finds an aerial wasps' nest either in shrubs or on the side of a building, please let me know before having it destroyed, so that I can identify the species and photograph the nest.

Hornet *Vespa crabro*

TL11D	Luton Hoo. In garden & at moth trap, seen most years.	VA
TL145433(L)	In Warden Warren & nearby cottage, seen frequently.	RR
TL149422(L)	Ivy blossom, Southill Estate, seen frequently.	RR
TL199443(X)	John Green's garden, 1994 & 1995.	JG
SP943515(K)	Woodside Cottages, Turvey Estate, two nests.	AS
SP96Q	Brownage Wood, one 26.6.95.	AS
TL05C	Radwell pits, one 7.7.95.	AS
TL061669(T)	Swineshead Wood, one 27.9.95.	AS
SP95X	Woodcraft Wood, Stevington, one 27.9.95.	AS
SP95N	Harrold Country Park, one 30.9.95.	AS
TL034610(F)	Galsey Wood, one 1.10.95.	AS
TL16K	Duloe Brook, Staploe. Hunting insects, 4.8.95.	VA
SP94Z	Hanger Wood, Stagsden. At M.V. light, 8.8.95.	VA
TL06H	Melchbourne Woods. At M.V. light & seen 16.9.95.	VA & RR
SP93H	Aspley Guise. At M.V. light July/Aug 95.	JB
SP93Z	Sharnbrook, Dave Manning's garden.	DM
TL130446(H)	Palmers Wood, Old Warden. Nests tree & shooting hut.	DH
TL14H	Nest in Coldharbour Farm house, Old Warden.	DH
SP9833	Nest in Farmhouse in Eversholt.	DH
TL152454(M)	Ickwell Green, The Old House, 1.5–19.10.95.	ND
TL145456(M)	Ickwell Bury 14.8.95.	ND

TL143370(N) Meppershall garden of Betty Chambers. Fourteen caught in wasp trap 18.8.95 and one in compost heap hibernating 12.10.95. ND & BC
TL139440(G) Old Warden. One flew into car of Mike Dawson 18.8.95. ND
TL061518(Q) Putnoe Garden of David Wood. ND
SP995449(X) Wootton Wood. Seen on BNHS fungus foray 16.10.95. SH
TL073504(Q) Bedford Garden. Male on pine feeding on honeydew Sept. 95. AK
TL255434(K) Potton Wood. Singles seen hunting insects July 95. IW & RR
TL05A In garden Aug. 95. PA
TL14J or P Mogerhanger. Nest in tree stump in garden Sept. 95. DH
SP948328 In Woburn garden from 13.8.95 until 31.8.95. BN

Median Wasp *Dolichovespula media*

TL152454(M) Ickwell Green, The Old House. Wood scraping & feeding on *Berberis wilsoniae* in garden July/Aug. 95 ND
TL1234(H?) Shillington. Nest in garden July 95. MC
TL119443(X) Biggleswade garden. Feeding on *Berberis wilsoniae* July 95. RR
TL100400(Z&A) Chicksands Wood. feeding on flowers and hunting July 1995. RR
TL14U Sandy. Nest in Privet hedge 31.7.95. DH
TL03I or J Ampthill. nest in garden 22.7.95. DH
TL25A Everton. Nest in garden 22.7.95. DH
TL44Y or Z Cardington. Nest in garden 12.7.95. DH
TL14A Haynes. Seen in John Adams' garden July 95. RR
TL098419(V) Haynes garden. A nest. DP
Luton area Tom Thomas reports that he has dealt with about 20 nests in the Luton area this year. No grid references but road names given. TT

D. Hillyard reports that his son's Ace Pest Control firm has dealt with about 50 nests in mid and north Bedfordshire, slightly more than in 1994.

Norwegian Wasp *Dolichovespula norvegica*

TL199443(X) Biggleswade garden. Two on *Berberis wilsoniae* July 95. RR
Luton Nest in Luton garden 12' up house wall 12.6.95. TT

Saxon Wasp *Dolichovespula saxonica*

TL189478(Y) RSPB Sandy. One found dead in light shade 16.11.95. ID

Tree Wasp *Dolichovespula sylvestris*

Luton Several nests dealt with by Tom Thomas July 95. TT
TL152454(M) Ickwell, The Old House. Nectaring on *Berberis wilsoniae*, *Eryngium giganteum* and *Angelica sylvestris* in garden July/Aug. 95. ND
TL100400(Z&A) Chicksands Wood. Nectaring July 95. RR

Common Wasp *Vespula vulgaris*

TL152454(M) Ickwell, The Old House. In garden and nest in capped chimney with many coming down chimney into house. Nectaring and hunting in garden 4.4.95–26.11.95. ND

TL199443(X) Biggleswade garden. Common from spring until autumn. RR
Luton area Tom Thomas reports that this wasp and *V. germanica* are in all tetrads covering Luton. TT
SP915246(C) Paul Madgett sent specimens from a nest in a bird box in his garden in Linslade. PM

Ace Pest Control dealt with a number of non-aerial nests in mid and north Bedfordshire but did not report species or location (JH & DH). I have seen this wasp in almost every habitat visited during the 1995 summer. It must be our most common wasp in Bedfordshire (RR).

German Wasp *Vespula germanica*

TL199443(X) Occasionally seen in my garden. RR
TL073504(Q) Bedford garden with *V. vulgaris* feeding on honeydew on pine leaves. RR

Except for Tom Thomas stating that this species and *V. vulgaris* are present in all Luton tetrads, I have no other records. It seems far less common than *V. vulgaris*; Nancy Dawson did not see it in her garden and I only saw small numbers in my garden.

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I should like to than the following for sending me records:
P. Almond, V. Arnold (VA), J. Barnwell, R. Brind, B. Chambers, M. Chandler, I. Dawson, N. Dawson, J. Green, S. Hawkins, D. Hillyard, A. Keech, P. Madgett, D. Manning, B. Nightingale, D. Parsons, A. Smith, T. Thomas and I. Woiwood.

RICHARD REVELS

LICHENS
Report of the Recorder

The British Lichen Society has a Churchyard Project, one of whose objectives is that by the year 2000 at least one churchyard in every 10km square in lowland England should have been surveyed. There are approximately 791 such squares and at least 621 have already received this minimal coverage.

Our county has been well covered, mainly due to the fact that most of the habitats favourable to lichen growth are to be found in the county's churchyards and that the area around is well supplied with lichenologists! However, we still have a long way to go before we can hope to enter the species richness league tables. At the moment 27 churches in the country have more than 100 species, while our top churchyard is Sharnbrook with 59 species.

A recent visit to Bolnhurst church TL081587 revealed a total lichen tally of 48 species. These included lichens found growing on ironstone memorials e.g. *Caloplaca teicholyta, Diploicia canescens, Lecanora sulphurea, Lecidella scabra, Psilolechia lucida, Rinodina teichophila, Tephromela atra* and one lichen which is commonly associated with copper run-off, *Psilolechia leprosa*. This lichen is often found growing on copper-rich rocks associated with derelict mine buildings and mineralised outcrops and if the thallus is rubbed, blue inclusions of copper oxalate may be seen.

FRANCES B.M. DAVIES

THE FUNGUS FORAY 1995
WOOTTON WOOD

The fungus foray, led by Dr. D.A. Reid, was held at Wootton Wood on 15 October with about 30 people in attendance, many of whom must have been wondering what effect the long, dry and exceptionally hot summer would have on the numbers of fungi. In fact they were relatively plentiful with a total of 125 species collected of which 12 were new to the county.

Wootton Wood comprises a variety of deciduous trees, as well as a plantation of Scots Pine and one of Poplar in the NW corner. This mix of trees, and some nice damp areas explains, in part, the relatively large number of species collected.

Crepidotus lundellii has the typical appearance of species belonging to the genus. The fruitbodies are small, white, fan-shaped up to 3 – 4 cm in diameter, with brownish gills; it is distinguished under the microscope by having rather short, broadly amygdaliform, to almost lemon-shaped spores, measuring 6.0 – 8.5 x 4.0 – 6.0µm, which appear smooth to slightly rugulose under high magnification. [See also under Recorder's Report p.104].

Cortinarius rigidus, which favours damp birch woods, is a member of the subgenus *Telamonia,* and is rather frequent at national level. It is recognised by: its small hygrophanous, acutely conico-campanulate, dark umber or chestnut pileus, to 3.5 cm diameter; stipe to 4 cm high to 3mm wide, of a dark brown colour with a whitish velar band; lamellae rust-brown at maturity; smell of *Pelargonium*; and spores ellipsoid 8.0 – 9.0 x 4.5µm.

Inocybe abjecta is recognised by having: a small shallowly campanulate, brown pileus, to 2 cm diameter, although when young the ground colour is often obscured by white velar fibrils; a non-pruinose stipe to 4 cm high, 0.3 cm wide, which is very pale brown and in the young stage shows traces of a cortina on the apical portion. Microscopically it shows prominent lageniform, thick-walled cystidia on both gill face and margin, and brown, amygdaliform spores 8.5 – 9.5 x 4.5 – 5.0µm. *Inocybe grammata*, although often larger, with pileus to 4 cm diameter, is similar to the previous species. The acutely umbonate pileus is covered with silky white fibrils on a clay-brown background, which is often flushed pinkish. The stem, rather tall to 7 cm and to 0.5 cm wide, is pale brown with a pinkish apex, pruinose throughout, and – very importantly – terminates in a marginately bulbous base. Microscopically it has thick-walled, fusoid cystidia on both gill face and margin, and brown spores measuring 7.6 – 9.0 x 5.0 – 6.0µm, with a knobbly outline – the knobs low and difficult to count.

Lactarius cimicarius, like *L.serifluus* which is already known from Bedfordshire, has thin watery, whey-like milk; both species are rather small, and smell of bed-bugs, especially when dried. However, while *L.serifluus* has an orangy to red-brown pileus, that of *L.cimicarius* is dark bay-brown. The discovery of *L.semisanguifluus*, represented by a single fruitbody, is of considerable interest as it is a rare species in Britain, or perhaps more accurately one which is seldom reported. It belongs to that group of species which includes *L.deterrimus*, with orange coloured milk and flesh. In the latter species the flesh changes slowly to blood red after 30 minutes or more, whereas in *L.semisanguifluus* the colour change occurs very rapidly after only 2 – 3 minutes.

Mycena acicula – a common, striking, if tiny orange coloured species, must be familiar to most forayers. In contrast *M.adonis* is a far less common, though similar fungus distinguished by the coral-red colour of its cap and pink gills. *M.abramsii* is a rare species which I had not previously met with in over thirty years of "foraying among the funguses". Only a single fruitbody was collected. This had a sulcate pileus, 1.5 cm across, of a pale ashy-grey colour with a dark umbilicate disc, the surface appearing distinctly pruinose to the eye; a stipe 6 cm high and 0.1 cm wide, whitish above, becoming brown and polished below, with a white tomentose base; and lamellae grey, paling to the edge. Microscopically it had narrow ellipsoid to subcylindric, amyloid spores, measuring 9.0 – 9.2 x 3.2 – 4.0μm (although according to the literature the full range is in the region of 9.0 – 11.5 (13.4) x 4.5 – 5.8 (6.5)μm), and thin walled fusoid cystidia on both gill edge and gill face. In the past this fungus has been reported from Britain under the name *M.praecox*, but Maas Geesteranus (1980, 1984) has indicated that the correct name for the taxon is *M.abramsii*.

Naucoria spadicea is a dark date brown agaric, easily mistaken for one of those small brown *Cortinarius* species, and like many of them it occurs in damp boggy situations with *Salix* spp. It has: a small radially sulcate, campanulate, date-brown cap, about 2 cm diameter, which becomes paler on drying; a short stem about 1.5 cm high and 1.5 mm wide, covered in whitish fibrils, but which discolours brownish from below; and cinnamon-brown gills. Microscopically it is easily distinguished from similar species of *Cortinarius* by the presence of cheilocystidia. These are thin-walled, hyaline and subcylindric, with a subterminal constriction and a capitate or clavate apex; in this collection they measured to 40μm in length, 4 – 7μm at the slightly swollen base, and 5 – 8μm at the inflated apex. The spores are brown, amygdaliform with a papillate apex; they show a roughened ornament, and measured 9.5 – 13.0 x 6.0 – 7.0μm. Basidia are 4-spored and clamp connections are lacking from the hyphae throughout the fruitbody.

Species of *Pluteus* are not that well represented in Bedfordshire, so the collection of 7 species at Wootton Wood, including two species new to the county is noteworthy. *P.leoninus* is a striking species, easily recognised by its bright yellow cap, with a velvety surface , comprising filamentous hyphae. It has gills which are free from the stem and of a salmon pink colour. *P.granulatus* has a small buffy-brown to horn coloured cap, which is distinctly hygrophanous, and which quickly becomes opaque and paler on drying; it is beset at the centre with minute granular punctate scales, and when moist shows a translucently striate margin. The cap surface is formed of narrowly clavate or narrowly fusoid elements.

Tricholoma squarrulosum belongs to the *terreum/atrosquamosum* group of the genus with: a grey, convex, felty-fibrillose cap, to 6 cm in diameter, ornamented with blackish scales and fibrils; a similar stem also bearing blackish scales; greyish white gills; and flesh with a slight mealy smell.

Other unusual species collected, although previously recorded from the county, included *Amanita inaurata, Mycena crocata, Stropharia inuncta* and *Stereum subtomentosum*. *Mycena crocata*, found for the first time in Bedfordshire at Flitwick Moor in 1994, is notable for exuding orange "milk" where handled. It is a species typical of beech woods on chalk in southern England.

The finding of *Auriculariopsis ampla* at another site in the county was also pleasing, since it is a rare species in Britain. It was first discovered by George Hooper in December 1987 at Willington Wood, where it still persists. It produces small, dorsally attached helmet shaped fruitbodies, about 1 cm diameter, which could easily be mistaken for a Discomycete – i.e. a true Cup Fungus, until microscopic study shows otherwise. The cups have a pale ochraceous or light brown interior, ornamented with radial ribs or wrinkles from the point of attachment, contrasting with the white felty exterior. The cups have a firm gelatinous texture, and produce narrowly allantoid or sausage shaped-spores, measuring 7.5 – 12.0 x 2.5 – 3.0μm. *A.ampla* occurs gregariously on fallen branches of Poplar.

The list of species follows:

*Agaricus macrosporus; Amanita inaurata; Armillaria mellea; Bolbitius vitellinus; Boletus chrysenteron; Clitocybe flaccida; C.odora; Collybia dryophila; C.erythropus; C.peronata; Conocybe filaris; Coprinus comatus; C.disseminatus; C.impatiens; C.micaceus; C.plicatilis; Cortinarius acutus; *C.rigidus; *Crepidotus lundellii; C.variabilis; Entoloma nidorosum; E.rhodopolium; Galerina unicolor; Hebeloma sacchariolens; Hypholoma fasciculare; *Inocybe abjecta; I.eutheles; I.fastigiata; I.geophylla; I.geophylla var. lilacina; *I.grammata; I.maculata; I.squamata; Lacrymaria velutina; Lactarius britanicus; *L.cimicarius; L.quietus; *L.semisanguifluus; Macrolepiota rhacodes; Marasmiellus ramealis; Marasmius recubans; M.rotula; *Mycena abramsii; M.acicula; *M.adonis; M.cinerella; M.crocata; M.galopus; M.galericulata; M.inclinata; M.oortiana; M.polygramma; M.pura; M.speirea; M.vitilis; *Naucoria spadicea; Nolanea hirtipes; Oudemansiella radicata; Panaeolina foenisecii; Pholiota gummosa; Pleurotus ostreatus; Pluteus cervinus; *P.granulatus; *P.leoninus; P.nanus; P.phlebophorus; P.salicinus; P.umbrosus; Psathyrella candolleana; P.gracilis; P.hydrophila; Rickenella fibula; R.swartzii; Russula barlae; R.emetica; R.fragilis; R.nitida; R.puellaris; R.xerampelina; Simocybe centuncula; S.sumptuosa; Stropharia aeruginosa; S.inuncta; Tephrocybe rancida; *Tricholoma squarrulosum; Tricholomopsis platyphylla; T.rutilans; Tubaria autochthona; T.furfuracea.*

Auriculariopsis ampla; Clavulina cinerea; Coriolus versicolor; Daedaleopsis confragosa; Fistulina hepatica; Ganoderma adspersum; Hapalopilus nidulans; Hirschioporus abietinus; Hymenochaete rubiginosum; Inonotus dryadeus; Lachnella villosa; Leptotrimitus semipileatus; Leucogyrophana mollusca; Phlebia rufa; Schizopora paradoxa; Stereum gausapatum; S.hirsutum; S.rameale; S.subtomentosum; Thelephora anthocephala; Tyromyces caesius; T.stipticus.

Calocera viscosa; Dacrymyces stillatus.

Myxarium nucleatum.

Auricularia auricula-judae.

Phragmidium violaceum.

Lycoperdon pyriforme.

Ciboria batschiana; Mollisia ligni.

Daldinia concentrica; Diatrype stigma; Nectria cinnabarina; Xylaria hypoxylon.

Physarum cinereum; P.nutans.

Total 125 species

⋆ Species new to the county (12)

DEREK A. REID

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FUNGI
Report of the Recorder

During the year a number of records have been received, some going back over several years. These are listed below, and all contributors are warmly thanked. In addition some records have been culled from the literature.

BASIDIOMYCETES
AGARICALES

Agaricus silvaticus: Putnoe, autumn 1995

A species with brown scaly cap, reddening flesh, and small egg-shaped spores measuring 4.5 – 6.0 x 3.0 – 3.5 (4.0)µm

Agaricus bohusii: Putnoe, autumn 1995

Recognised by its clustered fruitbodies, the caps densely covered with brown fibrillose V-shaped scales, with free upturned tips; club-shaped cheilocystidia and ellipsoid spores, 6.0 -7.0 x 4.5 – 5.5µm.

Calocybe (Tricholoma) gambosum: border of scrubby wood, Dallow Down [TL06092135] Steve Hawkins, 7 May 1992.

A fairly robust, white, vernal species, with a strong mealy smell.

* *Coprinus friesii*: a group of about 8 fruitbodies on a garden lawn, 108 Brookfield Road, Bedford, George Hooper 1 Aug. 1994.

A tiny whitish species which grows on dead grass and rotting vegetation. The cap is acorn-shaped, sulcate, up to 6mm high, but expands with age; young caps are minutely floccose-scaly with velar remains, formed of narrow, branched, coralloid hyphae, with thickened walls bearing short spine-like excrescences. The dark brown spores are slightly lentiform, broadly ovoid to subglobose in face view, with a truncate germ pore, 7.0 – 9.0 (11.0) x 6.0 – 7.0 x 7.0 – 8.0 (9.0)µm.

**Crepidotus lundellii*: on the ground, Putnoe wood, George Hooper, 20 Sept. 1995.

This gathering and that collected during the fungus foray at Wootton Wood, would, hitherto, have been determined as *C.amygdalosporus* on the basis of spore shape, but in a recent paper Senn-Irlet (1995) has indicated that *C.lundellii* is a variable species with regard to spore shape. She indicated that she "did not find one single collection with exclusively amygdaliform spores; all collections have a certain percentage of oblong to broadly oblong spores". Accordingly she assigned *C.amygdalosporus* to synonymy under *C.lundellii*. Her nomenclature has been adopted here.

**Hebeloma pusillum*: under *Salix* spp. Clifton Plantation. Alan Outen, 5 Oct. 1993.

One of the smaller members of the genus, with a preference for damp boggy areas with willows. Cap seldom exceeding 25mm, and usually less, dark reddish brown at the centre, paling elsewhere to beige-brown, and to whitish at the margin. Stem whitish, narrow, to 30mm tall, and to 2.5mm wide. Gills clay colour, weeping along the edge. Cheilocystidia thin-walled, hyaline, very elongated with a club-shaped or capitate apex; the spores, 11.5 – 12.0 x 5.7 – 7.0μm, are brown, amygdaliform, and ornamented.

**Hemimycena candida*: on remains of *Symphytum* sp., alongside River Ivel, Clifton, Alan Outen, 23 Sept. 1993.

A tiny white mycenoid agaric, recognised in the field from its habitat: on rotting *Symphytum*. The cap, up to 10mm diameter, is flattened, striate; the gills are decurrent; and the stem up to 50mm tall, and 1mm wide. The spores are hyaline, narrowly fusoid, 8.0 – 11.0 x 3.0 – 4.0μm, and non-amyloid.

Lentinus lepideus: on railway sleeper, Luton to Wheathamstead railway line, just south of Luton station [TL09852135] Steve Hawkins, 10 Sept. 1992.

A tough leathery robust fungus of conifer stumps, or railway sleepers of coniferous origin. The pallid cap is ornamented with conspicuous brown scales, and is up to 80mm diameter. The stem, up to 60mm high, and to about 12mm wide is concolorous with, and scaly like the cap. The gills are widely spaced, cream coloured and have a strongly serrated edge; spores are thin-walled, hyaline, subcylindric, and measure 9.0 – 17.0 x 3.5 – 5.5μm.

**Marasmius limosus*: on remains of *Carex* and *Phragmites*, alongside the River Ivel, Clifton [TL160397], Alan Outen, 23 Sept. 1993.

Recognised from its habitat on remains of grasses and sedges and by its small delicate fruitbodies. The pale ochre-brown, shallowly convex cap, 1-3mm diameter, is marked with 6 – 10 prominent grooves which radiate from the centre; the stem is hair-like, blackish-brown, and up to 20mm in length; and the pale whitish gills are attached to a collar around the stem apex. Microscopically the surface of the cap is formed of pyriform cells, covered in minute peg-like protuberances as are the cheilocystidia; spores, 9.5 – 12.0 x 4.5 – 5.5μm, are thin-walled, hyaline, non-amyloid and elongated pip-shaped.

APHYLLOPHORALES

**Ceratobasidium calosporum*: on fallen branch of *Salix* sp. with *Tulasnella eichleriana*, Flitwick Moor, 12 Sept. 1991 [cited by Roberts, 1994b].

A resupinate, pruinose or waxy species when fresh, but barely perceptible when dry, which produces large, hyaline, elongated filiform-cylindric or sigmoid spores, measuring 23.0 – 36.0 x 3.0 – 3.6μm, according to the original description.

Heteroporus biennis: Putnoe, autumn 1995.

This bracket fungus forms tough leathery rosettes, to about 150mm across, which appear terrestrial, but in fact grow from roots or buried wood – often very close to the ground. Just occasionally the species occurs as solitary fan-shaped brackets on standing wood. The upper surface is felt-like, and either whitish or pale buff; pores are whitish but bruise pinkish in fresh material, and have an irregularly daedaleoid appearance. The spores are broadly ellipsoid to subglobose, 4.0 – 7.0 x 3.5 – 4.5μm.

**Subulicium lautum*: Maulden Wood, A. Henrici, 11 Sept. 1991. Specimen in Kew Herbarium. Cited by Roberts (1994a).

An inconspicuous resupinate corticioid fungus with prominent elongated projecting cystidia, to 150μm in length. These organs, which are slightly thick walled, have a broad base and taper to an acute apex. Blunt gloeocystidia are also present. The hyaline spores are thin to slightly thick walled and vary from globose to subglobose; they are non-amyloid. This species is normally found on coniferous wood.

**Tomentella pallidofulva*: R.S.P.B. Lodge, Sandy, George Hooper, 18 Aug. 1993.

A resupinate, rust coloured fungus, with yellowish-brown, globose, echinulate spores, 9 – 11μm diameter; the long pointed spines to 2μm in length.

**Tulasnella eichleriana*: on fallen branch of *Salix* sp. with *Ceratobasidium calosporum*, Flitwick Moor, 12 Sept. 1991 [cited by P.Roberts, 1994b].

An effused, resupinate, subgelatinous, violaceous-grey species with subglobose, pip-shaped or ellipsoid spores measuring 2.5 – 4.5 (6.0) x 2.5 – 3.5μm

ASCOMYCETES
DISCOMYCETES

Mitrophora semilibera: scrubby border of wood, Dallow Downs [TL06902135], Steve Hawkins, 7 May 1992.

This species is distinguished from species of *Morchella*, which it strongly resembles, by virtue of its brown, deeply pitted cap, hanging free and pendulous from the apex of the whitish stem. *M.semilibera* is seldom collected in the county probably due to its occurrence in spring.

**Mollisia discolor* var. *longispora*: Stockgrove, Beds. Natural History Society Foray, Alan Outen, 31 Oct. 1993.

Peziza micropus: on carpet in Vauxhall Viva car, Stopsley, Steve Hawkins, 12 Oct. 1992.

Fructification cupulate, 12mm diameter, with a short stalk, hymenium fawnish, outer surface paler, scurfy. Tips of asci blue in Melzer's reagent. Spores smooth, ellipsoid, 15.0 – 19.0 x 9.0 – 11.0μm.

**Sarcoscypha austriaca*: Ampthill, 22 Feb 1953.

This collection, originally reported as *S.coccinea*, was recently redetermined by Butterfill & Spooner (1995) as *S.austriaca*. The authors, in their paper on "*Sarcoscypha* (Pezizales) in Britain" have noted that "It is evident from the herbarium material that the relative abundance of these two species [*S.coccinea* & *S.austriaca*] has changed dramatically in recent years. *Sarcoscypha austriaca* has become more common and is now widespread in the British Isles. The previous predominance of *S.coccinea* has been gradually eroded to the extent that it is now only rarely collected; there have been only 5 collections of this species in the last 20 years".

According to Butterfill & Spooner (l.c.) the two taxa are distinguishable on microscopic characters as follows: in *S.coccinea* the hairs on the outer surface of the cup are straight to slightly sinuous, ascospores are mostly 9 – 12μm wide, typically with rounded ends, and never germinate to form conidia; and the paraphyses in the hymenium lack inflated segments toward the base; in contrast *S.austriaca* has the surface hairs strongly sinuous to coiled; ascospores mostly 11 – 14μm wide, usually truncate or indented at the ends, sometimes germinating in the hymenium to form conidia on short germ tubes; and paraphyses often with inflated segments towards the base.

★ = species new to the County.

DEREK A. REID

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FLOWERING PLANTS, FERNS AND FERN ALLIES
(Spermatophyta and Pteridophyta)
Report of the Recorder

Good progress was made in the recording of the flora and the aims of the Bedfordshire Flora Project (Boon, 1993) are still valid. Although the main emphasis is on the recording for sites, whether they are National Nature Reserves or interesting stretches of roadside verge with no conservation status, the tetrad mapping proceeds apace. From these data the 10km^2 records will be used for the Atlas2000 project of the Botanical Society of the British Isles. Funding for this national project has finally been received from the Department of Environment and a new atlas of the British flora will be published early in the new millenium.

The present survey continues the work carried out by John Dony who started his serious studies of the flora of the county in about 1946. As a consequence of his work Bedfordshire is probably one of the best recorded counties for flowering plants in the country. Few counties can boast two post war published accounts of the flora (Dony 1953, Dony 1976). John Dony was, almost, a founder member of the Society and was certainly one of its most eminent members. He held the recordership for flowering plants for forty years from the Society's inception until 1987. He was a main instigator in the conservation of the most important sites from which we all benefit today. Whilst Recorder he produced short, but informative, annual reports in the *Bedfordshire Naturalist* and wrote several important articles concerning the vegetation of specific sites in the county (Boon, 1991). The quality and quantity of recording carried out by John and Chris Dony during the first 40 years of the Society was incredible. Theirs was a difficult act to follow but I feel that the present flora project will be seen to uphold the botanical traditions in Bedfordshire.

The year 1995 produced some excellent finds. Perhaps the most exciting was the rediscovery of Proliferous Pink *Petrorhagia prolifera* (TL24E). This species has an interesting history. It was first found near Potton by Chris Dony in 1974. At that time the species was not considered to be a native to Britain, it was regarded either as a casual or an established alien, and thus had no conservation status. It had also been confused with a closely allied species but a recent article by Aleroyd and Beckett (1995) clarifies the situation and suggests that *P. prolifera* should be regarded as a British native. Its only other locality is in Norfolk which makes the Potton site very important, although at present this species still has no legal protection. Unfortunately the site is now a sand extraction quarry and the plant was considered extinct in Bedfordshire. However, a report reached me in early 1995 that a visitor (TD) to the county had in fact seen the plant on the edge of the quarry. A visit confirmed the presence of about 20 plants with one or two in flower. It appears to be somewhat precarious but, hopefully, with liason between conservation interests and the site owner the site will be secure (Plate 8).

An intriguing record (MA) was of Yellow Bartsia *Parentucellia viscosa* in some profusion on the roadside verge of the new Woburn to Woburn Sands road (SP93H). This is the second record for this normally coastal species in the county, the first being from Stanbridge in 1991 (Boon, 1992). The site was on disturbed ground and had been seeded with a wild flower mix. However, this did not contain Yellow Bartsia. It is always possible that the soil had been brought in but the provenance will probably remain unknown.

One of Bedfordshire's rarest plants is the true Oxlip *Primula elatior* which, although frequent in woodland in neighbouring Cambridgeshire, only occurs with us in Potton Wood, but only within a few yards of the county boundary (TL25K). A special Flora Group outing confirmed it is still present in the county albeit in small numbers. In the vicinity were many plants of the hybrid with the Primrose *Primula vulgaris* which has the scientific name *P.* x *digenea*. This hybrid is quite different from the Primrose - Cowslip (*P. veris*) hybrid, which is called False Oxlip *P.* x *polyantha*, which was also recorded. The hybridisation of the Oxlip with the Primrose is probably the cause for its decline.

Wild Celery *Apium graveolens*, found by JW in some ditches at Cotton End (TL04Y), had not been recorded since about 1955. JW also reported Mousetail *Myosurus minimus* from Millbrook Pillinge Pit. This unusual member of the Buttercup family seems to be on the increase with sightings nearly every year. Prior to 1987 it had not been seen for 10 years.

Gardens often harbour unusual "weeds". One such is Great Lettuce *Lactuca virosa* reported from a garden at Clapham (JT)(TL05G). When I went to see it it was about 2.5m high and still growing. It is a plant not often recorded, unlike its ubiquitous cousin Prickly Lettuce *L. serriola*.

During the year the Flora Group had several field trips to places such as Holcot Wood, Waterloo Thorns, Swineshead Wood and Kings Wood, Heath and Reach. Our annual joint meeting with the Herts Flora Group was at Blows Downs in July and enabled all to study a good quality chalk downland flora. Flora recording in the county is now well placed to move into the second 50 years of the Society's existence.

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CHRIS BOON

CHRISTINA MAYNE DONY
(1910-1995)
by Chris Boon

Chris Dony (née Goodman) passed away peacefully on 23 May 1995. Although not in the best of health during the previous months, her death came as a great shock to her family and friends. I first met Chris in 1975, soon after I moved to Bedfordshire and became interested in the local flora. From that time onwards I joined some of the botanical exploits of Chris and her late husband John around the county. These were wonderful occasions and from both of them I learned much of my field botany. Chris herself was an excellent field botanist, with a keen eye backed up by a wealth of knowledge. She was particularly good at the grasses and her enthusiasm for wool aliens, a Bedfordshire speciality, was unbounded. She seemed to have a second sight for locations of unusual species, often leaving the beaten track for no apparent reason, and then one would soon hear the call to see a new species for the day's records. One of her most interesting finds, on a visit to an old railway line in north-east Bedfordshire, was the discovery of an extensive colony of a *Petrorhagia* sp. This, after much deliberation, was identified as *P. prolifera* which has recently been designated as a British native species. In the intervening years, with no protection, the site has been nearly destroyed by sand extraction with the plant apparently being eliminated from the site. However, earlier this year (1995) a few plants were discovered at the edge of the sand quarry but, sadly, Chris did not live to hear that the plant had been rediscovered. I hope that the colony can be conserved, perhaps in her memory.

Christina Mayne Goodman was born in Selly Oak in Birmingham, into a family of three older sisters and later they were joined by a brother. She was educated at Edgbaston High School for Girls in Birmingham and, after leaving school, went to work in the family business, a builders and coal merchant, in Selly Oak. She worked there from 1932 for 30 years, eventually becoming a director. During the last war she did voluntary work in the ARP and at Birmingham Service Club, and, in addition, she worked nights once a week in an aircraft parts factory.

The Goodmans were a sporting family and Chris followed this course for many years with hockey being her main interest. She played centre forward for Edgbaston Ladies Club from 1929-1950, for the County of Warwickshire from 1939-1949 and for Midland Counties from 1932-1948. In 1935 she was a reserve for the England team and, finally, played for her country in 1937, 1946 and 1947, in the latter year being England Vice-Captain. Recently she reminisced to a reporter on the way international sport was conducted some 60 years ago "...we just turned up at the ground about an hour before the game and had dinner together afterwards" (*Daily Telegraph*, 12 May 1995). Although Chris had an early interest in natural history, it was to sport that much of her life was devoted at this time.

After the war, although continuing to play hockey, she became involved in natural history, joining the Birmingham Natural History Society in 1947. She was involved in recording for the flora of Warwickshire up to 1965, and, in the Flora, when published in 1971, it was noted that she was one of the main contributors of the field records.

One of her early botanical interests was the study of the alien flora, in particular the wool aliens of Worcestershire and it was through this that she met her future husband, John Dony. They were married in 1962 and she was soon involved in the botany of her adopted county, Bedfordshire, an area where there was also a good diversity of wool aliens. Naturally they were both members of the Bedfordshire Natural History Society, John being the Recorder for Flowering Plants, and together they led many botanical field meetings over the years. One recent memorable occasion was the 40th anniversary field meeting to Great Hayes Wood on 28 June 1986 - the first field meeting of the Society was at the same site on 18 May 1947. Chris was honoured with Life membership of the Society in 1991 for her contributions to the study of the flora of the County.

Following John's retirement from teaching in 1964 they devoted their time to the study of the flora of Bedfordshire and Hertfordshire. During the recording season it was not unusual for six days a week to be spent in the field, and it was only at Chris' firm insistence that at least half a day per week was spent on housework and shopping! Certainly it was only by this single-minded approach that they were able to complete field work for the local floras of these counties within a relatively short time period, an amazing six years for the *Bedfordshire Plant Atlas*. The work was definitely a team effort and John often told me that Chris really should have been a co-author of this and the Hertfordshire flora. *The Wild Flowers of Luton* was published in 1991 and, indeed, was accorded joint authorship.

Chris was involved in many important publications associated with the flora of Bedfordshire and the full references are detailed below. She carried out a detailed study of the spread of *Puccinellia distans* along the major routes through the county. In 1981 she started studying the dandelions of Bedfordshire and, in the following five years, with her co-workers, had recorded about 65 *Taraxacum* species for the county. This list was published jointly with Adrian Rundle and many additions were added in subsequent years. This study was one of the most important of recent years on the Bedfordshire flora, and it was due to her marvellous eye for detail that she became quite an expert in this difficult group. Following the publication of the *Bedfordshire Plant Atlas* in 1976 the study of the local flora did not stop and subsequent discoveries were duly published in a joint paper with John in *Watsonia*. Many important sites were resurveyed resulting in a comprehensive report detailing the important species present in virtually all the worthwhile sites of the county. This document is an invaluable local resource and, whilst it was written in John's inimitable handwriting, the content owes a great debt to Chris.

When, recently, I tentatively started work on recording for a new flora for Bedfordshire, Chris was very enthusiastic and, although somewhat frail, she took on the responsibility for the tetrad where she lived in Dunstable and was actively recording up to a few weeks before her death. She was still excited to be taken out to a favourite site to see that plants recorded many years ago were still flourishing. She was a mine of information on the sites for many rare local species.

In her last year she maintained an active interest in the botanical exploits in Bedfordshire and was always keen to hear about her friends still involved in the national botanical societies, the Botanical Society of the British Isles and the Wild

Flower Society. Chris made an outstanding contribution to the Bedfordshire and Warwickshire floras and will be remembered with much affection by all who knew her.

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Chris and John Dony by the River Ouse, Harrold-Odell Country Park 10.8.1982
Photo: Chris Boon

RECORDERS 1995

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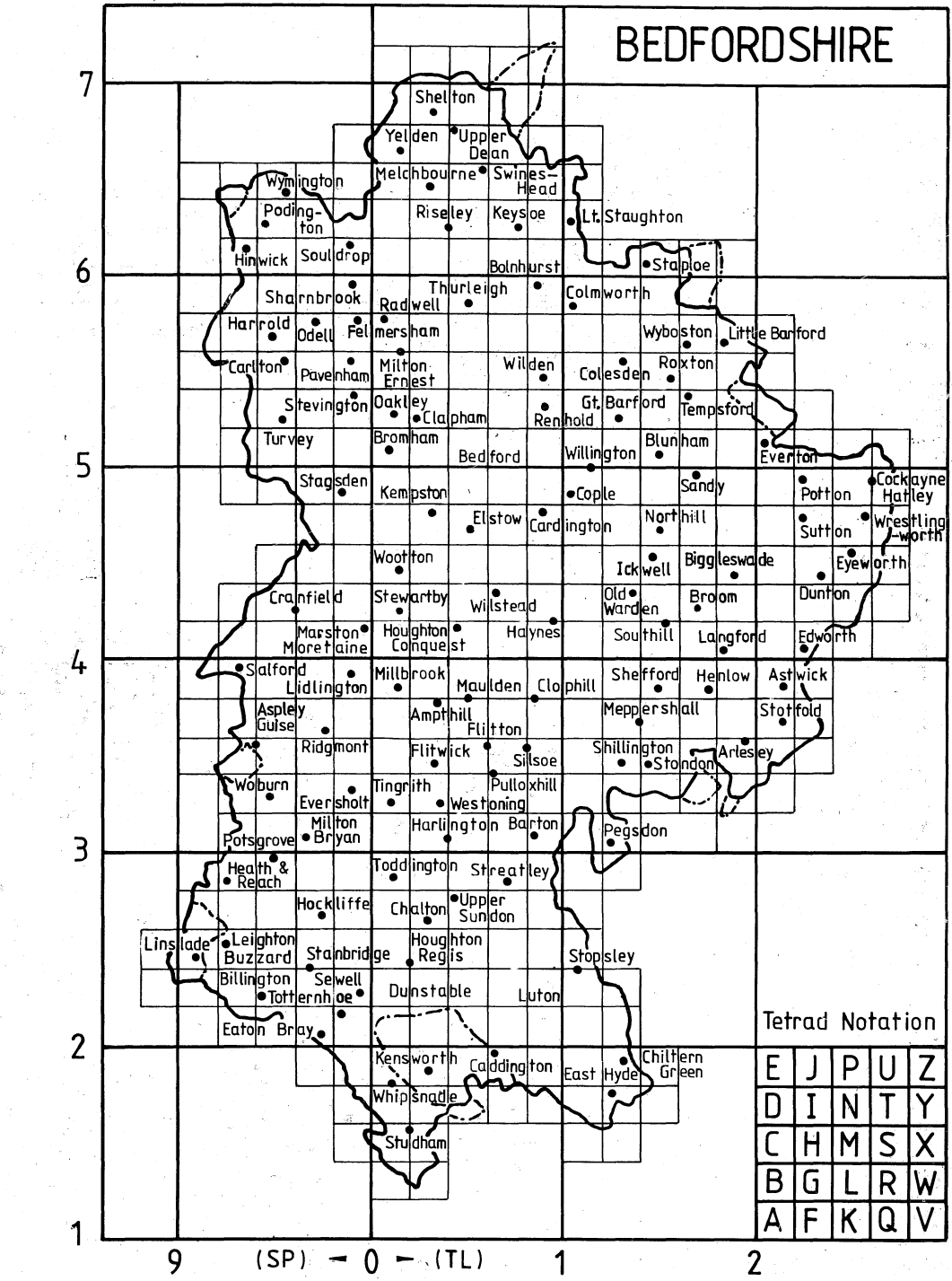
Where a species is not covered by one of the Society's Recorders please pass the record on to Miss R. Brind, Bedford Museum, Castle Lane, Bedford MK40 3XD.

THE SOCIETY

The Bedfordshire Natural History Society was formed in 1946 when a group of local naturalists joined together with the aim of giving the recording of natural history within the county borders a focal point. The Society now has over 20 Recorders who gather information on different disciplines of natural history and publish annual reports in the Journal of the Society, *The Bedfordshire Naturalist*. Other publications include *Bedfordshire Wildlife*, which gives a broad overview of our wildlife habitats, flora and fauna, the *Bedfordshire Bird Atlas*, mapping the distribution of breeding birds within the county from 1968 to 1977, and the more recent *Atlas of the Breeding Birds of Bedfordshire 1988–92*. Members of the Society also receive a quarterly newsletter, *The Muntjac*, and a programme of field meetings both locally and further afield. Throughout the winter a series of illustrated talks are arranged in different locations around the county; these are usually free to members and cover a wide variety of natural history related topics.

As a respected authority the advice of the BNHS is often sought when planned work may be detrimental to the local environment and its members regularly contribute to nationally organised surveys. Membership is open to all, whether resident in the county or not and whether novice or expert. Further information may be sought from:

The Bedfordshire Natural History Society,
c/o Bedford Museum, Castle Lane, Bedford MK40 3XD



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