The Bedfordshire Naturalist 51 (Part 1)

Journal for the year 1996

Bedfordshire Natural History Society 1997
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BEDFORDSHIRE NATURAL HISTORY SOCIETY 1997
(Established 1946)

Honorary Chairman:
Mr A. Cutts, 38 Mountfield Road, Luton LU2 7JN

Honorary Secretary:
Mr E. Newman, 29 Norse Road, Bedford MK41 0NR

Honorary Treasurer:
Mr P. Clark, 43 Montrose Avenue, Luton LU3 1HP

Honorary Editor (Bedfordshire Naturalist):
Miss R.A. Brind, 46 Mallard Hill, Bedford MK41 7QS

Honorary Membership Secretary:
Mrs M.J. Sheridan, 28 Chestnut Hill, Linslade, Leighton Buzzard, Beds LU7 7TR

Honorary Scientific Committee Secretary:
Mr J. Comont, 26 St Margaret's Avenue, Rushden, Northants NN1 9YH

Honorary Chairman of Bird Club:
Mr B. Nightingale, 7 Bloomsbury Close, Woburn MK17 9QS

Council (in addition to the above):
Mr J. Adams, Mrs G. Dickens, Mr P. Dove, Mr P. Glenister, Mr D. Green, Dr P. Madgett, Ms A. Proud, Mr P. Soper, Mr P. Wilkinson, Mr M. Williams

Honorary Editor (Muntjac):
Mrs S. Larkin, 2 Browns Close, Marston Moreteyne, Bedford MK43 0PL

Honorary Librarian:
Mrs G. Dickins, 9 Ullswater Road, Dunstable LU6 3PX

Committees appointed by Council:

Finance: Mr P. Clark, Mr J. Comont, Mr A. Cutts, Mr E. Newman, Mr K. Sharpe, Mrs M. Sheridan, Mr P. Wilkinson.

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

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Registered Charity No. 268659

THE BEDFORDSHIRE NATURALIST
No. 51 Part 1 (1996)
Edited by R.A. Brind
Photographic Editor : R.C. Revels

CONTENTS

The Bedfordshire Bird Report for 1996 is published separately as Part 2 of the *Bedfordshire Naturalist*

The Society would like to thank Bedford Borough Council for a grant towards publication of the Journal.

THE BEDFORDSHIRE NATURALIST

The Bedfordshire Naturalist is the official Journal of the Bedfordshire Natural History Society, a body which has been a prime contributor to botanical and zoological knowledge of the county. Published since 1946, the Journal is noted for its original papers on all aspects of natural history, especially distribution, status, population, habitat and field ecology. It caters for the professional and amateur alike and aims for the middle ground.

The Journal is published in two parts; Part 1 comprises meteorology, geology and all aspects of natural history excluding birds. Part 2 comprises the annual bird report and all articles relating to birds.

Relevant papers on the natural history of the county are welcomed. Guidelines are obtainable from the Editor who will be pleased to discuss inclusion of any articles.

Contact: Honorary Editor, Bedfordshire Naturalist, BNHS c/o Bedford Museum, Castle Lane, Bedford MK40 3XD

LIST OF COLOUR PLATES

Front cover : The Hairy Dragonfly, *Brachytron pratense*, was first recorded in the county during 1996. *Richard Revels*

REPORT OF COUNCIL FOR 1996

This was a very special year for the Society, being the 50th year following our formation in 1946. The Programme Committee and the special Golden Muntjac Committee have been particularly busy organising and running a programme of field and indoor meetings reflecting this anniversary, many being "Jubilee repeats" of meetings held during 1947. Maulden Woods, with which the Society has had a long association, was the site where the Golden Jubilee was launched in June. A series of guided walks on a range of natural history topics took place throughout the day for BNHS members and the general public.

Other Jubilee repeat field meetings were at Warden and Galley Hill, Luton, a visit to Bromham Mill, Cooper's Hill, Barton Hills, Potton and Cockayne Woods and Flitwick Moor. One special meeting in November was a Golden Jubilee repeat to Slimbridge Wildfowl and Wetlands Trust Reserve which coincided with their own 50th Anniversary; entrance fee Two Shillings!. Indoor meetings also reflected those held in 1947, with a look at areas of special interest in Bedfordshire based on discussion at the 7th Ordinary meeting in November 1947 and the Geology of Bedfordshire, first discussed in December 1947. A highlight of the summer for some members was the field trip to the Gower in Wales, organised by Paul Madgett. The 8th Bedfordshire Bird Conference, organised by Paul Trodd, was held on 23rd November and proved to be an excellent event supported by over 80 people. In all there were 36 field meetings and 18 indoor meetings during the year. The indoor meetings now benefit from the purchase of new projection equipment and thanks are due to Don Green for attending every meeting with the projector and stand.

Behind the scenes, much work has been put into preparing a *Red Data Book* for Bedfordshire. This is an arduous, analytical task requiring stern dedication. It is also a cooperative venture with the other main natural history interests, and will be the basis for writing local action plans and countryside management strategies for individual species and specialised habitats.

One major project which has begun is the preparation for a book of photographs of wildlife sites. Richard Revels is photographing sites throughout the county recording exactly where and when the photographs are taken. Coupled with text about the habitats and sites this will make a fascinating book showing the wildlife habitats present during the 1990s and the threats and others issues which face the countryside today.

It was with pleasure that we heard during the year that two early members of the Society have been awarded the MBE for their work in the field of natural history; Frank Gribble was a founder member of the Society and Edgar Milne-Redhead joined the Society shortly after its formation. It was, however, with sadness that we learnt of the death of Edgar Milne-Redhead later in the year.

The Finance Committee has been tasked with looking into the Society's reserves. Under new Charity Commission rules these must not be "excessive" unless held for future projects. To this end, Council expressed their desire to see more publications produced on the county's fauna and flora using our large collection of records and our members' expertise.

Council would like to thank the many people who have contributed to the work of the Society during the year, in particular the Golden Muntjac and Programme Committees promoting the Society, and the Society's Recorders and those members who have contributed to the important recording work in the county. Ro Madgett, Honorary Editor of the Muntjac is standing down after four years, and the quarterly newsletter and the Society has benefited from her enthusiasm. Although the book *The Butterflies and Moths of Bedfordshire* just missed a 1996 publication date, Council must thank all those members who made a tremendous effort this year to make the book as accurate and up-to-date as possible, in

particular the authors Vic Arnold, Charles Baker, David Manning and Ian Woiwod. Special thanks must go to Vic Arnold, who is standing down as Macro-moth Recorder after 20 years.

To mark the Society's Golden Jubilee, Council will seek to confer Honorary Life membership on two surviving founder members, Olive Key and Bernard Verdcourt.

Membership of the Society 1992–1996

	1992	1993	1994	1995	1996
Ordinary	435	450	430	414	395
Associate	62	68	41	48	66
Student	4	5	3	2	6
Corporate	12	13	10	7	9
Life	5	5	5	4	4
Hon. Life	1	1	1	1	1
Total	**519**	**542**	**490**	**476**	**481**

(Totals include Bird Club members)

ERROL NEWMAN
Hon. Secretary

PROCEEDINGS

Indoor Meetings

720th Ordinary Meeting 4th January, Bedford. Members' evening. Chair: Mr R. Revels.

721st Ordinary Meeting 16th January, Dunstable. "Farming and wildlife, 40 years on" by Richard Knight, Farming and Wildlife Advisory Group. Chair: Mr J. Niles.

722nd Ordinary Meeting 25th January, Aspley Guise. "The brilliant Kingfisher" by Mr B. Mason. Chair: Miss S. Alliez.

723rd Ordinary Meeting 30th January, Maulden. Bedfordshire Bird Club Members' Evening. Organiser: Mrs B. Matthews.

724th Ordinary Meeting 7th February, Bedford. "Batting for Bedfordshire" – the work of Bedfordshire Bat Group by Ms J. Childs. Chair: Mr J. Adams.

725th Ordinary Meeting 15th February, Luton "The marine wealth of our sea and shores" by Mrs F. Dipper, Marine Conservation Society. Chair: Mr M. Williams.

726th Ordinary Meeting 20th February, Dunstable. "Siberian Waders and Mammals" by Dr R. Prys-Jones. Chair: Mr R. Dazley.

727th Ordinary Meeting 7th March, Bedford. "The natural history of a rural garden" by Dr C. Welch. Chair: Dr B. Nau.

728th Ordinary Meeting 12th March, Dunstable. "An evening of microscopy" with the Queckett Microscopical Club. Chair: Mr C. Baker.

Annual General Meeting 19th March, Maulden.

729th Ordinary Meeting 24th September, Maulden. "The search for Sylvia" by Mr D. Cottridge. Chair: Mr B. Nightingale.

730th Ordinary Meeting 15th October, Dunstable. BNHS Members' evening. Organiser: Dr A. Aldhous.

731st Ordinary Meeting 24th October, Luton. "Fish of Bedfordshire Rivers – their status and conservation" by Mr A. Taylor, Environment Agency. Chair: Mr H. Winter.

732nd Ordinary Meeting 29th October, Maulden. "European seabirds" by Dr P. Evans, Edward Grey Institute of Field Ornithology. Chair: Mr B. Nightingale.

733rd Ordinary Meeting 6th November, Bedford. "Areas of Special Interest in Bedfordshire" by Miss R. Brind. Chair: Mr R. Revels.

734th Ordinary Meeting 19th November, Dunstable. "Orchids and butterflies of the Poitou-Charente area of France" by Mr N. Wilding. Chair: Dr W. Powell.
8th Bedfordshire Bird Conference 23rd November, Silsoe. Organiser: Mr P. Trodd.
735th Ordinary Meeting 26th November, Maulden. "Making birdwatching count" and "An autumn in Jordan" by Mr R. Bashford, British Trust for Ornithology. Chair: Mr B. Nightingale
736th Ordinary Meeting 4th December, Bedford. "The Geology of Bedfordshire" by Dr J. Eyers, Open University. Chair: Dr G. Bellamy.
737th Ordinary Meeting 12th December, Haynes. Christmas Quiz and Social Evening. Organiser: Mr R. Revels.

Field Meetings

Wildfowl & Wetlands Trust, Welney 7th January. Swans by floodlight. Leader: Ms J. Childs.
North Norfolk coast 11th February. Birdwatching. Leader: Mr D. Green.
Maulden Woods 10th March. Identifying trees from their bark and shape. Leader: Mr C. Taylor, Forest Enterprise.
Minsmere RSPB Reserve, Suffolk 24th March. Birdwatching. Leader: Mr P. Soper.
Blows Downs 21st April. Looking for spring migrants. Leader: Mr R. Dazley.
Lower Greensand quarries, Leighton Buzzard 28th April. Cretaceous rocks at Arnold's, Pratt's and Mundays Hill Pits. Leader: Dr J. Eyers, Open University.
Maulden Woods 5th May. Dawn Chorus. Leader: Mr P. Trodd.
Bedfordshire 6th – 9th May. Badger sett watches organised jointly with Bedfordshire Badger Network. Organiser: Mr R. Cornes.
Dunstable Sewage Treatment Works 8th May. Visit to the wader scrape. Leader: Mr P. Trodd.
Priory Country Park, Bedford 12th May. Migration Day. Organiser: Mr P. Almond.
Greensand Ridge 23rd May. Circular walk from Three Locks Picnic Site, by Grand Union Canal. Leader: Dr P. Madgett.
Maulden Woods 2nd June. Golden Jubilee "Springboard meeting" with guided walks for BNHS members and public. Leaders: Mr B. King, Mr P. Irving. Dr B. Nau.
Warden Hill & Galley Hill, Luton 9th June. "Jubilee repeat" looking at butterflies and downland plants. Leader: Dr T. Tween.
Gower, South Wales 14th – 16th June. Weekend visit. Organiser: Dr P. Madgett.
Stockgrove Park 21st June. Mothing evening. Leader: Mr V. Arnold.
Hilborough, Norfolk 29th June. Farming and wildlife including Stone Curlew and "Beetle Banks". Leader: Mr V. Cutsen.
Bromham Mill 6th July. "Jubilee repeat" of general natural history along the river. Leader: Mr P. Almond.
Sharpenhoe Clappers 12th July. Mothing evening. Leader: Mr V. Arnold.
Priory Country Park, Bedford 16th July. Identifying 'Bandit' and 'Brown' Pipistrelle Bats. Leaders: Ms J. Childs & Dr A. Aldhous.
Chicksands Wood 21st July. Woodland walk for butterflies. Leaders: Mr J. Adams & Mr D. Parsons.
Cooper's Hill, Ampthill 23rd July. "Jubilee repeat" meeting for general natural history. Leader: Mr R. Cornes.
John Dony Field Centre, Luton 26th July. Bat and moth evening including walk and talk. Leaders: Ms J. Childs, Dr A. Aldhous & Mr V. Arnold.
Barton Hills 28th July. "Jubilee repeat" meeting looking at butterfly transects. Leader: Dr G. Bellamy.

The Lodge, RSPB, Sandy 2nd August. Searching for Serotine Bats.
Leaders: Ms J. Childs & Dr A. Aldhous.

Potton & Cockayne Hatley Woods 3rd August. "Jubilee repeat" meeting including demonstrations of butterfly transects. Leader: Mr I. Woiwod.

Flitwick Moor 31st August. "Jubilee repeat" meeting with guided walks for BNHS members and public. Leader: Mr C. Carpenter.

Redlands Quarry, Sandy 8th September. Heathland regeneration. Plate 6.
Leader: Mr J. Comont.

White Wood, Everton 22nd September. Annual fungus foray. Leader : Dr D. Reid.

Mammalthon 6th October. Competition for seeing the highest number of mammal species in a day. Organiser: Mr D. Anderson.

Greensand Ridge 12th October. A circular walk from Ampthill Park. Leader: Mr J. Knowles.

Slimbridge Wildfowl and Wetlands Trust, Gloucs. 10th November. "Jubilee repeat" meeting, entrance fee Two shillings. Leader: Mr D. Green.

Stagsden 1st December. Badger survey day with Bedfordshire Badger Network.
Organiser: Mr J. Adams.

Bedfordshire 7th December. Geological transect of the county starting at Dunstable Downs.
Leader: Dr J. Eyers.

Priory Country Park, Bedford 15th December. Winter bird walk to Willington.
Leader: Mr E. Newman.

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, including donations of £1575 towards the cost of the Butterflies and Moths of Bedfordshire. Nothing has been paid during 1996 for either the Journal or the Bird Report and it is anticipated that there will therefore be a substantial payment during 1997 of about £6000. The M & G Charifund Accumulation Units continue to do well, but this type of investment can go down as well as up.

The final year end position is that the total assets of the Society have increased by £7486 and now stand at £58,419.

P.S. CLARK
Hon. Treasurer

INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 31ST DECEMBER 1996

	1995	1996	
OPENING BALANCE (Current Account and Building Society Account)	21,121	22,615	
INCOME			
Subscriptions (for 1996)	3,149	2,940	
Subscriptions (for 1997 received in 1996)	1,028	787	
Sales	-	11	
Journal and Bird Report sales	87	48	
Receipts from meetings	191	217	
Sundries/Donations/Grants	4,123	3,564	[1]
Interest received from Building Society	1,654	859	
Interest received from Bank (gross)	59	46	
Receipts from Publication Account	2,167	324	
SUB TOTAL – Income	**12,458**	**8,796**	
EXPENDITURE			
Postage and stationery	175	114	
Sundries	56	73	
Insurance	282	282	
Officers' expenses	86	179	
Computer	241	178	
Books	-	-	
Bank charges (Safe Custody)	17	13	
	857	**839**	
MEETINGS			
Hire of halls	404	456	
Lecturers and leaders	258	465	
Programmes	232	-	
	894	**921**	
SCIENTIFIC			
Journal and Bird Report	2,766	-	
Recorders' Expenses	165	-	
Sundries	139	-	
	2,970	**-**	
PUBLICITY/DEVELOPMENT/MEMBERSHIP			
Newsletter	5		
Sundries (Postage, Printing)	1,770	2864	[2]
	1,775	**2864**	

PUBLICATIONS ACCOUNT - EXPENDITURE		
Expenditure	952	115
Beds Naturalist & Bird Report	3,516	-
	4,468	**115**
SUB TOTAL - EXPENDITURE	**10,964**	**4,739**
CLOSING BALANCE (Current Account and Building Society Account)	**22,615**	**26,672**

STATEMENT OF ASSETS AS AT 31ST DECEMBER 1996

FIXED ASSETS	**1995**	**Cost**	**Depreciation**		**1995**
			Total	**per Year**	
Display Boards	191	371	200	20	171
Display Table	34	69	42	7	27
Computer	1,723	2,431	1194	486	1,237
Projection Equipment		1,130			1,130
					2,565

CURRENT ASSETS			
		1995	**1996**
Stock at cost - Vertebrate Fauna of Bedfordshire		369	165
- Bird Atlas		3,400	3,400
Bank Current Account		2,021	2,995
Woolwich Building Society		20,594	23,677
City of Nottingham Bonds to 30/6/99 (at 7.50%)		3,000	3,000
City of Nottingham Bonds to 30/6/99 (at 7.50%)		3,000	3,000
M & G Charifund Accumulation 475 Units Cost £10,000			
Bid Price at 21/12/96 4.130.3 pence per unit		16,842	19,617
TOTAL CURRENT ASSETS		**49,226**	**55,854**
Fixed Assets (see above)		1,948	2,565
TOTAL ASSETS		**51,174**	**58,419**
CURRENT LIABILITIES			
Subscriptions received during 1994 for 1995/1995 for 1996		1,028	787
NET ASSETS OF THE SOCIETY		**50,146**	**57,632**

NOTES

1. Includes: grants of £300; interest from City of Nottingham Bonds £348; donations towards cost of Butterfly and Moth book £1,575 (total £2,825 for two years).

2. Includes: printing £785; projector equipment £1,130..

Since 31st December 1996 a sum of £11,225 has been paid from the Woolwich Building Society account for the book, "The Butterflies and Moths of Bedfordshire".

P.S. Clark
Hon. Treasurer

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

METEOROLOGY
Report of the Recorder

The air temperature in 1996 was not far from the long term average, with day temperatures a little above normal and night temperatures a little below. As might be expected, this apparent normality hides many variations. But perhaps the most striking characteristic of 1996 was its exceptional dryness with just 402.9mm of precipitation at Silsoe (see Table 1) compared with a long term average of 549.4mm and a total of 593.6mm recorded the previous year (1995). The wettest months were August and November, both with over 70mm of precipitation, and the driest months were March, May, June and September each with less than 20mm of precipitation. There have been many drier months but perhaps few years with so many dry months. Not surprisingly 1996 was also a sunny year. There was also a singular weather event in June when a small part of the county experienced golf-ball size hail. Such events are often under reported but on this occasion the Recorder was able to witness the event directly. All figures quoted in this report are from the records at Silsoe (Table 1).

January

The year started cloudy and rather cold with an anticyclone to the east, but by the end of the first week milder, wetter weather with strong winds spread from the south-west. The 8th was particularly wet with heavy showers. By mid month high pressure, which had remained over eastern Europe, began to re-exert its influence on the weather. Temperatures dropped steadily and the last week of the month was particularly cold with even daytime temperatures close to or below freezing from 25th–29th. Light snow showers occurred at times in the strong easterly winds but there was insufficient to cover the ground. There was severe frost too during this period. Overall though, the mean maximum was very close to normal, and the mean minimum slightly above. With the anticyclonic influence precipitation was only three quarters of the normal, but it was a very dull month with just 55% of the average sunshine for January.

February

The cold weather continued, but less severe than before. The anticyclone weakened considerably and by the 10th a deep depression heralded much milder, wetter weather for a while with strong winds. The weather turned colder again in the third week with slight snow cover from showers, but the last week was near normal. Temperatures were generally below the normal for February, the mean minimum being -1.2°C with frost on around twenty nights. Rainfall was 36% more than normal but it was still a significantly sunny month with totals 38% above average.

March

March was one of the driest months of 1996 with rainfall totals only half that to be expected, but not exceptionally dry. Temperatures were almost uniformly below normal throughout the month, though there were very few really cold days. The month started with an anticyclone to the north of Britain with light northerlies. The anticyclone then transferred to the east and intensified resulting in a lengthy period of

strong easterly winds. From mid month onwards the anticyclone declined and winds were lighter though still east or south-east. By the end of the third week a depression over the south Atlantic brought fronts and less cold conditions into southern Britain. Eventually a new high became established to the north and the month ended with lighter northerly winds. Daytime temperatures were 2.2°C below normal, but in the cloudy and windy conditions night time temperatures were only 0.9°C below average. It was also dull with only 68.4 hours of sunshine compared with an average of 111.9.

April

The weather continued to be influenced by high pressure to the north or east of the country but was coldest during the first week. Thereafter, with the high pressure more to the east, its effect diminished and temperatures rose. By the 15th daytime maxima were reaching 17°C and on the 20th and 21st exceeded 22°C (over 70°F). Most of the month's rainfall fell on just two days, on the 12th with 9.5mm of drizzle and sleety snow, and 11mm on 22nd in much warmer conditions. On the 13th there was slight snow cover, but this soon disappeared. April was another dry month and quite sunny, but despite the cold start it was a little warmer than average (up 1.4°C by day, but down 1.0°C by night). Frost was frequent in the first week.

May

Although yet another dry month May 1996 was unusually cold with temperatures overall more than 2°C below average. The month began with low pressure to the south feeding in cold north-easterly winds. A weak ridge of high pressure maintained generally light winds from the same direction and these became more pronounced again from the 8th to the 10th. After a calmer interlude high pressure to the north reinforced a further period of of east to north-east winds before low pressure became more dominant from 18th till the end of the month. Most of the meagre rainfall occurred in this period, and temperatures in the second half of the month were generally higher than those in the first half. The month finished with a temperature of 24.5°C (76°F) on the 30th. In contrast there were eight nights of air frost mostly in the first half of the month.

June

After three cool days daytime temperatures climbed above 20°C and remained at this level for most of the month. It was very sunny and with frequent clear skies night-time temperatures were below average overall and slight ground frost occurred on eight nights, most notably on the 23rd. June was also a particularly dry month with but a quarter of the normal rainfall (as recorded at Silsoe). However, the late evening of Friday 7th June saw a severe but localised thunderstorm affect the Barton/Luton area of the county. Frequent flashes of lightening and loud thunderclaps were then followed at approximately 11pm BST by large-sized hailstones which lasted for about twenty minutes. The Recorder's garden was within the affected area. Hailstones as large as golf balls caused significant damage to plants and foliage, some of which (to *Hosta* sp.) remained visible throughout the summer. Many small twigs were broken off and some damage was also caused to property – a neighbouring carport with corrugated plastic

roofing was pitted with large holes by the hail. The hailstones themselves frequently displayed a multi-layered appearance often slightly flattened (see Figs. 2 & 3). For hailstones of this size to be created they need to be borne aloft by very strong updrafts. Frequently, large hailstones like this will be carried upwards several times, on each occasion accumulating a further layer of ice before the effect of gravity overcomes the updrafts and the hailstones fall to the ground. This process also accounts for the flattened appearance. Both characteristics are visible in the accompanying photographs.

The hail storm was mentioned in the local press, but there were, to the Recorder's knowledge, no reports of any significant damage, and the Recorder's own car, parked outside, remained unscathed. This storm actually had quite a long life. The day had been hot with temperatures (in Bedfordshire) exceeding 29°C (84°F). There was a small depression over the Bay of Biscay with an occluded front heralding cooler air running from south-west to north-east England (see Fig. 1). The storm appears to have crossed the south coast near the Isle of Wight and tracked north-eastwards before leaving the coast over the Wash. During its progress the intensity of the storm cell varied. Bedfordshire was but one of several places to experience its full effect. In the Silsoe record (see Table 1) that storm accounted for 85% of the total precipitation for June. The rest of the month was exceptionally dry.

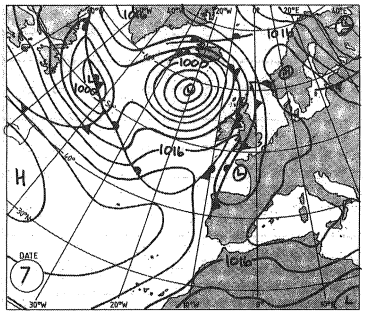

Fig.1 Weather map for 12 noon GMT, 7th June 1996, reproduced with permission of the Royal Meteorological Society

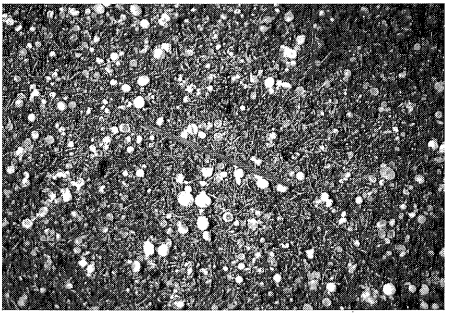

Fig.2 Hailstones photographed where they fell

Fig.3 Larger hailstones collected for examination and photographing

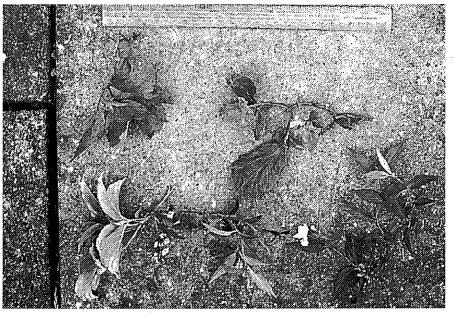

Fig.4 Typical foliage broken from trees and shrubs

July

The month was generally warm and dry with nearly all the month's rainfall occurring in the first week and last weeks. The rainfall deficit though was less marked than in June. The highest temperatures occurred at the end of the third week, towards the end of a two week dry spell, when 31.2°C (88°F) was recorded on 22nd. As an indication of how localised rainfall can be, 27.4mm of rainfall from a thunderstorm with lightening and hail was recorded at Meppershall on the 23rd, yet Silsoe a short distance away recorded only 4.9mm on the same date. Daytime temperatures were 1.8°C above average, but very close to average by night. Sunshine was 25% above average.

August

This was another warm month but one of 1996's few wetter months. The first week was generally warm and dry under the influence of high pressure. Depressions then moved across the country with significant rainfall on the evening of the 9th. A week of dry weather followed until the 22nd which was another quite wet day as a depression moved into Britain becoming more or less stationary until moving into the North Sea from the 28th onwards. The 27th and 28th saw significant rainfall from thundery showers. Rainfall was 20% more than average and the month also saw less sunshine than usual, but despite this average temperatures were still on the warm side with a maximum of 30.2°C (86°F) on 19th.

September

September was the driest month of the year, though still not to any extreme degree. Temperatures were near normal and the first ground frosts appeared mid month. The weather was dominated by anticyclones for the first three weeks with winds predominantly from the east or north-east. In the last week, as the high receded eastwards, a large area of low pressure moved to the north of Britain bringing wind and some rain.

October

The weather in October was generally changeable and on the warm side, though rainfall was still below normal for the time of year. The first air frost of autumn occurred on the 17th, but the month was generally frost free. At the end of the month ex-hurricane Lili moved eastwards over Britain bringing very strong winds for a while. In keeping with the relative dryness of this October it was also relatively sunny.

November

Although temperatures were near or a little below normal there were two instances of significant snowfall this November. On the 19th heavy rain with wind turned to snow by 9am and continued for some two hours giving a light covering, particularly to the east of Barton where the Recorder's house is situated. By midday the snow had largely gone, though the north Midlands experienced blizzard like conditions. On the 24th a repeat performance saw rain turn to sleet and snow by lunch time for two or three hours before turning back to rain and easing. There was little snow cover in

Barton but the tops of the Chilterns were white, as were some parts of the Greensand ridge. It was also a frosty month with eleven nights of air frost and eighteen of ground frost. Rain (or snow) occurred throughout the month, the 17th, 19th and 24th being the wettest days, making this the wettest month of the year with nearly 50% more than the average. There was no dominant wind direction, but both the cold spells referred to were caused by cold northerly outbreaks behind small lows moving into the near continent.

December

December continued the pattern of largely dry months in 1996, but the month ended with a significant spell of cold weather (which continued into the following January). The first week was rather mild with some rain. There then followed a colder, dryer interlude before milder weather returned from 16th to 20th. A developing anticyclone to the north of Britain then introduced colder air which intensified as the high transferred to the east of Britain. On several occasions light snow gave a dusting to the ground and this sometimes persisted with the very cold temperatures. On the 24th the River Lea was noted as being completely frozen over in Luton, and by the end of the month even deep water lakes like that at Stewartby had large areas iced over as the continuing frost penetrated into ground and water. Overall temperatures for the whole month averaged nearly 2°C below normal, and on the ground temperatures fell as low as -12°C on 26th and again on 29th.

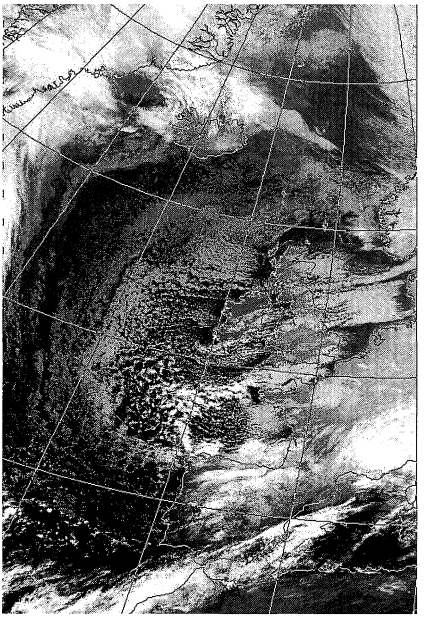

Fig. 5 NOAA infra red satellite image for 18.42 31st December 1996, showing low cloud in very cold air streaming across the North Sea into Eastern England and East Anglia under the influence of an anticyclone between northern Scotland and Norway.

Thus ended a year which had its fair share of notable weather events. The hail storm in June was particularly noteworthy (though a repeat event was to occur in May 1997), and the cold spell at the end of December was also quite memorable.

I would like to acknowledge my appreciation of the provision of weather records from both Silsoe College (reproduced in Table 1) and from the Silsoe Research Institute (where yet again there was a significant interruption to records in December). However, as reported previously (Williams 1996), there still appear to be unexpectedly large differences at times between the records from the two sites, and as such both sets of records must be treated with some degree of caution. I would also like to thank Betty Chambers for continuing to supply records and observations from her home in Meppershall.

Finally, I would like to ask members of the Society to contribute descriptions of any significant weather events which come their way, such as the fall of large hail in June. Such events (storms, floods, snowfall, wind or tornado damage) are often extremely localised, and any record depends on those living in the locality affected.

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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	5.9	1.8	11.9	-5.7	35.5	28.3	10	14
February	5.7	-1.2	12.5	-6.4	48.8	93.0	20	22
March	7.1	0.7	11.8	-5.5	19.7	68.4	13	19
April	13.8	2.6	22.5	-9.4	24.8	156.1	9	14
May	14.0	3.7	24.5	-3.0	15.7	183.1	8	14
June	21.7	8.0	29.2	2.4	13.3	268.0	0	8
July	22.8	10.9	31.2	4.5	31.0	230.4	0	1
August	22.4	10.6	30.2	5.6	72.3	201.4	0	0
September	18.1	8.9	22.2	1.6	12.4	137.5	0	3
October	16.0	7.2	20.5	-1.1	33.1	141.3	1	7
November	9.7	2.6	17.6	-4.1	75.7	95.0	11	19
December	5.4	-0.3	12.4	-9.5	20.6	32.8	16	18
Year	13.6	4.6	31.2	-9.5	402.9	1635.3	88	139

Table 1. Summary of the weather for 1996 recorded at Silsoe College.
In the absence of relevant data from Silsoe College, records of ground frost are based on figures from Silsoe Research Institute

GEOLOGY AND PALAEONTOLOGY
Report of the Recorder

The report for 1996 is primarily concerned with two locations: Chamberlain's Barn quarry near Leighton Buzzard (around SP929265) and the Laporte Fuller's Earth workings near Clophill (around TL 099380). Other Lower Cretaceous sections that have figured in previous reports were visited when time permitted, but during the year field work was concentrated on the two localities mentioned above for specific reasons.

Chamberlain's Barn sandpit has seen a great increase in sand extraction recently, accompanied by considerable extension to the quarry both in a southerly and easterly direction. This was noted in last year's report together with a stratigraphical diagram showing three sections. Two very rare ammonites were also obtained from the southern portion of the pit – *Cleoniceras (Cleoniceras) floridum* Casey and *Hoplites pseudodeluci* Spath, this latter specimen confirming the *Lyelliceras lyelli* Subzone in the district.

Early in 1996, however, an additional 10 metres or so of the beds above the Upper Aptian Woburn Sands were removed as overburden, extending the most southerly part to its boundary limit alongside Vandyke Road. This resulted in a 150 metre long section which exposed the Gault-Woburn Sands junction beds (Lower Albian) at their maximum thickness below the Middle Albian Gault clays. The gradual thickening of these beds in a southerly direction was also described (Smart 1995).

The first visits in February and March to the newly exposed southern section were unsatisfactory due to surface water and waterlogged clay, but from April conditions improved and excavating into the beds using a hand-pick became possible. Typical faunal assemblages including a number of *Douvilleiceras mammillatum* Schlotheim, *Beudanticeras newtoni* Casey and *B. dupinianum* (d'Orbigny) were found *in-situ* in the junction beds. Successive visits made throughout the summer and autumn resulted in many interesting specimens including a second *Cleoniceras* (*Cleoniceras*) *floridum* Casey from Bed 3(i) as described by Owen (1972), in a more complete condition than the first specimen of this species found in the same bed further north in 1995. By now (July) time was running out, as many sections in this pit existed for a relatively short time before being lost, and the 150m long exposure alongside Vandyke Road was no exception. In fact, infilling with overburden was scheduled to commence in November with completion before the end of the year.

It was during July that two ammonites were discovered that proved to be of importance both to the lithology and biostratigraphy of the area, being previously unknown in the junction beds at Chamberlain's Barn quarry. Single specimens of *Douvilleiceras alternans* Casey and *Otohoplites destombesi* Casey were found *in-situ* in Owen's Bed 3(ii) indicating the presence of ammonites of either the *Protohoplites (Hemisonneratia) puzosianus* or *Otohoplites bulliensis* Subzones, possibly both. The latter specimen, *Otohoplites destombesi* Casey, is particularly important as the bed is now known to contain a late *Douvilleiceras mammillatum* Superzone element (H.G. Owen 1996 – personal communication). The beds indicated refer to the stratigraphical succession in Owen (1972 p294) and updated by Smart (in press), the ammonite Zonal and Subzonal scheme being shown in Table 1.

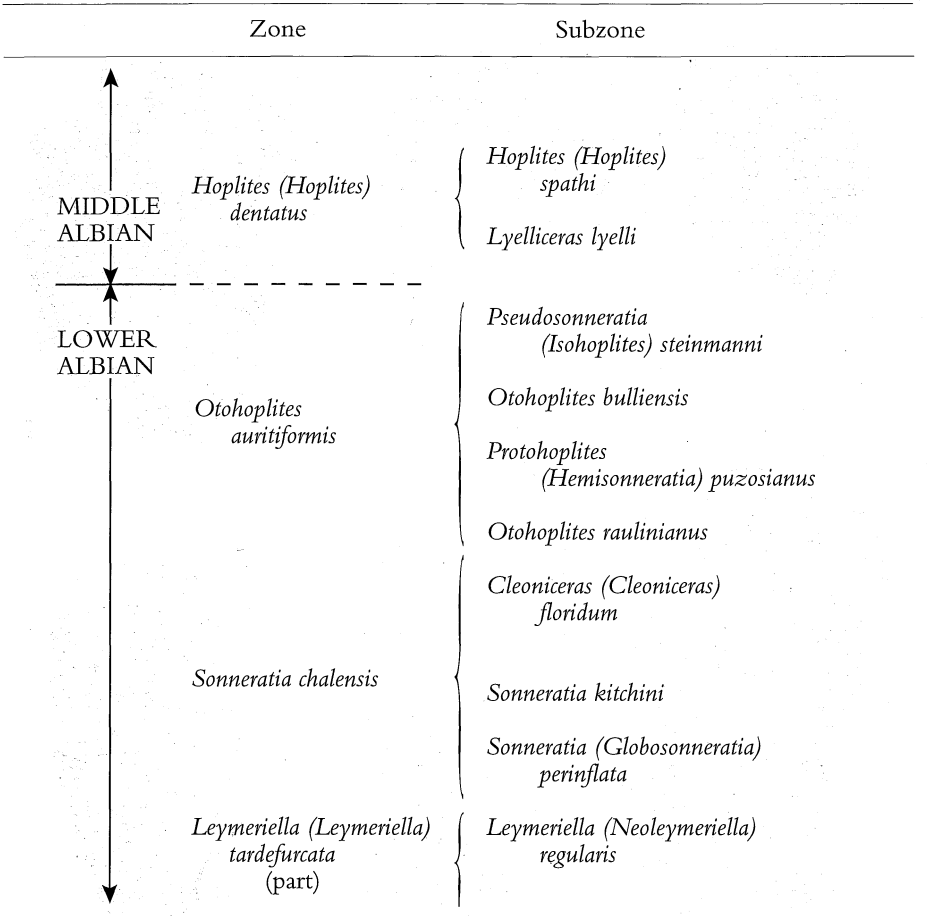


Table 1. Zonal and Subzonal scheme of the basal Middle Albian and Lower Albian. Elements of all Subzones are represented in Chamberlain's Barn quarry.
(After Owen, 1992 p84)

By October a number of other rare ammonites had been obtained from this section including *Douvilleiceras leightonensis* Casey; *D. scabrosum* Casey; *D. monile* (J. Sowerby); *D. pustulosum* Casey; *D. mammillatum* (Schlotheim) var. *aequinodum* (Quenstedt); *D. mammillatum* (Schlotheim) var. *praecox* Casey; *Cleoniceras (Cleoniceras) strigosum* Casey and *Hoplites* cf. *benettianus* (J. de C. Sowerby). Those requested were presented to the Natural History Museum during the course of the year after identification by Dr H. G. Owen, the three most important specimens: *Cleoniceras (Cleoniceras) floridum*; *Douvilleiceras alternans* and *Otohoplites destombesi* being illustrated in Fig. 1.

At this time, a number of the ammonites that had been donated to the NHM on this and previous occasions came to the attention of Dr Raymond Casey, who is at present

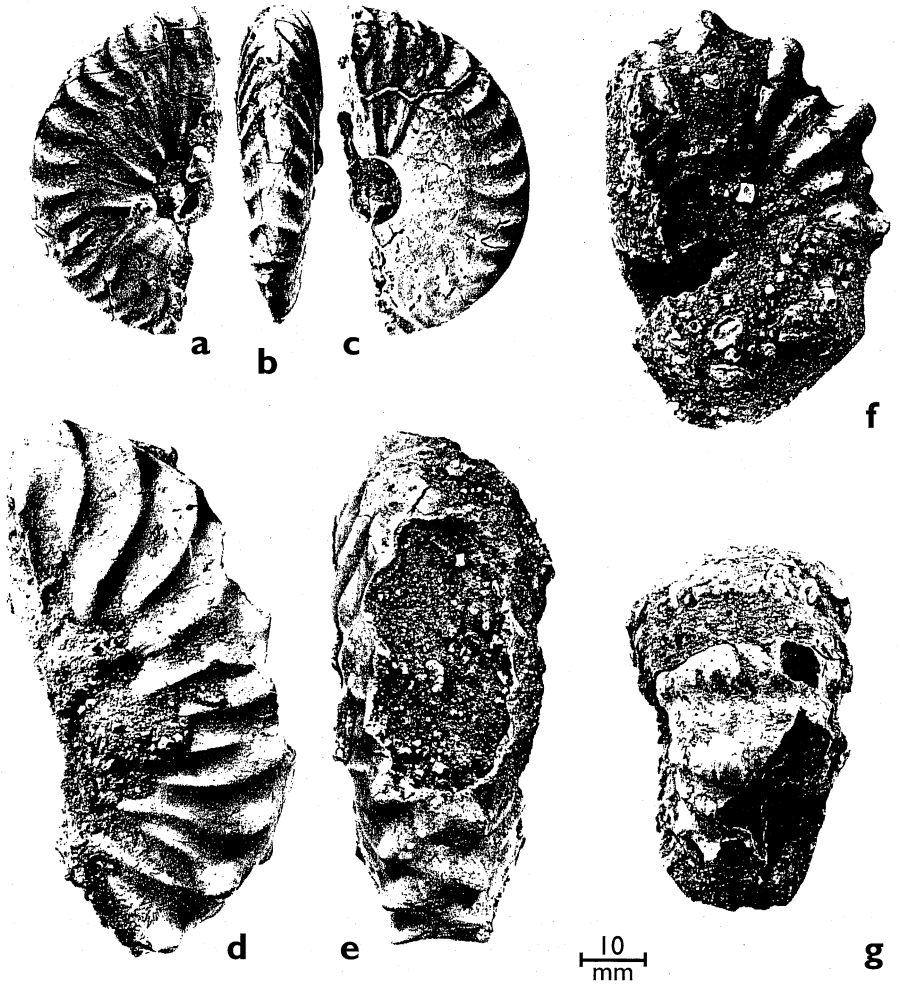


Fig. 1 Side and ventral views of – a, b & c *Cleoniceras* (*Cleoniceras*) *floridum* Casey (BMNH CA 413);
d & e *Otohoplites destombesi* Casey (BMNH CA 411);
f & g *Douvilleiceras alternans* Casey (BMNH CA 410). Lower Albian, Chamberlain's Barn quarry. Scale bar 10mm.
Photo. The Natural History Museum

working on a revision of his extensive monograph "The Ammonoidea of the Lower Greensand" (Casey 1960–1980) as Research Fellow in the Department of Palaeontology, the Natural History Museum. At his suggestion a field meeting was held in Chamberlain's Barn quarry during October, during which the Lower Albian junction beds were studied in relation to the ammonite biostratigraphy.

This meeting took place just in time, infilling with excavated overburden and clay-contaminated sand commencing within three weeks. This rapidly obscured the deep section in the Woburn Sands and by the end of November the major part of the junction beds had also been covered, a mere 20 metres of the ammonite bearing strata, Beds 3(i) and 3(ii), remaining accessible into December. This on-site examination of *in-situ* Lower Albian beds was something of an event, it being many years since a similar meeting between the writer and Dr Casey took place. Several photographs were also taken by Mr J. Craig, a vertebrate palaeontologist who had accompanied Dr Casey on the visit, as a permanent record (Plate 1).

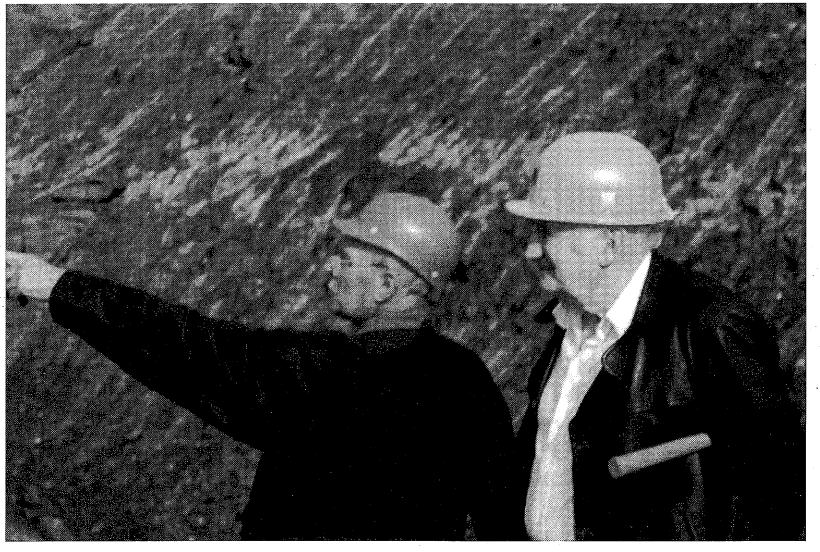


Plate 1. The Recorder (left) and Dr Raymond Casey, FRS.
Chamberlain's Barn Quarry, Leighton Buzzard, 12th October 1996.
Photo: Jim Craig, Minster-on-Sea

Although the greater proportion of the Recorder's work in Chamberlain's Barn was concentrated in the southern portion of the quarry, particularly the 150m long south-east section alongside Vandyke Road which had been excavated during the year, the junction beds and overlying Gault clays northwards along the eastern side were not neglected. A part-phosphatised specimen of the nautiloid *Eutrephoceras clementinum* (d'Orbigny) was discovered associated with various *Douvilleiceras* spp. and *Beudanticeras* spp. in Owen's Bed 3(ii) in which these ammonites occur as the indigenous fauna (Owen, 1972 p294). This is the first record of *E. clementinum* made by the writer from the Lower Albian sediments, the two previous records of the species occurring in the Middle Albian Lower Gault, *Hoplites dentatus* Zone, upper *Hoplites spathi* Subzone, in Mundays Hill quarry (SP 936279) when this Subzone was confirmable above the Silty Beds Member along the north-west side (Smart, 1957; 1993).

In addition to this nautiloid, the overlying *H. spathi* Subzone clays of the same location, approximately 120m north of the south-east section, yielded 16 associated vertebral centra of a large shark in an area of 0.2 square metres, the largest being 22mm in width. Although isolated fish vertebrae can only rarely be determined even to generic level, the size of the individual bones indicate one of the larger growing species. No other remains were found and the position of these 16 centra in the vertebral column could not be determined, but a likely candidate would be *Cretolamna woodwardi* Herman.

Billington Road quarry (section near SP 930240) was visited four times, all to the new extension along part of the southern side. Part-phosphatised ammonites of the *Hoplites dentatus* group were noted in the lower *Hoplites spathi* Subzone clays, but the most interesting discovery from the Gault was a partial lower jaw of the bony fish *Apateodus glyphodus* (Blake). Fang teeth of this teleost, some in excess of 20mm in height, have been recorded from all the Leighton Buzzard quarries and the species is not particularly uncommon throughout the Gault as regards isolated teeth. Remains other than teeth, however, are very rare and the small jaw is the first such specimen discovered by the Recorder in the area.

It was a great disappointment to find the 22mm long jaw severely damaged, the anterior portion missing and several of the small teeth broken away at the base of the crowns. This damage is recent, undoubtedly the result of the ever-increasing number of visitors to this and other Lower Cretaceous exposures in the Leighton Buzzard district. Coach parties are frequent, many of the "geologists" showing little if any regard for the small delicate fossils beneath their feet. Despite the considerable damage, however, the jaw is of importance and it has been donated to the Natural History Museum – Register number P. 64802 – and is illustrated in Fig. 2.

Brief visits were made to Mundays Hill to keep abreast of quarry extensions and to search the weathered clays for shark teeth, particularly hexanchid teeth, as the Lower Gault *Euhoplites loricatus* Zone sediments in this locality have yielded several anterolaterals of *Notorynchus aptiensis* in previous years. Unfortunately, none were recorded this year from any of the Leighton Buzzard sections.

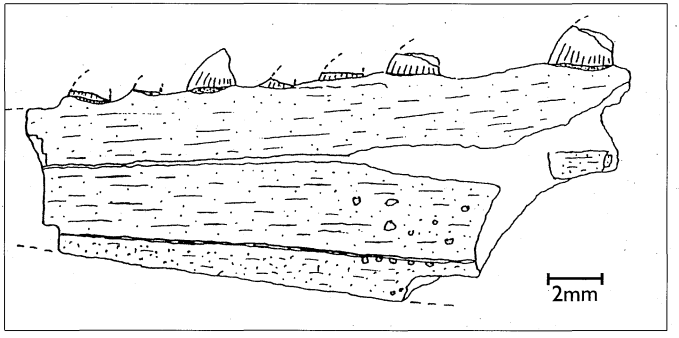


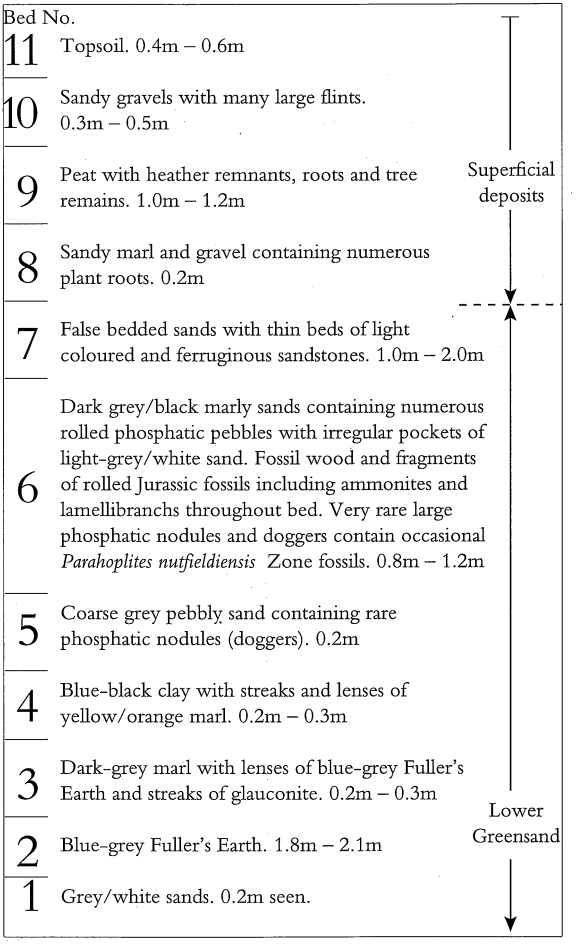
Fig. 2 Partial lower jaw, right lateral inner aspect, of *Apateodus glyphodus* (Blake) from the Lower Gault *Hoplites dentatus* Zone, lower *Hoplites spathi* Subzone, Billington Road quarry, Leighton Buzzard (BMNH P. 64802). The unshaded posterior section and the outer aspect are obscured by calcium phosphate.

It was during September, a month before the Leighton Buzzard meeting, that Dr Casey enquired about the possible occurrence of *Parahoplites nutfieldiensis* Zone ammonites in the Clophill Fuller's earth quarries in connection with the revising of his monograph on Lower Greensand ammonoidea. A previous application by the Recorder to gain access to the quarries at Clophill during the early 1980s had to be refused due to de-watering problems, these resulting in hazardous site conditions. No further approaches were made, however, as work on the Lower Greensand and Gault of Leighton Buzzard fully occupied the writer with research on Gault sharks and Lower Greensand ammonites, the latter for the NHM collections.

This year however, following Dr Casey's communication, Laporte Earths were contacted and proved most helpful, consent being granted for visits that were immediately followed up and, from October onwards, Chamberlain's Barn pit at Leighton Buzzard and Clophill Fuller's earth pits were studied at regular and frequent intervals.

The *Parahoplites nutfieldiensis* Zone is earlier than the Lower Albian junction beds of Leighton Buzzard, being of Upper Aptian age. The beds are exposed at Clophill as pebbly sands and sandy marls with numerous small, highly polished phosphatic pebbles and rolled fragments of Jurassic fossils including ammonites and bivalves (Beds 5 & 6, Fig. 3). Lower Greensand ammonites have, in past years, been collected from large phosphatic concretions or "doggers" that occur occasionally in these beds, four fine specimens being put in the quarry site office by Laporte staff some years ago for collection by Dr Casey. Regrettably, these were stolen by an unknown visitor and no trace of them has since been found.

P. nutfieldiensis Zone ammonites from the Clophill exposures are important for Casey's monograph revision as they are generally in a good



Lithostratigraphical summary pertaining to Fig. 3.

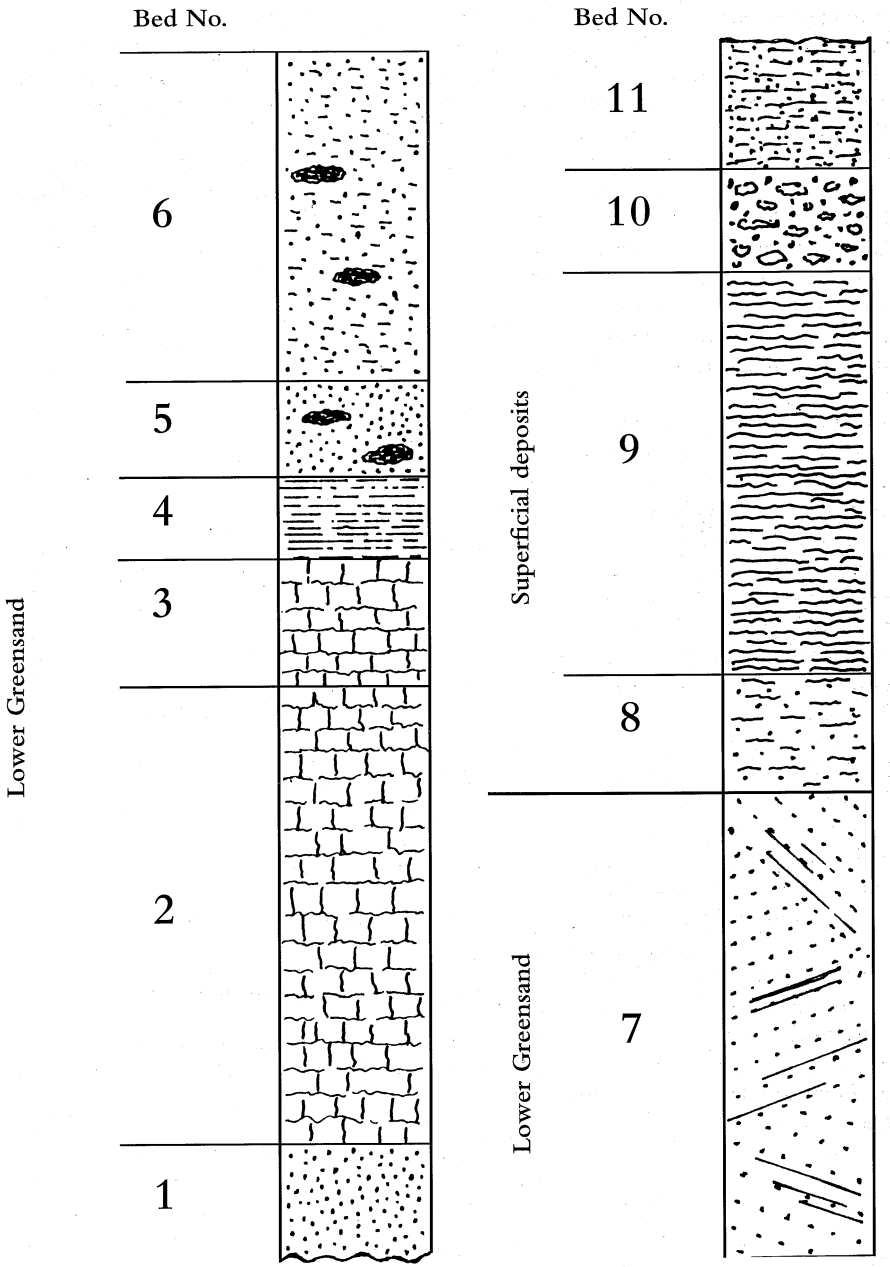


Fig. 3 Section in Laporte Fuller's Earth quarry, Clophill (TL 099380): western boundary of quarry complex, 8th October 1996

state of preservation and, of particular value, uncrushed. These features are essential for the accurate measurements necessary. Other sections elsewhere in the country that expose beds of *P. nutfieldiensis* Zone age are less satisfactory in this respect, including the type locality at Nutfield, and perfect specimens represent a very small percentage of the collected material (R. Casey 1996, personal communication)

Numerous visits were accordingly made during the rest of the year, continuing into 1997. The beds of pebbly sand and sandy marl, in appearance a blackish pebble bed when weathered, between 1.0m and 1.2m thick, are not well exposed at the present time, many of the sections being obscured by tipped material. Despite thorough searching and excavating, very few of the phosphatic "doggers" were found by the Recorder and, of these few, only one yielded a single fragment of a large ammonite.

The specimen was subsequently determined by Dr Casey as a partial body chamber of a *Parahoplites* sp., but the fragmentary condition rendered it of limited scientific interest and it could not be identified other than to genus. A typical *P. nutfieldiensis* is illustrated in Fig. 4(a), the Clophill whorl fragment being shown in its approximate position (as in life) in Fig. 4(b).

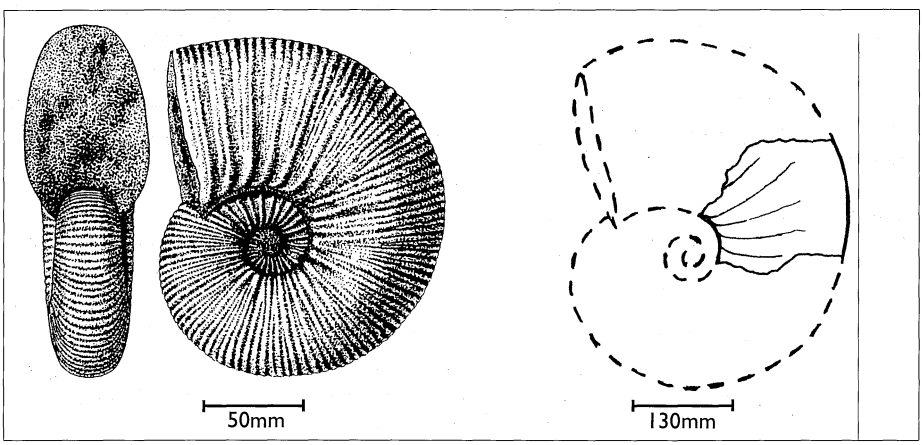


Fig. 4. (a) *Parahoplites nutfieldiensis* (J. Sowerby). Drawing of Nutfield specimen (reproduced from British Mesozoic Fossils, courtesy The Natural History Museum).
Fig. 4. (b) *Parahoplites* sp. Partial body chamber of large specimen from Upper Aptian *Parahoplites nutfieldiensis* Zone, Clophill (shown in unbroken outline in its approximate position). October 1996. Clophill Fuller's Earth quarry, western end of complex around TL 099380. PJS coll. 15581 M.

The rarity of the phosphatic concretions in Beds 5 & 6 is a great disappointment. Quarry staff clearly recollect many such "doggers" in the beds further east, and described to the writer how "large ammonites rolled down the slopes of excavated overburden" when the Fuller's earth basement bed (Bed 2) was being exposed. The present workings are at the western end of the series of contiguous pits, and there is little doubt that the lithology and fauna are variable throughout the quarry complex. The eastern pits are now either backfilled with spoil sufficiently to obscure the remaining sediments or, after removal of the Fuller's earth, used as tips. De-watering

pipes also run along the sides of all the individual pits, preventing access to Beds 5 & 6 where they are still visible in two sections on the southern side. It is understood, however, that extensions to the quarrying area will be in a more northerly direction when the present deposits of Fuller's earth are exhausted, so it is to be hoped that the situation will improve and *P. nutfieldiensis* Zone ammonites re-appear.

ACKNOWLEDGMENTS

I thank Dr Colin Patterson, FRS, Dr Hugh Owen, Dr Angela Milner, Dr Peter Forey and Miss Alison Longbottom of the Department of Palaeontology, The Natural History Museum for identifying material, helpful comments, and for allowing me access to the National collections. My thanks also to Mr Phil Crabbe of the Natural History Museum Photographic Unit for photographing the ammonites illustrated in Fig. 1, also the Trustees of the Natural History Museum for permitting reproduction of Fig. 4(a).

My sincere appreciation is also due to Dr Raymond Casey, FRS, for providing much useful unpublished information concerning his present work on the revising of his monograph, and for many notes and comments on the Lower Greensand ammonoidea.

For permission to visit their properties I thank CAMAS Aggregates, Eastern Way, Heath & Reach, Leighton Buzzard; Hepworth Minerals Ltd., Eastern Way, Heath & Reach, Leighton Buzzard and Mr J. Gann and Mr J. Hedges of Laporte Earths, Luton. My thanks also to Mr F. Garnett and Mr Peter Clarke of the Clophill quarry for much local knowledge which proved invaluable, and all associated staff who are always most helpful.

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P. J. SMART

ROE DEER – A NEW COUNTY RECORD
by D. Crawley

Roe Deer *Capreolus capreolus* an adult male near Dunstable on 7th May 1996

I was driving south on the A5 through Dunstable at 0730 hrs on 7th May 1996. As I left the town I noticed a large animal bouncing towards the road in a cereal field to the west. It was roughly 100–150 yards away from me. At first I thought it was a large dog but then realised that it was a deer and so I pulled into the side of the road to get a better look.

The animal stopped and I was able to observe it through ×8 binoculars.

Description – it was a brown/russet coloured deer the size of a large dog. It had a straight back and held the neck at a 70°–90° angle up from the body. The head was held at roughly right angles to the neck with the ears on top of the rear of the head. It had a black nose and two prong antlers that just reached above the ears.

As I was watching the deer a bus travelling along the A5 frightened the animal which ran across the field away from me showing clearly a round to oval white rump before it disappeared from view over a ridge in the field at 0735 hrs.

I had a very good view of the deer identifying it as an adult male Roe Deer. I have been mammal watching for over twenty years and have had experience of watching Roe Deer in Lancashire, Sussex, Scotland and the Lake District. I am also familiar with all the other British deer species.

Address: Staffordshire College of Agriculture

With Roe Deer numbers increasing throughout Britain it was only a matter of time before we had our first Bedfordshire record. By the late 1980s small populations were present in Cambridgeshire, Hertfordshire, Buckinghamshire and Northamptonshire. At around this time there were reports of Roe Deer in Bedfordshire but the records were unverified (D. Anderson in litt.). Because of their crepuscular habits and liking for dense undergrowth it was imperative that a good view was obtained to differentiate them from the other deer species already found in Bedfordshire. Evidence that they were occurring very near to the county was obtained in 1992 when a road casualty was seen in Buckinghamshire close to the southern county boundary (S. Cham, personal communication).

There then followed reports of Roe Deer in several sites in Bedfordshire including the Blows Down/Zouches Farm area of Dunstable (F. Westrobe, personal communication) and a male reported in autumn 1995 (T. Matcham, personal communication) near to the first confirmed sighting. Like the earlier records these too remained unverified. With Roe Deer seen in east Buckinghamshire in 1996, in a tetrad adjoining Bedfordshire, I doubt if we will have to wait long before we get more records of this attractive deer in the county. If the population continues to increase in our neighbouring counties we can expect Roe Deer to move into Bedfordshire and become established as part of the fauna of the county.

Cliff Tack, Mammal Recorder

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MAMMALS
Report of the Recorder

What an excellent year for mammal records with all the mammals on the county list recorded apart from Yellow-necked Mouse. We also had a long-awaited addition to the county list when Roe Deer was finally confirmed in the County.

There was also a very good response to the second year of the distribution survey with a further 600 tetrad records received from the 126 contributors mentioned at the end of the report. We now have over 2000 tetrads mapped which is an excellent start for this important five year survey. An excellent initiative by the British Trust for Ornithology was to ask all the birdwatchers doing a one kilometre transect on their breeding bird survey to note any mammals seen. This resulted in a wealth of important records so my thanks go out to everyone taking part as well as to Phil Cannings for collating all this information.

A disturbing picture emerging from the fieldwork taking place is the decline of the Water Vole. The population is continuing to get fragmented with the recent dry conditions causing the extinction of the Luton/River Lea population. We need all records of this once common small rodent which is struggling to survive in Bedfordshire.

Luckily the Bank Vole has no such problems with high numbers reported in early 1996 in the hedgerows and woods around Bedfordshire. Rubbish left in the countryside can become a death trap to small mammals. This was illustrated by Jamie Newell who found a champagne bottle at Barton Hills which contained the bodies of eight Woodmice, three Common Shrews and single Bank and Field Voles. Jamie also carried out an extensive search in the south-east of the county for signs of Dormice by checking hundreds of gnawed hazelnuts. A couple of nuts indicated that Dormice might still occur in the area. This was confirmed in November when Mrs Joy Chaplin found a dead animal in a tit nest box in her garden at Pegsdon. This was an excellent breakthrough in the search for the distribution of this elusive, arboreal, nocturnal small mammal.

In the other area where we still have Dormice another 100 nestboxes were erected by the Bedfordshire Wildlife Trust so that we now have over 200 in the south of the county as well as 100 in the north. There was a poor uptake by Dormice but they were appreciated by a range of other creatures including Wood Mice, Wrens, Hornets, Blue and Great Tits, Bank Voles and even a Pygmy Shrew.

Road casualties are an unfortunate statistic of the modern era but they do give us an opportunity to find the occurrence of some difficult-to-see mammals. Polecat certainly comes into this category with three records during the year, all found dead on roads. To find out more about the spread of Polecat we need all bodies to be examined. If you find one in a position that is not dangerous it would be helpful to have it passed on to myself or Bedford Museum.

Badger road casualties are now being well reported with a total of 47 deaths in 1996 which is thankfully down on the highest total recorded of 57 in 1995. The Bedfordshire Badger Group goes from strength to strength and as well as an annual conference and important surveys it also is doing some excellent work on bait marking giving a better understanding of badger territories.

Hedgehogs are another species very vulnerable to traffic so Ken Winder's total of 70 found dead in an area to the east of the county is of no great surprise. If his results are reflected throughout the county this would give a total of one thousand plus Hedgehogs killed on the county's roads in just one year. The most significant traffic victim of the year, however, was the Otter which was killed on the road near Stagsden. With such a small population in the county one death could ruin any chances of re-establishment. There is, however, an ever increasing band of prople who have been lucky enough to see Otter in the county. Their enthusiasm in describing their sightings indicates their good fortune in being able to see this delightful mammal in its natural habitat. Let us all hope successful breeding will occur and establish a permanent population in Bedfordshire for us all to enjoy.

The long awaited arrival of Roe Deer in Bedfordshire now means that all six British deer have been recorded in the county. In fact all six species were seen in Bedfordshire in 1996, with five species seen together in a bean field by one of the teams on the Mammalthon in October.

The Roe Deer, as in the case of Fallow Deer, came to Bedfordshire as the population in neighbouring counties increased. The other four species in the county all came about as escapes in Bedfordshire. The Muntjac and Chinese Water Deer both have sustainable populations but whether or not the Red and Sika become established we will have to wait and see. If the Roe Deer continues to increase in numbers in our neighbouring counties more animals will come into Bedfordshire and hopefully a population will become established.

1996 will long be remembered as an outstanding year for the mammal enthusiast. There cannot have been a better year in living memory to have seen such a wide variety of mammals in Bedfordshire. We now have an opportunity to observe and study a wide diversity of species within the county including six species of deer and seven of mustelid.

SYSTEMATIC LIST FOR 1996

Red-necked Wallaby *Macropus rufogriseus*

The only record was of one seen on a school playing field in Dunstable in June (TL02A).

Mole *Talpa europaea*

With over 50 more tetrad records being added during the year this species has now been recorded in 69% of the county's tetrads during the first two years of the mammal distribution survey.

Hedgehog *Erinaceus europaeus*

The first of the year was one in a garden at Dunstable on 14th January (RD) with the latest at Luton on 19th December (LJ). One weighing 700grammes was found still hibernating in Luton on 25th April. It was marked and came for food until the autumn (BC). There were 33 tetrad records added so the Hedgehog has now been recorded in 50% of the tetrads in the first two years.

Common Shrew *Sorex araneus*

There were 19 new tetrad records during the year for this common and widespread small mammal.

Pygmy Shrew *Sorex minutus*

There were seven tetrad records added, the most unusual being one found in a Dormouse nestbox in a hedgerow at Studham (TL01D) in November (CT).

Water Shrew *Neomys fodiens*

The only record was of one found dead in a storeroom at Whipsnade Wild Animal Park (TL01D) in February (TM).

Rabbit *Oryctolagus cuniculus*

With another 42 tetrad records added the Rabbit has now been recorded in 71% of the county. High populations in the south of the county are causing concern on some chalk grassland reserves. The Rabbit is a valuable tool in reserve management by keeping the grass sward closely cropped but too many actually damage the turf. Several populations were affected by myxomatosis which can reduce a population by an estimated 80%. Black animals were reported from Bromham (SP95Q) (PA), Whipsnade (SP91Y) and Picts Hill (SP95R) (TS).

Brown Hare *Lepus capensis*

The Brown Hare has now been recorded in 49% of the county's tetrads. The two largest counts, both of fourteen animals, were made during the BTO breeding bird survey one kilometre transect counts. These were in TL14E and SP95R (JN).

Dormouse *Muscardinus avellanarius*

Despite erecting another 100 nestboxes in the south of the county only one animal was seen using a box, a male in July, although eight others contained Dormouse nests. This poor usage was mirrored nationally and was probably due to a very cold May. The surprise of the year came in November when a young animal was found dead in garden tit box at Pegsdon (TL13F) (JC). This exciting discovery indicates that there is still a lot to be learnt about the distribution of this secretive mammal. It also gives us a second area for the Bedfordshire Dormouse Group to concentrate its efforts upon.

Edible Dormouse *Glis glis*

The only record was of one found dead in a grain drier at Studham.

Bank Vole *Clethrionomys glareolus*

A population high was very evident early in the year with rustling leaves betraying their presence in many of Bedfordshire's woods. This very high population was well illustrated by a cat at Woburn which caught a staggering 91 during the year. This compares with an average of two a year over the previous five years (BN). One animal was found in a hedgerow Dormouse box at Studham in July (CT).

Short-tailed Vole *Microtus agrestis*

Another eighteen tetrad records were added during the year making a total of 38 tetrads mapped during the two years of the survey.

Water Vole *Arvicola terrestris*

Only one animal was recorded at the former stronghold in Luton on 11th February (LJ). The drying out of the River Lea later in the year has probably led to the extinction of our main colony and with declines noted almost everywhere it is difficult to see where re-colonisation could come from. The only other record was of one caught and released unharmed from a Mink trap at the Bellows Mills trout lake, Edlesborough (SP91Z) (MMk).

Harvest Mouse *Micromys minutus*

There were three records during the year. One was found dead in a combine-harvester at TL15Y (RL) and the other two were both records of the distinctive summer nests at SP95Z (JG) and TL04L (FD).

House Mouse *Mus musculus*

There were nine additional tetrad records during the year making a total of 24 tetrads mapped.

Yellow-necked Mouse *Apodemus flavicollis*

No records were received of this species.

Wood Mouse *Apodemus sylvaticus*

Another 22 tetrad records were added giving a total of 46 tetrads over the two years. A young animal found in Dunstable had been born in late February or early March showing the potential for early breeding of this prolific small rodent (DA, KA).

Brown Rat *Rattus norvegicus*

This common and successful small mammal is still very much under-recorded with so far only 76, 21%, of tetrads mapped.

Grey Squirrel *Sciurus carolinensis*

Recorded in 50% of the county after the first two years of the mammal distribution survey. Black or melanistic animals were reported from another nine tetrads making a total of 22 tetrads for the two years. The black squirrels in Haynes Park were noted as increasing in numbers and spreading their distribution (TL04Q,V,W) (DP). Also near Haynes a pair of white Grey Squirrels were seen throughout the year and were observed mating (JA, DP).

Fox *Vulpes vulpes*

A further 56 tetrad records were added during the year giving a total of 172, 45% of the county. Animals were recorded frequently in daylight and are commonplace in urban areas of both Bedford and Luton. Recorded as visiting gardens in the evening when food scraps were put out for them.

Badger *Meles meles*

There were another 37 tetrad records added during the year giving a total of 133 tetrads, covering 30% of the county, for the first two years of the survey.

Fifty road casualties were reported during the year of which all but three were fatal. The outcome of animals injured in March and October was not reported but another animal also injured in March was later released after treatment. A monthly table of road casualties is listed below:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	7	16	4	1	11	4	–	2	3	–	–

Otter *Lutra lutra*

Information was received about the sick animal mentioned in the 1995 report. It was a female found dying near Sharnbrook in August 1995. A post mortem revealed it died of toxic poisoning. As no tattoos or micro-chips were found it was considered not to be one of the re-introduced animals (PC). Unfortunately we also had a death reported in 1996, this time a road casualty of a female at Stagsden (JG). Despite these losses there were at least twelve sightings of live animals all seen singly, some at very close quarters. The majority of records come from the River Great Ouse although one was seen frequently on the River Ivel.

Ferret *Mustela furo*

Two albino animals were reported: one seen at Whipsnade (SP91Y) in September (BB) and the other at Knockinghoe (TL13F) (GB). There were also two Polecat Ferret bodies that were submitted for examination to rule out the possibility of them being true Polecats. These were from Edlesborough (SP91Z) (MB) and Knockinghoe (GB). In addition to the above there are also four road casualties that were not examined and therefore could have been Polecat Ferrets or Polecats. They were at Leighton Buzzard

(SP92G) (JCC), Hammer Hill (TL04W) (DP), Shefford (TL13J) (DP) and Moggerhanger (TL14P) (JCh). A Polecat or Polecat Ferret seen crossing a road at Heath and Reach (SP92J) also remains indeterminate (RC).

Polecat *Mustela putorius*

After a blank year last year we had three records, all road casualties, that looked like true Polecats although it is possible that some of the records mentioned under the previous species were also of Polecats. The records were as follows: one at Husborne Crawley (SP93S) (PM) in August, one on the A5 road south of Hockliffe (SP92X) in September (CT), and finally one at Haynes (TL04V) in November (JA, DP).

Mink *Mustela vison*

There were another fourteen tetrad records added during the year making a total of 38 for the first two years of the survey. Bold animals were noted alongside the River Great Ouse in Bedford with one seen along the embankment on a busy July afternoon (DO) and another stealing bait from some anglers (SW). There were also records from the south of the county with animals recorded from Edlesborough (MMk) and Dunstable Sewage Farm (PT).

Stoat *Mustela erminea*

Thirty-two additional tetrad records were added so that 71 tetrads have now been mapped.

Weasel *Mustela nivalis*

This species was recorded from another 17 tetrads in the count giving a total of 57 tetrads mapped during the first two years of the survey. Weasel droppings were found in one of the Dormouse nestboxes at Studham during the summer (CT).

Chinese Water Deer *Hydropotes inermis*

Another three tetrad records were added during the year giving a total of 34 tetrads mapped during the first two years of the survey. The highest count was of six animals seen feeding together in a bean field near Eversholt (SP93X) (DP, JA).

Fallow Deer *Dama dama*

Seven more tetrad records were added during 1996 making a total for the two years of 24. A herd of Fallow Deer were seen feeding near some Sika Deer at Wakes Farm in October providing a useful comparison. The wide variety of colours found in Bedfordshire can cause problems with identification with other deer species especially with animals that do not show themselves well to the observer.

Muntjac *Muntiacus reevesi*

Forty-seven more tetrads were added during the year giving a total of 171, which covers 45% of the county. It is by far the commonest and most widespread of the deer found in Bedfordshire with four times more tetrads recorded than Chinese Water Deer which is the next commonest.

Red Deer *Cervus elaphus*

A stag was seen near the M1 at Steppingley in September (MMc) with another seen during the Mammalthon at Wakes Farm in October (CW and JW). These are both sites close to Woburn Park and they are the first county records since 1989.

Sika Deer *Cervus nippon*

Four hinds were seen feeding in a bean field at Wakes Farm by both teams on the Mammalthon in October (JA, DP) (CW, JW).

Roe Deer *Capreolus capreolus*

The first confirmed record for Bedfordshire was of a male seen on 7th May just south of Dunstable (DC). Details of this record are on page 24. There was also one reported close to the county boundary in Buckinghamshire (SP95G) (ML).

ACKNOWLEDGEMENTS

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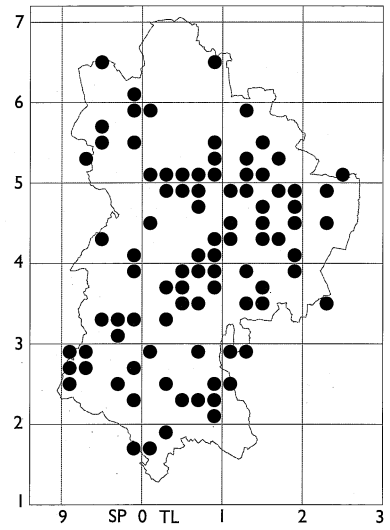
CLIFF TACK

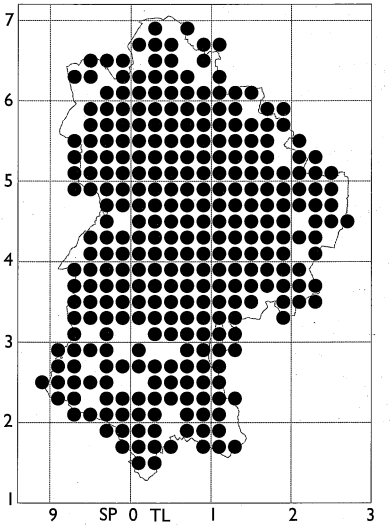
MAMMALS – BATS
Report of the Recorders

Introduction

In 1996 bats were recorded in 90 tetrads (2km x 2km squares). This is comparable with previous years: 1995 – 96, 1994 – 94, 1993 – 88, 1992 – 88, 1991 – 101 and 1990 – 98 tetrads. 1996's records are spread evenly across the country.



Bat records for 1996



Bat records from 1987 to 1996

Distribution of bat records

Earliest bat record

The earliest bat was an unconfirmed Noctule at Chicksands Priory on 29 February. A dead Brown long-eared bat was found in the Priory on 21 February. Bats in houses were reported on 10 February (a confirmed 'Bandit' pipistrelle from Eversholt) and 21 February (an unconfirmed pipistrelle from Upper Caldecote).

Latest active bat record

An unconfirmed Long-eared bat was seen flying at The Lodge, Sandy on 14 and 15 November. On 15 November the bat was seen to enter the clocktower, a roost for this species. A bat was found in a house in Ampthill (actually in the toilet) on 21 November. A bat seen flying in December in the cellar of a house in Ampthill was found torpid on the steps of the cellar on 19 December. The bat may have been trying to hibernate in the cellar.

Daubenton's Bat *Myotis daubentonii* (Kuhl, 1819)

Confirmed records: 3 summer roosts
2 hibernation sites
Unconfirmed records: 3 sightings of flying bats
Earliest active bat: 8 April
Latest active bat: 16 September
Hibernating bats: January, February and December

The originally discovered roost at Stockgrove Country Park, SP916288, was only known to be occupied on 21 May. A count was not made. Sixteen bats were counted out from the nearby low roost, SP917288, on 20 May. Flying Daubenton's bats at Stockgrove were recorded between 8 April and 16 September. The only other known summer roost was in Old Warden Tunnel. This was identified when a bat was mist-netted by Tony Aldhous as it emerged from the tunnel entrance, TL113447, on 9 August.

Bats hibernated in Silsoe ice-house and Old Warden Tunnel.

Bats were seen flying near Henlow Grange (4 June), along the River Great Ouse between Clapham and Bedford (16 July), and over Home Wood fish ponds in Northill (14 September).

Natterer's Bat *Myotis nattereri* (Kuhl, 1818)

Confirmed records: 8 hibernation sites
1 grounded bat
Hibernating bats: January, February and December

Hibernating Natterer's bats were identified in 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.

The grounded bat was a male found on the doorstep of a house in Cambridge Road, Dunton, TL237443. The bat showed no signs of injury, but later died.

Noctule *Nyctalus noctula* (Schreber, 1774)

Confirmed records: 3 roosts
Unconfirmed records: 2 sightings of flying bats
Earliest active bat: 29 February
Latest active bat: 14 September

Noctules were reported in the Scot's pine roost at Stockgrove Country Park SP916290 between 3 June and 24 June. They peaked at nine on 24 June. A second noctule roost was discovered at Stockgrove in an oak tree, SP920293. Twenty-three bats emerged on 10 June.

Flying bats were seen feeding over the lake at Stockgrove between 8 April and 12 August. A maximum of two were seen in flight.

A noctule roost was also found in an ash tree along the River Great Ouse between Clapham and Bedford, TL033510. Fifteen bats were counted out on 16 July.

Unfortunately this tree is very close to the route of the proposed Clapham bypass and the bat group has been involved in negotiations to protect the tree.

The two unconfirmed records were of single bats flying over Chicksands Priory on 29 February and over Whipsnade Zoo on 14 September.

Pipistrelle *Pipistrellus pipistrellus* (Schreber, 1774)

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

45 kHz 'Bandit' Pipistrelle

Confirmed records: 4 roosts
19 sightings
Unconfirmed records: 2 roosts
7 sightings

The four confirmed roosts were: 33 bats in Haynes, a maternity colony of 81 bats under the eaves of a house in Houghton Regis, a roost on a house in Broom, and two bats found roosting behind the soffit board of a house in Westoning on 11 November.

The confirmed sightings were a bat mist-netted in Potton Wood, injured bats from Hockliffe, Luton, Bedford, Clophill, Toddington, Kempston and Haynes, grounded bats from Maulden and Luton, and bats in houses in Eversholt, Bedford (after a ceiling was removed), Potton (bats may roost in the porch), Maulden (in the toilet) and a garage in Leighton Buzzard.

The two unconfirmed roosts were a bat seen in the crack between a wall and door-post of a farmhouse in Pulloxhill on 12 November, and a roost at a second house in Haynes.

The seven unconfirmed sightings were bats in flight, identified using a bat detector, at Stockgrove Country Park, along the River Great Ouse between Clapham and Bedford, at Bradger's Hill in Luton, at Priory Country Park, at Home Wood fish ponds in Northill, at Haynes Park Estate, and at The Paddocks in Linslade. Roosts at the latter two were probably of this type of pipistrelle.

55 kHz 'Brown' Pipistrelle

Confirmed records: 1 summer roost
4 injured bats
Unconfirmed records: 1 sighting

The roost was in a house in Willington, TL105498. This has been a problem roost for some years, being a large and smelly colony. This year the householder requested exclusion.

Four bats were found injured. These were in Tilsworth, Harrold, Sandy and Biggleswade.

Bats were identified in flight, using a bat detector, at Stockgrove Country Park.

Pipistrelles not identified to type

Confirmed records: 1 roost
8 injured bats
Unconfirmed records: 16 roosts
1 bat in a building
7 flying bats

The confirmed maternity roost was located under the eaves of a house in Wilden when a baby bat was found underneath. The baby was returned to the roost. The injured bats were found in Luton, Bedford, Pavenham, Biggleswade, and near Heath and Reach. A grounded bat found in a cellar in Ampthill in December may have been attempting to hibernate.

The unconfirmed roosts were mainly in houses (11) including in cavity walls, under eaves, behind cladding and in chimneys. Roosts were also noted in churches, a garage, and in a bat box. The records of flying bats included one seen at lunchtime in Sandy on 9 April, and one seen at 9 am, also in Sandy, on 30 September.

Unidentified bats

There were 41 records of unidentified bats from around the county. Thirteen of these were flying bats, 13 were roosts (seven churches, five houses and one in the main stand at Luton Town Football Club), 13 were bats flying in buildings, and two were grounded bats. Many of these bats are likely to have been pipistrelles.

Brown Long-eared Bat *Plecotus auritus* (Linnaeus, 1758)

Confirmed records:	5 summer roosts
	7 winter roosts
	4 injured bats
	1 sighting
Unconfirmed records:	6 roosts
	1 feeding site
Hibernating bats:	January, February and December

The confirmed summer roosts were in Chicksands Priory, Shuttleworth House, a house in Souldrop, the shoot-room at The Lodge in Sandy, and a farm in Sewell. The sighting was of a bat hanging in the porch of a farmhouse in Silsoe in October.

The seven winter roosts were in Moggerhanger ice-house, Southill ice-house, Silsoe ice-house, Old Warden Tunnel, Whipsnade bear pit, Woburn rockery tunnel, and Shuttleworth ice-house.

The injured bats came from Woburn, Moggerhanger, Marston Moretaine, and Sandy.

The unconfirmed roosts were in Great Barford Church, Pertenhall Church, Cranfield Church, a house in Langford, a clocktower at The Lodge in Sandy, and the belltower of Turvey House. Droppings were found in the porch of Northill church, but there was no sign of a roost and it was probably only a feeding site.

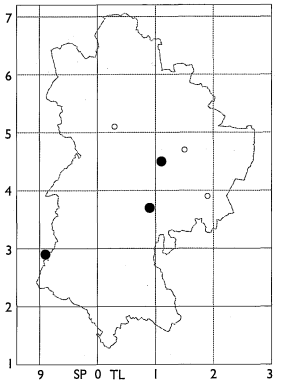
Barbastelle *Barbastella barbastellus* (Schreber, 1774)

Confirmed record: 1 hibernation site

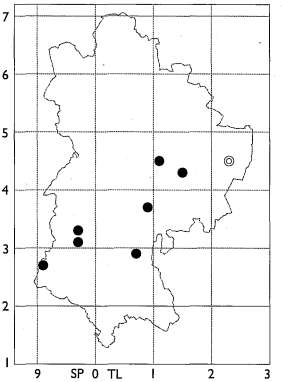
A hibernating barbastelle spent the winter 1995/96 hibernating in Old Warden Tunnel TL113447, a new site for this species. The bat had disappeared when the site was visited in March. This was only the sixth record for Bedfordshire this century.

A barbastelle was also found in Old Warden Tunnel in December. This was probably the same bat, as it was located in a crevice close to the one occupied by the barbastelle at the beginning of the year (the original crevice had disappeared through weathering).

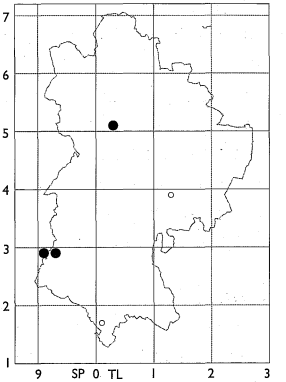
JOAN CHILDS and TONY ALDHOUS



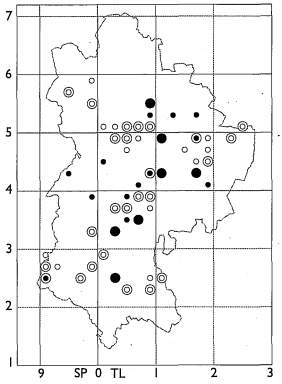
Daubenton's Bat



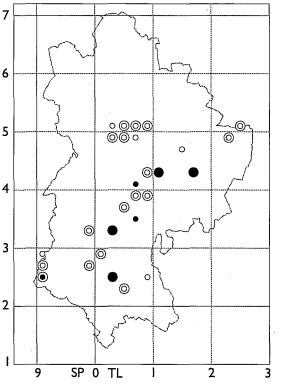
Natterer's Bat



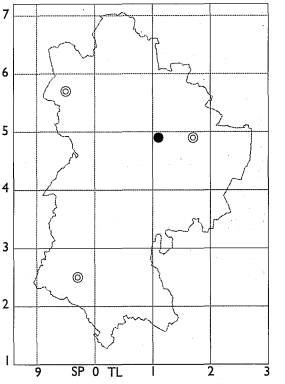
Noctule



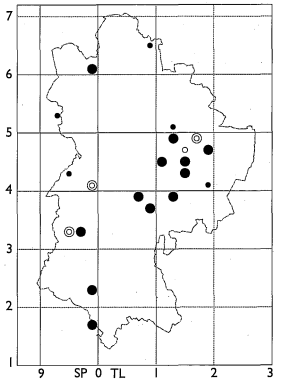
Pipistrelle



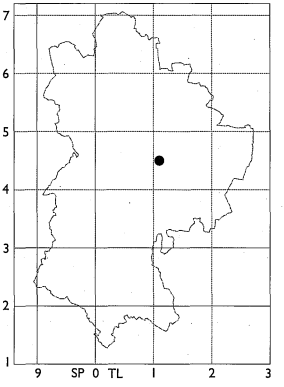
'Bandit' Pipistrelle



'Brown' Pipistrelle



Brown Long-eared Bat



Barbastelle

Key for species distribution maps

- Confirmed roost
- Confirmed bat and unconfirmed roost
- Confirmed bat
- Unconfirmed roost
- Unconfirmed bat

A HISTORY OF BAT RECORDING IN BEDFORDSHIRE

Joan Childs and Tony Aldhous

Introduction

Bat recording in the county falls into three main phases:

1. Up to 1970. Very little work on bats was undertaken in the county up to this date. Most of the observations were made by J. Steele-Elliott.
2. Between 1970 and 1986 when David Anderson was mammal recorder for the Bedfordshire Natural History Society (BNHS). Most of the records appear in the BNHS Journals.
3. From 1987 onwards when Joan Childs and Tony Aldhous began working on bats in the county and formed the Bedfordshire Bat Group. Most of the records appear in the bat group Annual Reports and the BNHS Journals.

This report details records up to the end of 1995.

BAT RECORDS UP TO 1970

General bat records

J. Steele-Elliott noted in *Victoria County History* (Bedfordshire) 1904: "Unfortunately there seems to be no one resident in the county who has specially studied the local mammalia, and this accounts for the omission of many little known mammals from this list. Amongst those species as yet unrecorded within Bedfordshire, and which would in all probability on careful investigation be found, are . . . several of the Cheiroptera."

BNHS Journal No 1 1946 contained an article entitled 'The Mammals of Bedfordshire' by mammal recorder Ray Palmer. The article reiterated the fact that further species of bats may yet be recorded, and included a request for any specimens of bats.

The article 'The Wild Mammals of Bedfordshire' in 1949's *Bedfordshire Magazine* included a paragraph on bats. It stated: "Bats are the least known of our native mammals, because their nocturnal habits and secluded daytime retreats make observation very difficult. Of the fourteen British species only six have been recorded in Bedfordshire, though no doubt others occur." It also noted the known records of each species in the county.

In 1951 Ray Palmer wrote an article entitled 'The Bats of Bedfordshire' for *Bedfordshire Magazine*. It was illustrated with photographs by the author. Although he dispelled the "blind as a bat" myth, some of his statements on bat "radar" and behaviour have not stood the test of time.

In 1951 the position of county mammal recorder became vacant. It was filled in 1952 by Henry A.S. Key. The next bat entry in a BNHS Journal was not until 1953, when Henry Key made a brief reference to bats in the article 'Some Observations on the False Spring of 1953'. It stated: "More than the average number of bats were seen flying until late in the year.' In the 1958 Journal there was again a brief reference to bats, this being a note of bats seen at Park Farm, Stevington. In 1965 J.A. Burton lectured to the BNHS on 20 October on "Bats". This meeting was re-run on 6 October 1966.

Barbastelle

J. Steele-Elliott noted in *Victoria County History* (Bedfordshire) 1904: "Evidently uncommon, and personally I have never seen a local specimen. One was taken in 1868 in the bedroom of a house in the Clapham road, another a few years after was knocked down by a boy with his cap near Brickhill farm, and a third found dead in Fosterhill Road in Bedford about the same year. The most recent was one picked up alive also in that road by Mr. A. Covington in August 1901, which he retained for a time before liberating."

He also made the following unpublished note: "Beds Mercury 1885 In p 216 Birds of Beds note by A Covington."

The 1946 Journal noted that this bat should be looked for, and in 'The Wild Mammals of Bedfordshire' 1949, Ray Palmer made reference to the early records in the county and included a photograph of a barbastelle.

Brown long-eared bat

Victoria County History (Bedfordshire) 1904 noted this species as abundant. J. Steele-Elliott also listed the following unpublished records:

"7.4.1901 Heard at Shefford.
5.2.1905 Evidently this species on wing at Blunham.
7.8.1906 Taken Crown Farm Turvey.
11.7.1912 Some 40 or more (26 taken) roosting in roof of Crown Farm House Turvey. Many young only just able to fly a short distance when released."

The 1946 Journal noted "A very common night flying bat, that frequently enters lighted rooms."

In 'The Wild Mammals of Bedfordshire' 1949, Ray Palmer stated: "The long-eared bat may be equally common [as the pipistrelle] but it does not appear until after dark and most of the specimens seen are those which fly into lighted rooms."

In the 1962 Journal W.J.àChampkin noted a long-eared bat found hibernating in January. The bat was hanging in a cellar in Colmworth on a beam white with frost. One ear was tucked under a wing and one was hanging down. When the frost had gone and the beam was wet the bat relocated to a confined space between the wall and beam amongst some cobwebs.

Daubenton's bat

Victoria County History (Bedfordshire) 1904 noted: "The first occurrence of this species recorded in the county is given in the Zoologist 1893, when two were obtained on 9 August from several flying by the river close to Cardington Mill. I have since observed this species in many other sheltered haunts along the Ouse and over the lake at Southill".

In his personal notes J. Steele-Elliott recorded: "14 July 1911 Several seen near Sandy Mill."

The 1946 Journal noted: "Known also as the Water Bat, this species frequents lakes and rivers overhung by trees, where it skims low over the water. It is probably common. . . A. H. Foster (Nat. Hist. Hitchin Region), records it from Southill Lake."

In 'The Wild Mammals of Bedfordshire' 1949, Ray Palmer compared the Daubenton's bat to "a ghostly sand martin" and stated: "it is found all along the Ouse and at large sheets of water such as Southill lake."

Greater horseshoe bat

The 1958 Journal gave a list of mammals seen at Park Farm, Stevington, which included this species. David Anderson noted in the 1971 Journal: "There are no other details for this record and, as bats must be handled to be identified, the record is in some doubt."

Natterer's bat

Victoria County History (Bedfordshire) 1904 noted: "Probably not very uncommon within the county, although seemingly local. It is first recorded in the Zoologist 1903, when several were observed during August in that year at Turvey and one obtained."

Noctule

Victoria County History (Bedfordshire) 1904 noted: "Common, haunting more particularly the neighbourhood of our rivers and larger pools, where not infrequently they may be observed in company with swifts, with which they seem equally adept when upon the wing at taking the Mayflies and other aquatic insects. At times I have observed this bat capture the larger beetles also. They sleep in the holes of trees, frequently in colonies. On 3 August 1897 I took exactly fifty from an old beech tree at Warden Warren, and I have heard of about as many being taken in other localities. A matutinal flight seems often to be taken by this as well as some of the other species."

J. Steele-Elliott's unpublished notes stated:
"2.4.1899 Common over Ivel between Clifton & Shefford.
May 1904 Colony in hole of poplar in Turvey Park.
3 May 1912 Took exactly 30 out of hole in oak tree Turvey Park."

The 1946 Journal noted: "The largest British species, and fairly common. It may seen flying at a great height in wooded country in the early evening, sometimes before sunset."

In 'The Wild Mammals of Bedfordshire' 1949, Ray Palmer stated: "The noctule is our largest bat, with a wing expanse of fifteen inches; it lives mostly in hollow trees, and flies to a greater height than other bats, sometimes swirling about amongst the swifts and at other times hovering like a kestrel."

Pipistrelle

Victoria County History (Bedfordshire) noted: "Very common. They sleep in buildings, especially in churches."

In his unpublished notes, J. Steele-Elliott recorded:

"So far I think we have killed about 40 in all in Oakley Church but I am ignorant of what species. (Rev H. S. Watts).
30 April 1901 Two pipistrelles taken off door (between door frames) at Wilden Church. 9 May 1901. Another one. Sometimes six or eight together are seen by the cleaner.
5 August 1907 From 8 pm to 8.37 pm 276 bats left their sleeping haunt in the gable

end of Blunham Mill House (under the slates) & others remained squeaking when I left, owing to the darkness preventing a further correct count being made. I caught two bats & both of them were of this species.

Beds Times and Ind 9 October 1914. 'Eversholt' Amongst the many bats seen flying at evening time during the past fortnight, a pure white one has been frequently observed."

The 1946 Journal noted: "The commonest species, this is the small bat that flies around buildings in the twilight, constantly uttering its high-pitched squeak."

In 'The Bats of Bedfordshire' 1951, Ray Palmer noted: "The most familiar bat is the little Pipistrelle, which is usually the one seen flitting about low down in the dusk of a summer evening, and often in daylight in early spring and autumn. It roosts in large colonies in the roofs of buildings, church towers, etc. . . The Pipistrelle is the smallest of our bats, and a living specimen which I had recently weighed only a tenth of an ounce."

The 1958 Journal noted pipistrelles seen at Park Farm, Stevington.

Whiskered bat

J. Steele-Elliott's unpublished records stated:

"10 August 1922 Found one in empty glass jamjar by outbuildings Burdelys Farm Stagsden.

23 September 1922 Another hovering around in my bedroom at night. Confirmed by S.K. Major, M.A.C. Hinton"

Both the 1946 Journal and 'The Bats of Bedfordshire' 1951 noted that this species is supposed to be nearly as common as the pipistrelle, but that there are no definite records from Bedfordshire.

BAT RECORDS 1970–1986

General bat records

In 1970 David Anderson took over the position of mammal recorder and a concerted effort to record mammals more thoroughly than in the past was initiated. Although bat records began to increase, there was still nobody specifically studying bats in the county.

David Anderson wrote a résumé of the current knowledge of mammals in the county in the 1971 Journal entitled 'Mammals in Bedfordshire – 1946–1971'. The article ends: "The Bat species . . . require work to establish their density and types." This Journal also included a record of bats at Hardwick Spinney: "Small numbers of this group seen flying on several occasions at dusk along the western edge of the spinney."

The Journals of 1971–74 noted that a number of other species of bats should be present in the county, and that bats were under-recorded. The 1974 Journal also noted: "The lack of the bat records is probably due to insufficient catching". Bob Stebbings gave a talk to the BNHS on 6 March 1974 entitled "Bats".

The 1975 Journal noted Ampthill Lake as one of the best bat locations in the county. There was a BNHS bat catching meeting on 1 July at Cardington Mill led by Clive Banks.

The 1976 Journal stated: "It is virtually impossible to identify any of the various species in flight so records are restricted to the finding of dead bodies, visiting known roosts and, in recent years, netting which requires both patience and skill. Clive Banks is probably the only person in the county capable of handling the bats when they have been caught. Netting has provided more bat records than all other means." This Journal included an article 'Notes on some species of mammal present in Bedfordshire' by David Anderson and Richard Woolnough. There was a BNHS outdoor meeting on 14 July "Riverside natural history and bat catching" led by Bernard Nau and there was a student meeting on 3 November entitled "Badgers and Bats" by David Anderson.

The 1980 Journal reported that: "The summer was not too warm and was wet at the critical times, so it was a poor year for bats. Summer catching trips did not reveal much . . ." A BNHS indoor meeting was held on 7 February entitled "Badgers and bats" by Clive Banks.

The 1981 Journal reported that: "The bat species only produced three new tetrad records as no summer catching was done for a variety of reasons. However, a new approach was started during the early months of the year to check hibernation sites. Some species of bat hibernate in caves or, in the absence of these in Bedfordshire, in man-made underground chambers such as Ice Houses. The two known sites were checked, one of which contained 5 bats . . ."

The 1982 Journal reported that numbers of bats found in hibernation sites had increased. It was noted: "During the year the new Wildlife and Countryside Act gave total protection to all bat species, and now any Bat worker has to be licensed. This means that householders have to notify the NCC if they have a Bat problem and someone - often this Recorder - is sent along to investigate and advise. This procedure produced several new Bat sites . . ."

The 1983 Journal stated: "Bats seemed to have a quiet year, although not much work was done with them during the summer. The usual winter check of hibernation sites showed some in use . . . Since that check I am sorry to report the loss of the best site in the county, by blocking of the entrances. Efforts have been made to get it re-opened and, although a promise was made to clear the entrances, no action has so far been taken. Continuing efforts will be made to get this site restored . . . A group of members went to a Mammal Society symposium of Bat workers during 1983 and I was surprised and pleased to find that Bedfordshire is very well up, compared to the rest of the country, in the amount and variety of Bat work we undertake."

The 1984 Journal stated that little bat work was done. "No large roosts were reported and it looks as if Bats continue to decline."

In the 1985 Journal David Anderson closed the mammal distribution maps after 15 years with him as recorder, and included the article 'Distribution of Bedfordshire mammal species 1971–1985'. This included distribution maps for all bats for the 15 year period. The BNHS held a meeting on 12 July to Melchbourne Park to trap and identify bats and moths, led by Clive Banks and Vic Arnold.

In the 1986 Journal the mammal report included bat flight photographs by Ralph Newton. The earliest and latest dates for active bats were included. The BNHS held an indoor meeting on 21 October entitled "British Bats" by Phil Richardson.

Barbastelle

The 1976 Journal noted: "... in May the body of a dead male Barbastelle Bat was found in Shuttleworth Estate by the Greens - father and son. This bat had not been recorded in Bedfordshire since 1901, when one was picked up alive in Bedford. The Barbastelle is one of Britain's rarer bats, so it is very exciting to find it is present in Bedfordshire ... All we need to know now is where it is living and in what numbers!"

In 'Distribution of Bedfordshire mammal species 1971-1985' in the 1985 Journal the barbastelle was recorded as present in one tetrad (0.3%) and noted as "vulnerable".

Brown long-eared bat

The 1971 Journal recorded this bat in one tetrad. In David Anderson's résumé in this Journal he noted: "Listed in 1946 as very common. Since then only recorded once in 1962 in north of county and once in 1971 in south of county."

In the 1972 Journal this bat was recorded in one tetrad, and the Journal featured the article 'A breeding colony of long-eared bats' by David Anderson, about long-eared bats in the loft of a house in Luton.

In the 1973 Journal long-eared bats were recorded in two tetrads. In the 1974 Journal it was noted that a low number of new tetrad records was obtained for this species.

The 1976 Journal recorded this species in one tetrad. It was noted that: "Long-eared Bat is the second most well-recorded bat in the county. It has not been netted but this is almost certainly due to its feeding habits as it hovers close to trees and bushes plucking its prey form the foliage. Records come from roosts in the lofts of houses and from dead bodies."

The 1980 Journal reported three new sites obtained from dead bats, the 1981 Journal noted one tetrad record, and the 1982 Journal noted two tetrad records.

In 1985 it was stated that this species was well recorded, with six new records obtained from bats found dead on the ground. In 'Distribution of Bedfordshire mammal species 1971–1985' in the 1985 Journal the brown long-eared bat was recorded in 18 tetrads (4.8%) and noted as "vulnerable".

The 1986 Journal noted several summer roosts at Whipsnade Zoo and recorded this species in four tetrads.

Daubenton's bat

The 1971 Journal noted no records during the year, but that it should be present. A single record was noted in the 1973 Journal.

The 1975 Journal noted that Daubenton's bats had been caught from Ampthill Lake – its only known location in the county. The 1976 Journal noted: "Specimens have been caught on Ampthill Park Lake and on a small pond on the Ampthill-Woburn road. It is probably more widespread but poses particular netting problems."

There was one tetrad record in each of the 1978, 1979, 1980 and 1982 Journals. The 1982 record was as a result of hibernation checks.

The 1984 Journal stated: "A very unusual but sad record was obtained when Adrian Rundle and Derek Rands found a Daubenton's bat caught on a discarded fishing hook hanging from a tree by the River Ouse at Great Barford. The Bat was alive and Derek

took it home and fed it up for three days before releasing it at the original site in a healthy state." This journal included a photograph of this bat, which was the only record for the year.

In 'Distribution of Bedfordshire mammal species 1971–1985' in the 1985 Journal the Daubenton's bat was recorded in 6 tetrads (1.6%) and noted as "vulnerable".

Natterer's bat

The 1975 Journal noted that this species was caught at Ampthill Lake in May: "The catch was made on a visit to check the site, one week before a Society meeting. Unfortunately, the meeting itself was held on a cold and rainy evening, and although a few bats were seen, none was caught." It is noted that this is the only known site for this species in the county. The article 'Notes on some species of mammal present in Bedfordshire' in the 1976 Journal noted that a single Natterer's bat had been caught along the edge of a line of trees near the lake in Ampthill Park.

The 1981 Journal noted one tetrad record, the 1982 Journal noted one tetrad record as a result of hibernation checks, the 1983 Journal recorded hibernation sites containing Natterer's Bats, and the 1984 Journal noted one tetrad record. In 'Distribution of Bedfordshire mammal species 1971–1985' in the 1985 Journal the Natterer's bat was recorded in 4 tetrads (1.1%) and noted as "vulnerable". The 1986 Journal reported two tetrad records of this species in hibernation.

Noctule

In the 1971 Journal there was one record. In the résumé in the same Journal it was noted: "Listed in 1946 as fairly common, but again only 2 records since. Both were in the north of the county, one in 1970 and one in 1971." In the 1973 Journal two records were noted. It was noted in the 1975 Journal that noctules were probably present at Ampthill Lake but that they had so far eluded capture.

The article "Notes on some species of mammal present in Bedfordshire" in the 1976 Journal noted that the noctule "... has been caught on the Ouse and on Luton rubbish dump but is much more often present flying too high to net."

In the 1978 Journal there was one record.

In 'Distribution of Bedfordshire mammal species 1971–1985' in the 1985 Journal the noctule was recorded in 4 tetrads (1.1%) and noted as "vulnerable".

Pipistrelle

Pipistrelles were not recorded in the 1971 Journal, but it was noted that they should be present. In the résumé in this Journal, David Anderson described them as common. In the 1972 Journal pipistrelles were noted in two tetrads. It was noted that: "The Pipistrelle Bat records were to be expected and the fact that this common bat has taken two years to record, only reiterates my earlier remark about the difficulty of obtaining bat records."

In the 1973 Journal pipistrelles were recorded from six tetrads, and in the 1974 Journal it was noted that they were recorded from a low number of new tetrads. It was noted in the 1975 Journal that pipistrelles were probably present at Ampthill Lake, but that they had so far eluded capture. The 1976 Journal recorded them from seven tetrads.

The article 'Notes on some species of mammal present in Bedfordshire' in the 1976 Journal noted that the pipistrelle ". . . roosts in large numbers in houses, 430 at Willington, 114 at Stevington, in both cases in houses less than ten years old."

In the 1977 Journal pipistrelles were recorded from one tetrad. In the 1978 Journal they were recorded in five tetrads. It was noted that they were probably commoner than the number of records indicated, but that they were not likely to be recorded casually and special effort was required to obtain additional records.

In the 1979 Journal there were two records both for new tetrads, in the 1980 Journal five new pipistrelle records were obtained by catching, and in the 1981 Journal there was one tetrad record.

In the 1982 Journal there were two tetrad records for pipistrelle. It was recorded that visits on behalf of NCC following the Wildlife and Countryside Act 1981 produced several new bat sites, all for pipistrelle. The best was a house in Toddington with a roost of at least 70 breeding under the tiles hanging on the south facing wall.

The 1993 and 1994 Journals each reported one tetrad record for pipistrelle. In the 1985 Journal there were two tetrad records. In 'Distribution of Bedfordshire mammal species 1971–1985' the pipistrelle was recorded in 41 tetrads (10.9%) and noted as "scarce".

The 1986 Journal reported this species "much around during the summer, and visits were made to house roosts in Woburn Sands, where 42 Bats were counted leaving the site, Leighton Buzzard, Edlesborough and Luton. However, in late summer several reports were received of youngsters being found on the ground under roost sites."

Whiskered bat

In the 1971 Journal David Anderson noted that the whiskered bat had been recorded in three places some year prior to 1960.

The 1986 Journal reported: "The Whiskered Bat - the first new species to the county list for two years, was a single animal found under the roof tiles of a farm house at Brogborough. Unfortunately the animal was killed in the roof removal, and no other Bats were found anywhere else in the whole of the roof. Although this is the first record of this species in Bedfordshire for over 26 years, it is found in adjacent counties, and has been expected for some years. This makes it doubly welcome, both as a new species to our list, and as confirmation of predicted records."

Unidentified bats

BNHS Journals also listed the following tetrad records for unidentified bats: 1971 (6), 1972 (20), 1973 (16), 1976 (10), 1977 (5), 1978 (9), 1979 (3), 1980 (10), 1981 (2). 1982 (3), 1983 (1), 1984 (3), 1985 (4). In 1986 all reports of unidentified flying bats were for small numbers of up to four, except for one roost site at Old Warden, where 50 were counted.

BAT RECORDS 1987-1995

General bat records

In 1987 the BNHS book *Bedfordshire Wildlife* was published. It referred to bats under

the "Graveyards and Dark Places" chapter with distribution maps of six species of bats. In the 1987 Journal David Anderson reported numbers of bats as lower than in previous years. It was noted that "The October storm may have caused serious loss of roosting sites in old trees but it could produce new sites for the future where branches have been torn off. L. Smith and B. Horne saw bats maintaining territoriality whilst feeding along a length of hedge and driving away other Bats trying to feed at the site. G Dennis reported a different sort of feeding behaviour when he witnessed a Hobby trying to catch flying Bats, but without any observed success." It was also noted in the 1987 Journal: "A massive increase in records was obtained by the welcome and hard work of Joan Childs and Tony Aldhous."

For each year, tetrad distribution maps for each species of bat identified in the county were plotted, noting if the record was confirmed or unconfirmed, and if it was a roost or not. A map for all bat tetrad records was also plotted, along with a cumulative tetrad map from 1987. The earliest and latest records of active bats and details of hibernation records were noted, along with the most interesting observations for each species during the year. In 1987 there were 57 tetrad records of bats. A church survey was initiated and by 1988 every church with a tower or steeple in the county had been surveyed for bats. Out of 148 churches surveyed 116 (78%) had evidence of use by bats. A number of churches are regularly revisited each year.

The Bedfordshire Bat Group was formed in 1988 and was later affiliated to the BNHS. In that year, there were 171 tetrad records of bats. Graham Dennis undertook a survey of bats at Priory Country Park between 1988 and 1990 which included bat box checks.

In 1989 Derek Rands took over as mammal recorder. He noted in the Journal "Overall it would seem to have been a poor summer for bats". There were 175 tetrad records of bats.

In 1990 bat recording was split from general mammal recording and Joan Childs and Tony Aldhous became the bat recorders. Joan Childs initiated a survey of The Lodge, Sandy which continued through to 1991. Five species of bats were confirmed roosting at this site. Philip Clarke began the construction of the Braystone Hibernaculum. There were 98 tetrad records for bats during this year.

In 1991 there were 101 tetrad records for bats.

The 1992 Journal contained an article by Joan Childs entitled, 'Winter records of bats in Bedfordshire'. It detailed all the winter sites regularly checked and the three species of bats recorded in them between 1989 and 1992. The article also included the results of a survey of all known ice-houses in the county and their suitability as hibernacula, the construction of the Braystone Hibernaculum, and the erection of fan-shaped bat boxes as winter roosts. All known hibernation sites are checked three times each winter. During the year there were bat records from 88 tetrads.

In 1993 there was an article in the Journal by Joan Childs comparing bat distribution to habitat features in the county. Brown long-eared bat and Natterer's bat distribution correlated to the distribution of woodland, and the Daubenton's bat and the noctule occurred along the rivers and over open water. During the year there were records of bats from 88 tetrads.

There were 94 tetrad records for bats in 1994 and 96 for 1995.

The bat group went from strength to strength and by 1995 included some very

Plate 1: The Hairy Dragonfly, *Brachytron pratense*, was first recorded in Bedfordshire during 1996 when it was seen at five different sites (p. 61). *Photos: Richard Revels*

Plate 2: The Bee Wolf, *Philanthus triangulum*, appears to be expanding its range. It was first recorded in Bedfordshire at Redlands Quarry, near Sandy, in September 1996 (p. 58). *Photos: Richard Revels*

active bat workers, including 10 licensed by English Nature. These bat wardens regularly undertake roost visits on behalf of English Nature.

Barbastelle

On 16 October 1991 Carl Welch picked up a dead female barbastelle from a house in Aspley Heath. The bat had originally been found alive on an outside wall of the house. In 1994 two barbastelles were found hibernating on the same weekend in February after a cold, frosty spell. In December 1995 a bat was found in hibernation at a new site, and spent the whole winter there.

Brown long-eared bat

The second commonest bat in the county. The 1988 Journal recorded a maternity roost at Heath and Reach containing 20 adults with young. An unconfirmed roost was noted with 23 individuals. The church survey in 1988 allowed analysis of the diet of brown long-eared bats by identification of insect wings under feeding sites. The dotted rustic and large yellow underwing moths were the commonest prey items, but other moth species, butterflies, other insects and spiders were also taken. In 1990 the largest roost consisted of approximately 30 bats in a roof space that had been sealed from the rest of the house for the 100 years since the house had been built. In 1991 five bats were seen roosting along the ridge beam of a house in Sandy despite it being 18 December. In 1992 a bat used the Braystone Hibernaculum and in 1995 one was found hibernating in a fan-shaped winter bat box in Whipsnade. Small numbers of this species were found during the regular winter surveys.

Daubenton's bat

In 1988 every tetrad that included the rivers Great Ouse, Ivel, Ivel Navigation and Hiz were surveyed for Daubenton's bats, along with all bodies of standing water including flooded pits, lakes and ponds. Daubenton's bats were found practically everywhere that water occurred. In addition, the flight direction of the first bat of the evening along stretches of the rivers was determined in order to track bats back to their roosts. Despite much field work, no roosts were found.

In 1988 a maternity roost of Daubenton's bats, the first roost of this species found in the county, was discovered in a tree at Stockgrove Country Park. This roost, and Daubenton's bats feeding over the lake, and other species of bats in the park have since been monitored on a weekly basis. This project is currently led by Philip Irving. The 1989 Journal included an article about the roost and other bats in the park by Joan Childs and Tony Aldhous. The maximum number of roosting bats recorded was 98 in 1993 and two other maternity roosts in the park have been confirmed. In 1994 the bat group organised a chemi-luminescent marking project on the Daubenton's bats to determine other feeding areas. This project was written up in the 1994 Journal, and the survey repeated in 1995 piloting a much improved new non-water soluble marker capsule.

In 1990 a maternity roost was located at The Lodge, Sandy. A Daubenton's maternity roost was found in Kempston when the limb blew off an ash tree and the limb was removed by the County Council to a site in Bedford. Baby bats began to emerge from

this limb, and by the time Joan Childs attended, 13 dead baby bats were found. There were three males and 10 females at various stages of development. The roost was destroyed by this unfortunate accident.

Juveniles were occasionally found under roosts, either dead or very weak and later died. A baby fell out of a roost at Stockgrove Country Park when an adult bat flew out of the hole, and had to be replaced in the roost.

An uninjured but extremely thin bat was found grounded at a school in Bedford in October 1992. It was fed, and released four days later.

Daubenton's bats are found occasionally in hibernation sites, normally in small numbers.

Leisler's bat

The 1988 Journal reported: "An unconfirmed report of this species at Hazells Hall, Sandy during 1987. Report was for definite identification from dead bat, but not supported by written record (Adam Adamou)."

Nathusius' pipistrelle

In April 1995 a dead bat was found in the back garden of a house in Marston Moretaine. Identification was confirmed by Tony Hutson of the Bat Conservation Trust. This is the only record of this species for Bedfordshire.

Natterer's bat

An uncommon bat in the county. All the known summer roosts are in churches, except for one in wooden boardings at The Lodge, Sandy in 1990. However, it is the commonest bat found in hibernation with a maximum of 15 together in 1994.

Noctule

The 1987 Journal noted: "... in March a large beech tree was cut down at Turvey which was found to contain 20 Noctules. Only one Bat died as a result of the felling, which is remarkable."

In September 1989 a noctule with a broken wing was found at Luton Airport. This bat underwent three operations to splint, pin and finally amputate the wing. There was an article in the 1990 Journal by Joan Childs and Tony Aldhous detailing surgery performed on this bat, including two X-rays, one showing the broken bone and one showing the pinned wing. This bat is still alive in captivity.

In 1990 a noctule emerged from an old woodpecker hole in a Scot's pine at The Lodge, Sandy. This tree no longer exists.

In 1992 there was one confirmed record – a female bat picked up emaciated in the Dunstable Bingo Hall on 21 April. She was fed, and released on 28 April. On 7 December a silver birch was felled at Everton. It was reported that two large bats were killed and two flew away. It is probable that these were noctules.

In 1993 five were seen flying together at Stockgrove Country Park on 31 May and one was seen pursued by a hobby. In 1994 a noctule was found injured on the ground early in the year at Stockgrove Country Park and later died. In June a noctule roost was identified in a Scot's pine in the park. The maximum count was nine bats in 1995. This is currently the only known active noctule roost in the county.

There are also records of bats seen flying at dusk, usually associated with water, or sometimes parkland or heathland. They usually occur in small numbers, with a maximum of nine seen.

Pipistrelle

The commonest bat, roosting in a wide variety of places including modern and older houses, churches, outbuildings, schools, between Portacabin sections, in barns, and occasionally under thatched roofs. Hibernating bats are occasionally found in the winter, usually when building work is undertaken on houses. One bat chose a more unusual hibernation site however when it was found on 8 January 1992 in a stage coach that was part of the Mossman Collection housed at Luton. Dead, injured and grounded bats are frequently recorded, usually caught by cats.

The 1987 Journal reported the first use of bat boxes in the county, with six pipistrelles in a box in Bedford in September.

In 1988 John Adams began monitoring a pipistrelle roost under boardings on the south facing wall of his house in Haynes. This roost has been regularly monitored ever since. Between 1988 and 1991 it was a maternity roost, however since then it has been a pre-maternity gathering roost only. The maximum number of bats recorded was 123 in 1990. An article about this roost, by John Adams and Joan Childs, appeared in the 1991 Journal.

The 1988 Journal records that: "A collection of Tawny Owl pellets from Turvey, yielded the skeletons of four Pipistrelle Bats." This Journal also had a photograph of a pipistrelle in a bat box at Priory Country Park, Bedford taken by Graham Dennis. The 1989 Journal reported a maximum estimate of 250 pipistrelles in flight at Priory Country Park, and six bat boxes were used there during the summer, one holding five bats in August.

In 1990, 23 injured bats were received. Two of these gave birth in captivity. On 23 June in Maulden wood, pipistrelles were observed feeding around a moth trap. The moth wings fell to the ground enabling them to be identified as green oak tortrix moths.

In 1991, two bat boxes at Priory Country Park contained pipistrelles – one had a single female, the other had six bats. An adult bat was found caught by a fishing hook on the embankment in Bedford and later died.

In 1992 a large roost was found under the eaves of a modern house in Blunham. A total of 490 bats were counted out and seven dead babies were discovered under the roost. On 1 June 1993, 501 bats were counted out of this roost – the current Bedfordshire record. Other babies that fell out of a roost in 1992 fell into the gap in a cavity wall and electrocuted themselves behind an electricity socket. On 30 April 1992 an estimate of 300 flying pipistrelles was made at Priory Country Park, Bedford by Tony Aldhous, and a kestrel was seen hunting them.

In 1994 the pipistrelle was split into two phonotypes – the 45 kHz or 'bandit' pipistrelle and the 55 kHz or 'brown' pipistrelle. Roosts of both types occur in the county. On only one occasion have both types been found roosting together. This was in September 1994 when a female brown and a male and a female bandit were found roosting behind a pub sign in Deadman's Cross.

Whiskered bat

The 1988 Journal noted: "A verbal report that two more definite records of this bat have been obtained in Bedfordshire during 1987 or 1988. No other information available (Adam Adamou)."

In 1989 a bat was found roosting in the open in Old Warden Tunnel in April. It was identified in the hand as whiskered/Brandt's.

Unidentified bats

Despite improvements in bat identification skills in the field, including increased familiarity with bat droppings and increased competence with bat detectors, some bats inevitably remained unidentified each year. These records were usually of bats observed in flight or signs of bat roosts, or from members of the public who came into contact with a dead, injured or grounded bat.

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THE FISH OF THE BEDFORDSHIRE GREAT OUSE

By H.R. Winter

The comparatively small inland county of Bedfordshire contains a varied landscape and may be described as scenically attractive, varying as it does from the low chalk hills of the south, with some impressive abrupt inclines, to the unspoilt rolling countryside and limestone villages north of Bedford. But possibly the outstanding natural feature is the river Great Ouse which pursues a meandering course from west to east, passing through Bedford in the centre of the county.

The River

The source of the Great Ouse lies along the 150 metre contour north of Brackley in Northamptonshire where several springs rise from the underlying Oolite limestone near the village of Whitfield.

There are a number of tributaries but the River Ouzel provides the first input originating from a source in Bedfordshire, rising as it does from the chalk near Dunstable, and although only of modest length itself actually forms the county boundary for a short distance.

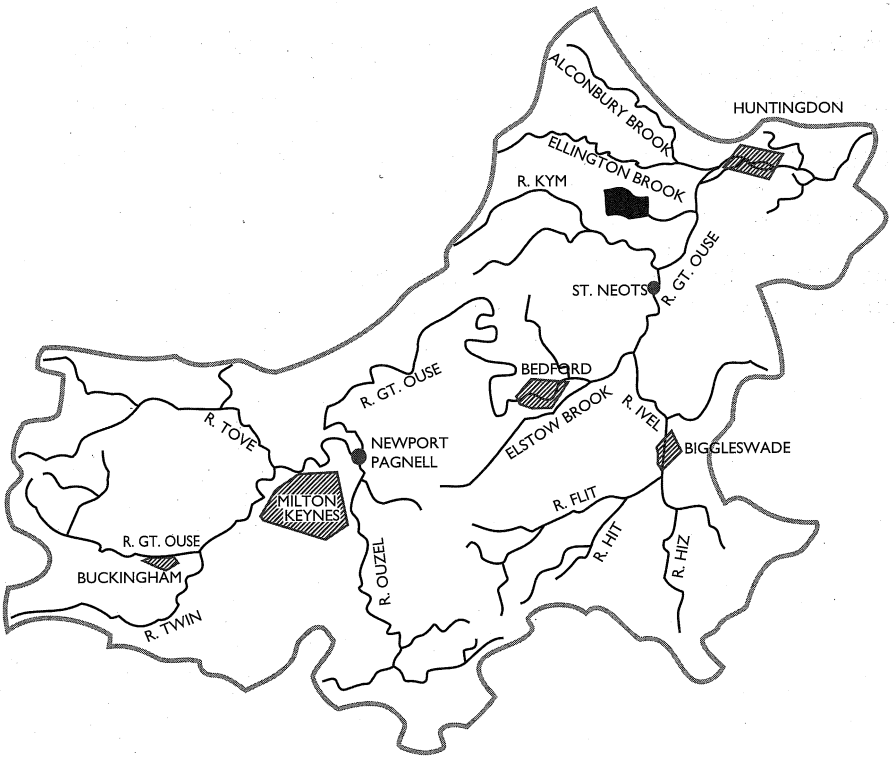

Fig.1 The Bedford Ouse catchment area showing principal rivers and towns

The main river enters Bedfordshire at Turvey and pursues a picturesque course across the county with further input from the Elstow Brook and several smaller streams together with the major River Ivel, the confluence being near Tempsford. Together with several more brooks a further tributary in the area is the River Kym which joins the main river a little downstream from St Neots in Cambridgeshire.

The Fish

The systematic recording of fish species in Bedfordshire commenced in 1947 with the formation of the Bedfordshire Natural History Society (BNHS) and the appointment of its first fish recorder, but very much earlier records do exist although the first serious attempt at recording was probably made with the publication of the *Victoria County History of Bedfordshire* (VCH) in 1904.

The Rev. Lysons, writing in 1806, states the fish of the Ouse to be Pike, Perch, Bream, Chub, Bleak, Fine Eels, Dace, Roach and Gudgeon; a list which still holds good today. A species of particular interest mentioned by old time writers is the Lampern. This has not been recorded in Bedfordshire since 1947, the nearest known location is in Buckinghamshire, but it is recorded as having been taken at Milton Mill and Pavenham in 1800, again at Milton Mill in the 1880s and at Tempsford Mill and Goldington Mill as recently as 1914.

There appear to be only three authenticated records of Salmon from the Bedfordshire Ouse in historical times, all of which are mentioned in the VCH. A 6lb fish was caught in an eel trap at Cardington Mill in 1840 or 1841 and was subsequently displayed by a Bedford fishmonger and another of 10lb in weight was taken by a Mr George Street from the same location when the river was in flood in July 1853. Finally a Salmon weighing 9½lbs was taken from an eel trap at Kempston Mill on December 22, 1880, as far as is known the last fish of its kind to be seen in the Bedford Ouse.

Eel traps were in use at many watermills for centuries and J. Godber, writing in *The History of Bedfordshire*, provides some interesting details from early documents which show that rental values of mills often included eels. At the time of Domesday record (1086) Cardington mill and one of the Bromham mills were each valued at 40s and 100 eels, Odell and Harrold mills each at 36s 8d and 200 eels and Oakley mill at 26s and 200 eels. A second Bromham mill and those at Great Barford, Putnoe, Goldington, Little Barford and Willington, together with two at Tempsford, were all valued partly in eels.

The VCH records 18 fish species as being indigenous to Bedfordshire but did not include either carp species on the basis that these were introduced to this country several centuries earlier. Also, although bream and loach are mentioned, no attempt is made to distinguish between the species (the Silver and Common Bream and Stone and Spined Loaches) although these had been recognised prior to the time of writing.

Mention was made that carp (Common?) were put into the Ouse from various ponds but had not since been seen and that a Crucian Carp was taken from an eel trap at Milton Mill. The Common Carp is now to be found at several sites downstream from Bedford but the Crucian Carp is not currently recorded from the main river.

In Victorian times angling competitions were extremely popular and prompted by this interest attempts were made to introduce several fish species to the Ouse; the

Bedfordshire stretch of the river was already considered remarkable for providing heavy catches of Common Bream, a species which subsequently declined but is now enjoying a resurgence of numbers. The golden form of the Tench was the subject of an early attempt at introduction with the presentation to the Bedford Angling Club by the Duke of Bedford in 1874 of a number of fish which were put into a pond at Clapham Park and which were subsequently transferred to the Ouse but without any long term success.

Following the introduction of Brown Trout to the River Ivel which met with short term success, the Bedford AC, in 1875, released 3000 fry of that species into the Ouse at Biddenham and in 1881–2 a further 600 yearling fish at Kempston and Renhold, the result of which was judged at the time to be not very successful owing to the abundance of Pike. This lack of success was perhaps not surprising as today the river thereabouts is not considered sufficiently aerated for the long term support of that species.

A venture which culminated in outstanding success more than 100 years later following several attempts, was the introduction of Barbel to the Bedfordshire stretch of the river. In 1876 the Bedford AC was presented with 31 fish ranging from 1 to 5lbs in weight by the Maidenhead Association and which were taken originally from the Thames. These were put into the Ouse at Kempston to be followed in 1888 by a further 38 fish, varying between 3 and 10lbs in weight, transferred from the River Trent. Some large fish were taken in the area in subsequent years as far downstream as St. Neots but it was not until after further attempts that the introduction of fish in the 1960s proved successful. Today the Bedfordshire Ouse between Turvey and Bedford can be considered one of the finest Barbel waters in the country. In 1994 a large number of fish of fingerling size were released into the river downstream from Bedford in the area of Cardington Mill and it will be interesting to see if this meets with long term success.

The most unusual record made since the formation of the BNHS dates from 1950 and is of a Roach x Bleak hybrid reported from the Great Ouse, most probably downstream from Bedford.

Cyprinid species are closely related and natural hybrids occur, Roach x Common Bream and Roach x Rudd being commonly found. A Roach x Bleak hybrid is rarely recorded and the BNHS Recorder of the time, F.G.R. Soper, described the specimen thus – 'Superficially it resembled a pale thin Roach with a pinkish eye, but its dorsal fin with eleven branched rays set well back behind the base of its ventral fin, its long anal fin with fifteen branched rays and its prominent lower jaw enabled it to be identified with certainty'.

Finally, mention should be made of a rare species, the Burbot. At one time this was found in East Anglian rivers such as the Cam but is now thought to be possibly extinct in this country. Only one mention of this species can be found for Bedfordshire which is an unconfirmed press report (Anglers Mail, 2 Oct 1969) of a 2lb specimen taken from the Great Ouse at Tempsford sluice and which was subsequently returned to the river (Marlborough 1970). It is not included in the list of records following because it is an unconfirmed record of a rare species.

Since 1947, following the formation of the BNHS, 23 fish species and two hybrids have been recorded from the bedfordshire stretch of the Great Ouse; the following is a complete listing.

Family Cyprindae
Roach *Rutilus rutilus*, Dace *Leuciscus leuciscus*, Chub *Leuciscus cephalus*, Minnow *Phoxinus phoxinus*, Rudd *Scardinius erythrophthalmus*, Tench *Tinca tinca*, Gudgeon *Gobio gobio*, Barbel *Barbus barbus*, Bleak *Alburnus alburnus*, Silver Bream *Blicca Bjoerkna*, Common Bream *Abramis brama*, Common Carp *Cyprinus carpo.*

Family Siluridae
Wels *Silurus glanis*

Family Cobitidae
Stone Loach *Noemacheilus barbatulus*, Spined Loach *Cobitis taenia.*

Family Anguillidae
Eel *Anguilla anguilla.*

Family Gasterosteidae
Three-spined Stickleback *Gasterosteus aculeatus.*

Family Percidae
Perch *Perca fluviatilis*, Zander *Stizostedion lucioperca*, Ruffe *Gymnocephalus cernua.*

Family Cottidae
Bullhead *Cottus gobio.*

Family Salmonidae
Brown Trout *Salmo trutta.*

Family Escocidae
Pike *Esox lucius.*

Hybrids
Roach × Common Bream, Roach × Bleak.

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Also thanks to the Environment Agency and staff from for their help with providing information for this article.

Address: 34 The Silver Birches, Kempston, Bedford MK42 7TS

FISH
Report of the Recorder

This report for the year 1996 includes a review of the River Ivel and its tributaries, the Navigation and the minor rivers Flit, Hiz and Hit. Following are some additional notes of species of particular interest this year, together with the record of a species new to the county list.

Environment Agency surveys of the river sites were actually completed before the end of 1995, although only recently available to the Recorder, but because of the requirement to place the information contained on permanent record, some details are included in this report.

Scientific names are included at the first listing of species, the well-established and accepted common names being otherwise used throughout the report.

THE RIVER IVEL

A total of eleven sites was sampled on the River Ivel between Astwick and the confluence with the Great Ouse which should provide a reasonably comprehensive view of the fish population.

Water surveys indicated biological and chemical quality varying from poor to good at this site.

Roach was numerically the dominant species being recorded from eight of the eleven survey sites and forming 56% of the total fish density, representing a slight decline since the previous survey of 1992. Successive surveys reveal population fluctuations and there appears to be no reason for a continuing or permanent decline of this species.

Gudgeon was numerically sub-dominant but being a species of small size was of little significance when considered by weight. Chub was the dominant species by weight, contributing 32% to total fish biomass, an increased figure, although density has remained virtually the same since 1992 with numbers of large fish from the 1980's year classes still present.

The only species to be found at all eleven survey sites was Pike which has maintained a constant density figure. Although Dace were found at nine sites a general decline in numbers was observed as has been noted in several reports of other sites in recent years.

Although percentage figures suggest that Common Bream has declined since the previous survey this can be attributed to failure to locate large shoals of fish, and it is encouraging to note a further slight increase in distribution of this species, which was recorded from eight of the survey sites. In the case of the bream species the distribution may be considered of more significance than a numerical estimate.

Total fish species and hybrids recorded by the Environment Agency from the River Ivel during 1995 are as follows: Pike *Esox lucius*, Gudgeon *Gobio gobio*, Dace *Leuciscus leuciscus*, Stone Loach *Noemacheilus barbatulus*, Three-Spined Stickleback *Gasterosteus aculeatus*, Bullhead *Cottus gobio*, Minnow *Phoxinus phoxinus*, Roach *Rutilus rutilus*, Common Bream *Abramis brama*, Perch *Perca fluviatilis*, Eel *Anguilla anguilla*, Chub *Leuciscus cephalus*, Bleak *Alburnus alburnus*, Ruffe *Gymnocephalus cernua*, Common Carp *Cyprinus carpio*, Tench *Tinca tinca*, Zander *Stizostedion lucioperca*, Spined Loach *Cobitis taenia*, Roach×Rudd hybrid, Roach×Common Bream hybrid.

THE IVEL NAVIGATION

As a fish habitat the Navigation suffers from being heavily canalised, although the work was carried out as long ago as the 18th century, with the purpose of improving navigation from the River Ivel to Shefford. As a result, the river does not contain the variety of features required to support an extensive range of fish species, as would an unimproved stream, although the channel is now showing some signs of natural recovery. Although water surveys are conducted at only one location, biological quality there was found to be good.

Although at first sight there was an apparent decline of fish biomass at this site in 1995 the varying results of past surveys reflect the presence or absence of shoals of Common Bream which are subject to continual movement, a phenomenon noted in previous reports.

Only two sites were sampled on the Navigation and Roach, Pike and Gudgeon were the only species found at both. The Roach was dominant numerically and by weight followed by Pike. Rudd were found to be present at one location, but as also remarked of the River Flit site, numbers were insignificant.

A total of nine fish species was recorded by the Environment Agency from the Ivel Navigation in 1995 as follows; Roach, Common Bream, Pike, Perch, Rudd *Scardinius erythrophthalmus*, Gudgeon, Minnow, Chub, Dace.

RIVER HIT OR CAMPTON BROOK

Recent Environment Agency surveys have indicated chemical water quality at this site to be good together with biological quality rated as excellent.

The dominant species of the Hit is the Dace, contributing 90% to estimated fish biomass and 47% density, although found to be present only in the downstream section of the river in the area of Shefford. The Dace is a short-lived species and it is exceptional to find fish exceeding eight years of age, but it is interesting to note that individuals were identified from all year classes back to 1983. On the main River Ivel no specimens were recorded from year classes prior to 1986.

The upstream stretch of the river supports comparatively high populations of the smaller fish species, the Minnow, Stone Loach and Bullhead being commonly found.

Total fish species recorded by the Environmental Agency from the River Hit in 1995 are as follows: Dace, Stone Loach, Gudgeon, Three-Spined Stickleback, Perch, Bullhead, Minnow.

RIVER HIZ

Water quality downstream at this site is described as being good, but upstream from Arlesey quality deteriorates.

Overall, Roach is the dominant species of the River Hiz, contributing 86% to total estimated fish biomass with a correspondingly high density figure, due to the presence of large numbers of fish in the area of Arlesey. Pike were found to have increased in numbers since the previous survey in 1991, particularly in the area of Church End.

Total fish species recorded by the Environment Agency from the River Hiz in 1995 are as follows: Roach, Pike, Perch, Gudgeon, Dace, Stone Loach, Three-Spined Stickleback.

RIVER FLIT

Water quality of the River Flit continues to be rated as only moderate, although estimated fish biomass is now the highest recorded since 1985.

The Dace remains the dominant species at this site with an increase in the Roach population also noted. The Common Carp and Rudd were also recorded, both species usually associated with still water conditions and, as might be expected, numbers were insignificant at this site.

Total fish species recorded by the Environment Agency from the River Flit during 1995 are as follows: Roach, Gudgeon, Common Carp, Dace, Bullhead, Minnow, Stone Loach, Rudd, Chub, Three-Spined Stickleback.

NOTES OF SPECIES OF INTEREST

Brown Trout

The Brown Trout *Salmo trutta* has been recorded from the county this year with several specimens reportedly taken from the River Ivel at Biggleswade. The Rainbow Trout *Salmo gairdneri* is now the species preferred for commercial introduction and as far as is known no trout species has been recently put into the Ivel. Therefore, the origin of these specimens remains unknown. Now recorded from four tetrads.

Spined Loach

The Spined Loach is regarded as an important species as it is nationally scarce and is mentioned in EEC Directives and afforded some protection. The species was recorded during the 1995 Environment Agency survey of the River Ivel from a site close to the confluence with the Great Ouse. All known sites for the species in the county are closely associated with the Great Ouse with the exception of one record for the Campton Brook. Since recording began following the formation of the BNHS only nine records exist for the species from six tetrads.

Bullhead

A second species on the county list to be mentioned in EEC Directives, the Bullhead is gradually being revealed as well distributed and locally common in Bedfordshire. The species is now known to be present at sites ranging from chalk streams in the south of the county to the River Ivel and its tributaries, the River Ouzel and the Great Ouse. The Bullhead is now recorded from over forty tetrads in the county showing a distribution comparable to such familiar species as Dace and Minnow.

Barbel

The Barbel *Barbus barbus* is already a successful species in the upper Great Ouse following introductions, and further releases of two year old fish, 15cm in length, have been made by the Environment Agency, into the New Cut and the River Ivel.

A specimen of 3½ lb weight is reported to have been taken from the Ivel this year but is considered too large to have resulted from a recent stocking and an unofficial introduction is thought most probable.

Zander

It is reported that several specimens of Zander were taken from the Great Ouse close to the Bedford town bridge and also another from the Ivel at Biggleswade this year. A single specimen was recorded during the 1995 Environment Agency survey of the River Ivel at a site upstream from Girtford Bridge, the first to be found by them or the NRA during a survey of the Ivel. Other sites recorded for the species in Bedfordshire are still waters.

A SPECIES NEW TO BEDFORDSHIRE

At the conclusion of the report for last year it was commented that any new species found in the county would probably be of one introduced for angling purposes. This has proved to be the case with numbers of Common Goldfish *Carassus auratus* which have been introduced to a still water site and become established.

This is a species native to Eastern Asia and the type resembles the Common Carp in appearance although attaining a smaller size and weight. The many fancy varieties offered for sale by the aquarium trade are simply the result of selective breeding and as a distinct species the Goldfish can be recorded on the same basis as other introduced species to the county.

CONCLUSION

Although water level was low this year at some sites due to the drought conditions, generally the condition of our linear water remains good. Recent annual reports have commented on the need to record the smaller fish species and this year has witnessed an increase in the recorded distribution of several of these. With angling and conservation interests remaining high to provide a motive for stocking and the introduction of new species, we can continue to take an optimistic view of the future of our fish and their habitat.

ACKNOWLEDGEMENTS

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H.R. WINTER

FRESHWATER CRAYFISH
Report of the Recorder

There were four records of crayfish in the county this year, three of which were identified to species level. Unfortunately none were of the native White-clawed or Atlantic Stream Crayfish, *Austropotamobius pallipes*.

The site near Pegsdon where that species was found last year was again visited by R. Revels but no sign of crayfish was found. This is disappointing but not conclusive, and as that is now the only known recent site, it is to be hoped that the species still maintains a presence there.

The four records for 1996 are as follows:

1. Several specimens of the introduced Signal Crayfish, *Pacifastacus leniusculus*, were found at Langford Mill on the River Ivel during work to clear aquatic plant growth. The Ivel was previously a known site for the native species but it is possible that this has now been replaced by the Signal Crayfish.

2. The Signal Crayfish was found to be present at a small stream site at Shillington. This site is known from previous years, but visited again, the species was found to be still present although apparently in reduced numbers.

3. The Signal Crayfish is reported to be present at an unspecified site at Toddington. This is a record supplied by English Nature and is of a location previously unknown to us.

4. A crayfish of unidentified species was seen in the River Lea at a site beside the A6 close to Luton. An unwanted aquarium pet released into the river appears the most likely origin of this specimen and either the Red Swamp Crayfish (*Procambarus clarkii*) or Signal Crayfish would be probable species.

ACKNOWLEDGEMENTS

Thanks to the following individuals and organisations for their help and information, particularly to Richard Revels for his continuing assistance with field work: Mr and Mrs Bunnage, A. Cutts, R. Handford, J. Leath, R. Revels, M. Russel, R. Spenlove, and English Nature and The Environment Agency.

H.R. WINTER

BEE WOLF *PHILANTHUS TRIANGULUM (F.)*
A New County Record
by R. Revels

On the BNHS field meeting at the Redlands Quarry N.R. at Sandy Heath on 8th September 1996, I captured a wasp which was hunting for insects over a patch of heather, and as I had not encountered this wasp before I decided to keep it for identification purposes. According to my insect guides it seemed to be a Bee Wolf or Bee Killer Wasp *Philanthus triangulum* which is a member of the solitary digger wasp family Sphecidae, and classed as a rare British species (Plate 2).

I sent the specimen to George Else at the British Museum (Natural History) who confirmed that it was this species, and enclosed the following information about its current known distribution.

"Until five or six years ago this fine species was a great rarity in Britain, mainly known from the Isle of Wight and one or two sites in east Anglia. However, more recently it has undergone a most remarkable expansion of its former restricted range and has been found in many counties in southern Britain, from Kent to Devon, northwards to Lincolnshire, Hereford and Worcester and north Wales. I do not know if it has been recorded from Bedfordshire, but it has been found by Raymond Uffen in several sites in Hertfordshire. The reason for this increase remains unknown."

"Some of this wasp's nesting aggregations are very large: several are known in which there were about 5,000+ nest burrows. In some areas the species even nests in urban gardens (there is also a colony on one of the main London roundabouts) and I have found a thriving aggregation in a pile of builder's sand on the West Sussex coast."

Raymond Uffen tells me that he first found this wasp in Hertfordshire in 1994, in quarry workings at Tyttenhanger near London Colney, where it was present in many hundreds. He has subsequently found it in sand pits near Broxbourne woods, and in golf course bunkers at Ashridge and Royston golf courses.

A second Bedfordshire record was made on 23rd August 1997 when Bernard Nau observed a Bee Wolf on mint flowers beside a gravel pit at Radwell. The lagoon was partly filled by sandy silt washed from the gravel and was colonized by willows.

The Bee Wolf seems to be yet another insect which has undergone a range expansion in recent years. With Honey Bee workers being its main prey for feeding its grubs, it will not be welcomed by bee keepers. In areas where it becomes very plentiful it could be a serious pest by depleting numbers of worker bees. Honey Bees are important, not only for producing honey, but also for pollinating some commercial crops, and it is fortunate that this wasp is not on the wing until July when most crops will have been pollinated.

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Address: 73 London Road, Biggleswade, Beds SG18 8EE.

SOCIAL WASPS
Report of the Recorder

With the exceptions of the cavity nesting Common and German Wasps, social wasps seem to have had a very poor year in 1996. This seems to have happened nationally. and was no doubt mostly due to the very dull and cold weather in May and early June. The aerial nesting *Dolichovespula* species would be most affected by these adverse weather conditions that coincided with the queens' need to be actively nest making and tending their grubs to produce the nests' first workers.

Our largest social wasp, the Hornet, seems to be still doing well, with records from many wooded areas of Bedfordshire, but I have no records at all of the Saxon and Tree Wasps during 1996, and the Median Wasp was far less in evidence this year.

Hornet *Vespa crabro*

TL605389	Maulden Wood. Queen around Roy Collings barn, BNHS meeting 2.6.96	RR
	One in wood 17.6.96.	AS
TL15T	Begwary Brook Marsh NR 30.6.96.	SC
TL01U	Caddington.	PS
TL11D	Luton Hoo In garden and moth trap.	VA
TL01C	Mansgrove Wood, Studham.	CT
SP93H	Woburn Sands.	JB
SP948328	Woburn, in garden and house. 16.6.96, 5.9.96, 5.10.96.	BN
TL152455	Ickwell. Seen on house and hunting insects on flowers of bush *Euonymus fortunei* "Emerald Gaiety" 11.7.96.	ND
TL145456	Ickwell Bury.	ND
TL145433	Warden Warren, in garden of cottage feeding on ripe plums September 96.	RR
TL144422	Southill estate hedge feeding on Ivy flowers. 9.96	RR
TL255434	Potton Wood. One only 25.6.96.	IW
TL192477	RSPB, Sandy. Two around bottom entry to reserve. 24.10.96.	PA
SP997495	Hanger Wood, Stagsden 10.7.96, 19.7.96.	PA
TL223481	Sutton. One Flying 20.7.96.	AS
SP95T	Odell river bridge 17.7.96.	AS
SP96W	West Wood. Several seen 18.6.96 – 23.8.96.	TT & AS
SP95Z	Sharnbrook garden.	DM

Median Wasp *Dolichovespula media*

The only records of this wasp during 1996 came from my own garden, and from Ace Pest Control (D. Hillyard) and Tom Thomas, pest control officer for the Luton area. I failed to find any in several places where I found it last year.

TL119443	Occasionally seen in my garden July & August.	RR
Luton area	Tom Thomas reports that he and his colleagues treated quite a few nests from 5.6.96 until 27.9.96. Most of these nests were 5 – 7 feet from the ground, but some were higher and one was 20 feet up under eaves.	TT
Ace Pest Control	were called out to only about half the number of aerial nests compared to 1995. Although wasps from the aerial nests were not identified, undoubtedly most would be *D.media.*	DH

Norwegian Wasp *Dolichovespula norwegica*
Luton Manton Drive, in a bird box 24.7.96. TT

Saxon Wasp *Dolichovespula saxonica*
No records for 1996

Tree Wasp *Dolichovespula sylvestris*
No records for 1996.

Common Wasp *Vespula vulgaris*

TL152455	Ickwell. Nest in roof space and in garden.	ND
TL044502	Bedford.	HW
TL064501	Bedford.	HW
TL065215	Luton.	HW
TL052243	Luton.	HW
TL035468	Kempston, in garden.	HW
Luton area	Common all over Luton area.	TT
TL050361	Flitton Moor. Seen hunting and nectaring July 96.	RR
TL255434	Potton Wood. A few seen in August.	RR
TL230485	Potton garden feeding on scraps on compost heap.	RR
TL119443	Biggleswade garden. Very plentiful in late summer and autumn. A nest in roof space of neighbour.	RR
TL14A	Haynes. In John Adams' garden.	RR

German Wasp *Vespula germanica*

Luton area	Tom Thomas reports it found all over Luton, with nests of this species and the Common Wasp found in habitats ranging from lofts, Wendy houses, cardboard boxes and pasting tables through to compost heaps.	TT
TL230485	Potton garden, feeding on household scraps on compost heap.	RR
TL050361	Flitton Moor. Nest in ground July 96.	RR
TL119443	Biggleswade garden. Occasional and much less common than *V. vulgaris*	
TL035468	Kempston, in garden.	HW

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RICHARD REVELS

Plate 3 (left): A colony of Navelwort, *Umbilicus rupestris*, found along the verge of a lane near Sandy is a new county record (p. 94).

Photo: David Tyler

Plate 4 (below left): Eastern Stork's-bill, *Erodium crinitum*, one of the county's wool aliens (p. 100).

Photo: Chris Boon 1983

Plate 5 (below right): Southern Marigold, *Tagetes minuta*, one of the wool aliens found in the county which was seen during 1996 (p. 102).

Photo: Chris Boon 1982

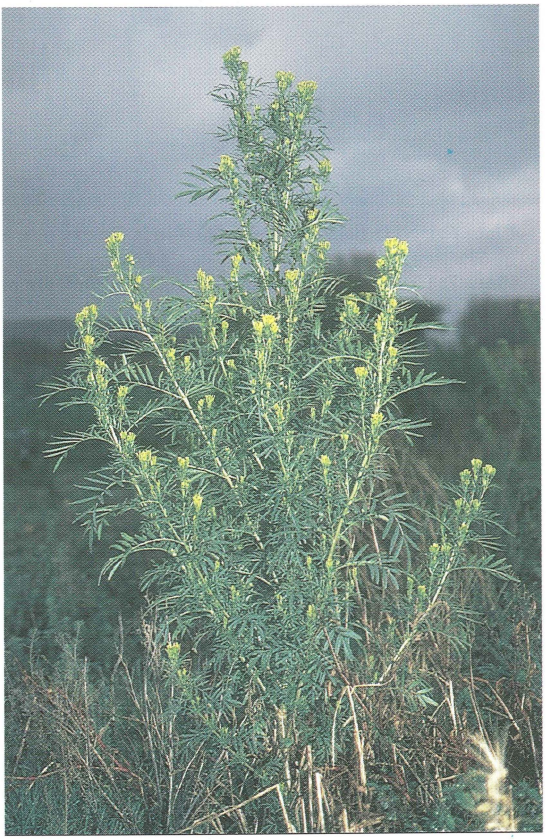

Plate 6: BNHS field meeting at Redlands Quarry near Sandy, September 1996, a site of heathland regeneration (p. 61).

Plate 7: Hill Rise Local Nature Reserve, Bedford, site of the study of the importance of hedgerows in the thermal regulation of butterflies (p. 74).

Photos: Richard Revels

DRAGONFLIES
Report of the Recorder

The migrant influx of Yellow-winged Darters at Willington during 1995 failed to produce any emerging adults during 1996. It would appear that the attempts at breeding were unsuccessful. All visitors to the meadow at Willington reported a lack of sightings, a scenario that was mirrored at sites throughout most of Britain. Only one confirmed emergence occurred in Staffordshire.

On the up side however, the Hairy Dragonfly *Brachytron pratense* was recorded as a new county record this year from five sites. The most surprising record for damselflies was of White-legged Damselfly *Platycnemis pennipes* at Chicksands Base. Kevin Sharpe recorded a number of adults including pairs 'in cop' along the River Flit which flows through the site. This is the first record for the species away from the R. Ouse and the lower reaches of the R. Ivel where it flows into the R. Ouse

SYSTEMATIC LIST

Zygoptera (Damselflies)

Banded Demoiselle *Calopteryx splendens*
New tetrads SP95K, TL13Z

Emerald Damselfly *Lestes sponsa*
New tetrad TL13J

White-legged Damselfly *Platycnemis pennipes*
New tetrad TL13J

Large Red Damselfly *Pyrrhosoma nymphula*
New tetrad TL13EJ

Azure Damselfly *Coenagrion puella*
New tetrad TL15V

Anisoptera(Dragonflies)

Hairy Dragonfly *Brachytron pratense*

The careful observation of John Comont revealed the first ever confirmed county record. A single male was observed patrolling around emergent vegetation at the margins of Bromham lake. The following day Steve Cham recorded several males and a female from Felmersham NR. In addition, a single exuviae was found at this site confirming breeding in the county. Unknown at the time Bernard Nau and Rosemary Brind had also recorded flying adults at Priory Park, Peter Almond also recorded it at Bromham Lake and Stewartby and Kevin Sharpe also reported it from Coronation Pit. Further observations at Felmersham revealed a female ovipositing into the dead floating stems of Club-rush at 8.00am one morning.

As a result of the discovery of the exuviae at Felmersham it would appear that the Hairy Dragonfly has been present in the county for at least two years (the life cycle is thought to be two years). An unconfirmed report of a small hawker at Kempston Church End during June 1993 was most likely this species. It is currently undergoing

range expansion in southern Britain and is being recorded in many new areas. It is an early flying species with a relatively short flight season and is most likely to be encountered during May and June. Males tend to patrol water margins, flying in and out of stands of Reedmace and Club-rush, where they search for females. This is a species to keep a watchful eye on. (Plate 1)

New county records SP95Z★, TL04AU★, TL05F★

Brown Hawker *Aeshna grandis*

New tetrads SP94T, SP95CQV, SP96Q, TL25KQ

Southern Hawker *Aeshna cyanea*

New tetrads SP95QU, TL06C

Migrant Hawker *Aeshna mixta*

New tetrads SP95MQ, SP96R, TL06C, TL25FK

Emperor Dragonfly *Anax imperator*

New tetrads SP94Z, SP95J, TL13Y

Broad-bodied Chaser *Libellula depressa*

New tetrads TL06C, TL13EJ

Four-spotted Chaser *Libellula quadrimaculata*

New tetrads SP96V★, TL04AR, TL13Z, TL15V

Black-tailed Skimmer *Orthetrum cancellatum*

New tetrads TL04R, TL05A, TL13J

Common Darter *Sympetrum striolatum*

New tetrads SP94Y, SP95Q

★ New 10km records

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STEVE CHAM

GRASSHOPPERS AND CRICKETS (Orthoptera)
Report of the Recorder

1996 was again a very good year for new records for most species, especially Dark and Roesel's Bush-crickets. It was also a good year for Slender Ground-hopper, Field and Lesser Marsh Grasshopper. I know new records for Bush-crickets will not go on for ever, and hopefully in a couple of years I will produce some maps showing the expansion in range that seems to have taken place in these warm summers over the last six years or more. Please keep sending me any and all records.

Oak Bush-cricket *Meconema thalassinum*

Recorded in 19 tetrads from 10th July to 29th September at SP93U/Z, SP94Q/Z, TL04D/I/J/K, TL11I/J, TL12F, TL14H/M, TL15F/G/T and three previously unrecorded tetrads:

SP94Y (Kempston Wood area), SP94X (Wootton Wood),
TL03Y (Warren Wood).

Dark Bush-cricket *Pholidoptera griseoaptera*

Recorded in 57 tetrads from 2nd June to 5th November at SP94Q/U/V/W/Y/Z, TL02C, TL03P/U/V/Y/Z, TL04B/C/D/G/H/I/K/Q, TL05A, TL11I/J, TL12F/G, TL13D/E/J, TL14I/N, TL15F/G/S/T, TL25K and 21 previously unrecorded tetrads:

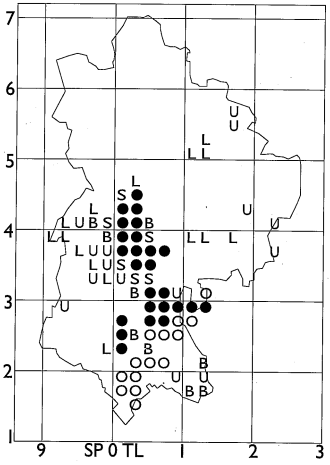
SP93E (M1 bridge), SP93U (Brogborough), SP93S (Ridgmont area),
SP93X (Eversholt/Ridgmont Road), SP93Z (Lidlington Pit), SP93J (Salford),
SP93N (A421), SP93P (Aspley Guise)
SP94A (Old Covert), SP94F (Cranfield Road), SP94K (Cranfield Airfield),
SP94X (Wootton Wood)
TL02B (Dunstable Sewage Works), TL02T (Bramingham area),
TL04E (Box End), TL04J (Kempston River Walk)
TL11P (Peters Green Wood),
TL14H/M (Home Wood),
TL24D (Potton Wood Road),
TL25Q (Cockayne Hatley Wood).

Roesel's Bush-cricket *Metrioptera roeselii*

Recorded in 65 tetrads from 10th July to 20th September at TL02B/C/D/N/P/T/U, TL03D/E/H/I/J/K/M/N/Q/T, TL04A/B/F/G/H, TL12E/J and 43 previously unrecorded tetrads:

SP92J	Kings Wood	1	Unknown
SP92N	Leighton Buzzard bypass	1	Long-winged
SP93E	M1 bridge	3	Long-winged
SP93J	A421/Salford	3	Long-winged
SP93N	A421	3	Long-winged
SP93R	Woburn Park	3	Unknown
SP93S	Eversholt/Ridgmont Road	2	Long-winged
SP93T	M1 bridge/Ridgmont railway	5	Unknown
SP93W	Shelton	3	Long-winged, 1 female
SP93X	Eversholt/Ridgmont Road	4	Unknown
SP93Y	A418	3	Unknown
SP93Z	Lidlington Pit	11	Both, 1 female
SP94F	Conns Farm	2	Long-winged

SP94K	Cranfield Airfield	5	Unknown
SP94Q	Marston Thrift landfill	5	Both
SP94R	Marston Thrift	3	Long-winged
SP94V	Marston Moretaine	8	Short-winged, 1 female
TL01Z	M1A1081 link road	2	Unknown
TL02H	Chalton	4	Both
TL02L	M1, Lewsey	2	Both
TL03B	Tingrith	4	Unknown
TL03C	Steppingley	3	Short-winged
TL03F	A5120	4	Both
TL03G	Westoning railway bridge	2	Short-winged
TL03L	Warthy End Farm	1	Short-winged
TL03P	Maulden	3	Short-winged
TL03V	Barton	4	Unknown, 1 female long-winged
TL04C	Wootton	6	Short-winged
TL04I	Kempston, A5140 roundabout	1	Long-winged
TL04K	Houghton Conquest	11	Both
TL11D	West Hyde	4	Both
TL11I	East Hyde	5	Both
TL11J	Chiltern Green	5	Unknown
TL12F	Luton Airport	5	Both
TL13E	Chicksands Base	12	Long-winged, 1 female
TL13J	A507	4	Long-winged
TL13U	A507 Henlow	2	Long-winged
TL14W	A1	1	Unknown
TL15A	Willington, River Gt. Ouse	3	Long-winged
TL15F	Gravel Pits	1	Long-winged
TL15G	Great Barford	2	Long-winged
TL15S	A1 road verge	1	Unknown
TL15T	A1 road verge	4	Unknown
TL23I	A1 Stratford	3	Unknown
TL24F	A1	2	Unknown



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

KEY

● – Old records recorded again in 1996
S – Short-winged form
L – Long-winged form
U – Unknown
O – Old records
B – Both long and short-winged form

Short-winged Cone-head *Conocephalus dorsalis*

Recorded at TL03M/N/T in good numbers, at Flitwick and Flitton Moors and along the River Flit.

Speckled Bush-cricket *Leptophyes punctatissima*

Recorded in 37 tetrads from 2nd June to end of September at SP93N/U/Z, SP94Q/W/V/U/Z, TL02T, TL03P/U/Y/Z, TL04H/I/K/Q, TL11F/I/J, TL13E/J, TL14H/I/M, TL15F/S/T and with nine previously unrecorded tetrads:

SP93Y (Beckering Park),
SP94F (Whitsundoles Wood), SP94T (Stagsden West End),
SP94Y (Kempston Wood), SP94X (Wootton Wood),
TL02C (Red Cow Farm),
TL11J (Chiltern Green),
TL14N (Home/College Wood), TL25K (Potton Wood).

Slender Ground-hopper *Tetrix subulata*

Recorded in 15 tetrads from June to October at SP94Q/V/X, TL02B, TL04H, TL15F and including nine previously unrecorded tetrads:

SP93U (Brogborough Lake), SP93Z (Lidlington Pit),
TL04E (River Gt. Ouse), TL04I/J (River Gt. Ouse),
TL12A (Luton Airport),
TL13E (Chicksands Base),
TL14N (Home Wood),
TL15G (River Gt. Ouse).

Common Ground-hopper *Tetrix undulata*

Recorded in ten tetrads from June to October at SP94Q/X, SP93U, TL04H, TL15T and five previously unrecorded tetrads:

SP93Z (Lidlington Pit),
TL11J (Chiltern Green),
TL12A (Luton Airport),
TL13E (Chicksands Base),
TL15F (gravel pits).

Common Green Grasshopper *Omocestus viridulus*

Recorded in seven tetrads from July to September at TL04G/H/N and four previously unrecorded tetrads:

TL13E/J (Chicksands Base),
TL14I (Home Wood),
TL15F (River Gt. Ouse).

Field Grasshopper *Chorthippus brunneus*

Recorded in 53 tetrads from 25th June to 30th October at SP93N/U, SP94Q/T/V/W, TL02B/C, TL03I/P/V/Y/Z, TL04C/G/H/I/J/K/Q, TL11C/I, TL12A/F, TL13E/J, TL14H/N, TL15F/G/S/T and 21 previously unrecorded tetrads:

SP93E (M1 bridge), SP93J (Salford/A421), SP93P (Aspley Guise),
SP93S (Ridgmont), SP93X (Higher Berry End),
SP94F (Cranfield Road), SP94K (Cranfield), SP94U (Grange Farm),
SP94X (Wootton Wood), SP94Y (Wood End), SP94Z (Astey Wood),
TL02T (Bramingham),
TL04D (Green End), TL04E (Box End),
TL11H (Thrales End Road), TL11J (Chiltern Green), TL11P (Peters Green),
TL12G (Wigmore Farm), TL13D (A507),
TL14I/M (Home Wood).

Meadow Grasshopper *Chorthippus parallelus*

Recorded in 31 tetrads from 6th June to 30th September at SP93J/N/U/X/Z, SP94V, TL03I/P/V/Y/Z, TL04G/H/I/J/K, TL12A, TL14H/M, TL15F/G/T and with nine previously unrecorded tetrads:

SP93Q (Marston Thrift),
SP94W (Shelton), SP94X (Wootton Wood), SP94Y (Wood End),
TL04C (Wootton), TL04I (Haynes),
TL12F (Luton Airport),
TL13E/J (Chicksands Base).

Lesser Marsh Grasshopper *Chorthippus albomarginatus*

Recorded in 48 tetrads from 25th June to 22nd September at SP93U/W/Z, SP94Q/T/U/V/Y, TL03Y/Z, TL04C/D/E/G/H/I/J/K/Q, TL13E, TL14I/M/N, TL15A/F/G/S/T and with twenty previously unrecorded tetrads:

SP93E (M1 bridge), SP93N (A421), SP93P (Aspley Guise),
SP93S (Higher Berry End), SP93X (Ridgmont),
SP94F (Cranfield Road), SP94J (Salford A421), SP94K (Cranfield),
SP94X (Wootton Wood), SP94Z (Astey Wood),
TL02N (Sundon Quarry), TL02T (Bramingham), TL02U (Streatley),
TL03P (Kings Wood), TL03Q (Sharpenhoe),
TL13D (A507), TL13J (Chicksands Base),
TL14H (Home Wood),
TL25K (Potton Wood), TL25Q (Cockayne Hatley).

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K.M. SHARPE

BUGS (Hemiptera-Heteroptera)
Report of the Recorder

Two additions to the County List have been brought forward from 1995, since the review of shield-bugs in the last annual report replaced the normal detailed report. Both of these were species that were expected to be added sooner or later. This maintained the traditional annual quota of 1–2 new county species.

The year 1996, by contrast, was quite different and an absolutely amazing 14 species were added! Few of these were expected and several were not included in the national Red Data Book as they were variously either unknown, known from a single specimen, a very occasional vagrant, or considered extinct in Britain. Another is listed in the Red Data Book as 'Notable A' and two others as 'Notable B'. Most of the 1996 new species were found on the Greensand Ridge and are thermophile or xerophile species which have probably benefitted from the low rainfall in the last two years combined with fairly sunny summers. Several of the species are well-established in the East Anglian Brecklands, which fits in with this view. See also: B.S. Nau, 1987, *Ent. mon. Mag* **133**, 261–262.

The grassland enclave of Maulden Wood SSSI, and the sand quarry on Sandy Heath proved particularly rewarding. In addition to my own fieldwork, Dr Peter Kirby made two visits to the county which yielded additional new species and supplemented some of mine. His records ('PK' below) relate to two sites (i) an unused area of former railway sidings near Bedford Hospital (South) on 13th June 1996 (TL052488); and (ii) Sandy Heath Quarry on 15th September 1996 (TL204492).

ADDITIONS TO THE COUNTY LIST

[...] denotes the revised national Red Data Book status in Kirby (1992, *A review of the scarce and threatened Hemiptera of Great Britain.* JNCC); this work is abbreviated below as 'RDB'.

Coreidae

Spathocera dahlmanni (Sch.): ['Notable A'] in sandy meadow in Maulden Wood SSSI (TL07063/38635) one on 2nd June 1996, 14 including a mating pair on 6th June, 2 adults and two 5th-instar nymphs on 24th August. Habitat is moss with Sheep's Sorrel (*Rumex acetosella* agg.). Subsequently in Sandy Heath Quarry in enclosure with planted *Calluna*, four in one sweep on 8th September (BSN); and numbers recorded by PK on 15th.

Arenocoris falleni (Sch.): numbers in Sandy Heath Quarry (PK).

Ceraleptus lividus Stein: Maulden Wood SSSI, 6th June 1996, one swept from tall dry grasses bordering new conifer plantation on sand, TL06923/38523 (BSN). Subsequently several in *Calluna* enclosure at Sandy Heath Quarry (PK).

Rhopalidae

Stictopleurus abutilon (Rossi): [considered extinct] Maulden Wood SSSI, 24th August 1996, mating pair swept from annual weeds at edge of new conifer plantation, on sand (BSN).

Liorhyssus hyalinus (Fab.): numbers around Common Stork's-bill (*Erodium cicutarium*) at Sandy Heath Quarry (PK).

Lygaeidae

Nysius senecionis (Sch.): [arrival in Britain post-dates RDB] First on 8th August 1996 at RAF Chicksands, a male and two females on hardcore being colonised by mosses, grasses and Mayweed (*Matricaria* sp.). Subsequently at Linslade and Eversholt (BSN), and Sandy Heath (BSN,PK).

Megalonotus emarginatus (Rey): [recognition in Britain post-dates RDB] In Bedford,13th June 1996 (PK). A male and a female, Maulden Wood SSSI, new plantation on sand 24th August 1996, on sandy soil among arable weeds (BSN). Sandy Heath Quarry, one 8th September 1996 (BSN), several (PK).

Megalonotus praetextatus (H-S): ['Notable B'] one at Sandy Heath Quarry 15th September 1996, among sparse ruderal vegetation (PK).

Trapezonotus desertus Seidenstücker: a male on Wavenden Heath, 13th May 1996 (BSN)

Emblethis denticollis Horvath: [very recent arrival in Britain] recorded from Bedford and one from Sandy Heath Quarry (PK).

Metopoplax ditomoides (Costa): [only one record at time of RDB] First on 8th August 1996 at RAF Chicksands, two males and a female, with *Nysius senecionis* (q.v.). Subsequently from Eversholt, Maulden Wood SSSI, and Pegsdon Hills NR (BSN); and Sandy Heath Quarry(BSN, PK).

Berytidae

Neides tipularis (L): A Breckland species, Sandy Heath Quarry (PK).

Anthocoridae

Cardiastethus fasciiventris (Garbiglietti): Ampthill Park, 10th August 1996, one adult, one teneral and four 5th-instar nymphs on Gorse (*Ulex europaeus*) (BSN). Frequent on Gorse in East Anglia but searches in Bedfordshire in previous years have been negative.

Miridae

Psallus luridus (Reuter): four males on Larch, south arm of Blows Down, 24 July 1995 (BSN).

Chlamydatus pulicarius (Fallén): ['Notable B'] a female swept, Stockgrove Meadow, 20th July 1996 and two more adults next day. Habitat: sandy grassland with Lady's Bedstraw (*Galium verum*) and fine grasses. A Breckland species. (BSN)

Psallodema fieberi (D & S): numbers on Wych Elm (*Ulmus glabra*) near Grange Mill, Heath & Reach on 7 July 1995. Subsequent systematic searching revealed it on the same host at Silsoe, Bushmead, Melchbourne Park , and Home Wood at Northill but not present in at least as many apparently suitable sites (BSN).

B.S. NAU

BUTTERFLIES (Lepidoptera)
Report of the Recorder

General

For butterflies, 1996 turned out to be another remarkable season. It started with a cool spring which lasted until the end of May when a spell of warm southerly winds brought a remarkable influx of migrants to Britain. Herbaceous food plants did not dry out as severely as in 1995.

Both the Bedfordshire Chalk Grasslands Butterfly Survey and the various transect walks continued to play a key role in monitoring butterfly numbers. Support for the Woodland Butterfly Survey was disappointing after a good start in 1995 though some useful observations have been made in King's Wood, Heath and Reach and in a few other woods.

References to the Chalk Grasslands Butterfly Survey and to the transects in the paragraphs that follow relate to the report by Herbert (1997) in which the results were set out in detail. Comparisons with 1995 are based on up to 7 of the transect reports for which such comparison can be made.

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

	1994	1995	1996	
Barton Hills	1903 (25)	2822 (25)	3673 (28)	(GB).
Blows Downs – north	–	1571 (25)	984 (19)★	(EM and others)
Blows Downs – west	–	2057 (22)	895 (23)★	(EM and others)
Bradgers Hill	–	2449 (21)	2202 (16)	(RG)
Dunstable Downs	2219 (28)	1302 (20)★	1069 (27)	(EJM)
Galley & Warden Hill	–	1947 (21)	2872 (27)	(MM)
Hill Rise, Bedford	443 (18)	579 (19)	943 (22)	(B&YA, SC, TG)
Potton Wood	3865 (20)	4112 (25)	4251 (22)	(IW, BF)
Priory Park	2162 (21)	2532 (20)	2680 (21)	(RB & EN)
Sharpenhoe Clappers	–	–	5837 (30)	(D&LC)
Sundon Quarries	–	–	5215 (28)	(PG)
Totternhoe Quarry	2206 (25)	1793 (29)	2565 (30)	(LJB)
Whipsnade Downs	5128 (25)	4223 (28)	8026 (29)	(GH and others)

★ – not comparable with previous years.

Skippers

Small Skipper *Thymelicus sylvestris* and **Essex Skipper** *Thymelicus lineola*

Usually not distinguished in transect counts. Slightly more common in 1996 than in 1995 (totals for 7 transect sites were 963 and 719 respectively; increased at 5 out of the 7 sites). Essex Skipper remains the more common in several areas in the north of the county.

Large Skipper *Ochlodes venata*

Slightly less common in 1996 than in 1995 (totals for 6 transect sites were 292 and 378 respectively; but increased at 3 out of the 6 sites). Abundant on some sites more suitable for it than the chalk.

Dingy Skipper *Erynnis tages*

Numbers remain very low. Totals for 4 transect sites were 20 in 1996 and 23 in 1995; increased at only 1 out of the 4 sites.

Grizzled Skipper *Pyrgus malvae*

Still very local but much more common where it occurred in 1996 than in 1995 (totals for 3 transect sites were 61 and 10 respectively; increased at 2 out of the 3 sites). Seen in good numbers at Waterloo Thorns (JA, RR) and several new colonies were found.

Whites

Wood White *Leptidea sinapis*

The only sightings reported were in Marston Thrift where it had not been seen for more than 10 years.

Clouded Yellow *Colias croceus*

A remarkable year. More than 60 individuals have been reported from over 30 sites across the county between 11 June and 16 September. A female was seen laying eggs in Waterloo Thorns on 17 June (JA, CW). The highest numbers were at Bromham Lake Nature Reserve (PA), near Halsey Wood (AS), at Rookery and Coronation Pits and at Ledburn Road Pit near Linslade (GD). The white *helice* form of the female was seen at three sites.

Brimstone *Gonepteryx rhamni*

More common in 1996 than in 1995 (totals for 7 transect sites were 526 and 335 respectively; increased at 6 out of the 7 sites).

Large White *Pieris brassicae*

Much less common in 1996 than in 1995 (totals for 7 transect sites were 183 and 358 respectively; increased at only 1 out of the 7 sites).

Small White *Pieris rapae*

Much less common in 1996 than in 1995 (totals for 7 transect sites were 1009 and 2526 respectively; increased at none of the 7 sites).

Green-veined White *Pieris napi*

Much less common in 1996 than in 1995 (totals for 7 transect sites were 381 and 812 respectively; but increased at 3 out of the 7 sites).

Orange Tip *Anthocharis cardamines*

Less common in 1996 than in 1995 (totals for 7 transect sites were 66 and 92 respectively; increased at only 2 out of the 7 sites).

Hairstreaks

Green Hairstreak *Callophrys rubi*

Much less common in 1996 than in 1995 (totals for 4 transect sites were 18 and 74 respectively; increased at only 1 out of the 4 sites). A sighting east of Heath and Reach was the first on the Greensand Ridge for some years.

Purple Hairstreak *Quercusia quercus*

No regular counts are available but seemed rather less common overall than in 1995, though good numbers were seen at RSPB, The Lodge (JO'S).

White-letter Hairstreak *Satyrium w-album*

Remains in good numbers in Chicksands Wood (JA, DP, CW) and new colonies continue to be found.

Black Hairstreak *Satyrium pruni*

Seen only in Marston Thrift where only a few were found (DCA, RN). Efforts are being made to improve the site for this species.

Coppers, Blues and Metalmarks

Small Copper *Lycaena phlaeas*

Similar numbers in 1996 as in 1995 (totals for 7 transect sites were 40 and 38 respectively; increased at only 2 out of the 7 sites).

Small Blue *Cupido minimus*

Much less common on some sites in 1996 than in 1995 (totals for 2 transect sites were 13 and 67 respectively). Increased at neither of the 2 sites compared but more than 150 were counted at Sundon Quarries.

Brown Argus *Aricia agestis*

Numbers continued to rise (totals for 7 transect sites were 1283 in 1996 vs 572 in 1995; increased at 6 out of the 7 sites). More than 1000 were seen at the Cople Landfill Site (RR) despite the food plants apparently drying up there at the end of the summer in 1995.

Common Blue *Polyommatus icarus*

On the transects, rather more common in 1996 than in 1995 (totals for 7 transect sites were 753 and 587 respectively; increased at 3 out of the 7 sites) but well down in numbers in the north-west of the county (AS).

Chalkhill Blue *Lysandra coridon*

Much more common in 1996 than in 1995 (totals for 5 transect sites were 2238 and 1251 respectively; increased at 4 out of the 5 sites).

Holly Blue *Celastrina argiolus*

Staged a remarkable comeback in 1996 being seen in good numbers throughout the county. Increased at 7 out of 7 transect sites: total 188 for 1996 as against only 15 in 1995. A few parasites were raised from larvae of the second generation but none earlier.

Duke of Burgundy *Hamearis lucina*

Increased on Whipsnade Downs but fewer were seen at Totternhoe Quarries.

Nymphalids

White Admiral *Ladoga camilla*

Seen in most of its usual haunts in the county and did particularly well in King's Wood, Heath and Reach.

Red Admiral *Vanessa atalanta*

Rather more common in 1996 than in 1995 (totals for 7 transect sites were 122 and 81 respectively; increased at 4 out of the 7 sites). Sightings at the end of February and in March suggest that a few may have over-wintered.

Painted Lady *Cynthia cardui*

The butterfly of the year! First arrivals were reported on 1 June (DG) and by 9 June 40 or more were being seen together. Large numbers were watched by C&JW in the first week in June approaching Jersey (Channel Islands). They were flying over the sea just 1–2 feet above the water. On land a definite northward movement was noticeable during the first half of June. By early August large numbers of the next generation were on the wing and 30 or more individuals on a single Buddleia bush was not uncommon. Many hundreds were present in King's Wood, Heath and Reach (GH, VWA). At some

time during the summer the Painted Lady was probably present in every tetrad in the county. Almost all the transect sites recorded large numbers, some idea of which can be gained from the total of 1447 from 7 sites where only 24 were seen in 1995. Numbers dwindled rapidly during August but a few were still present in mid-September. The last report was on 21 October (AS).

Small Tortoiseshell *Aglais urticae*

Slightly more common in 1996 than in 1995 (totals for 7 transect sites were 685 and 460 respectively; increased at 6 out of the 7 sites). Overwintering individuals were again found during surveys of bat hibernation sites (JEC).

Camberwell Beauty *Nymphalis antiopa*

One seen sunning itself in a garden in Houghton Conquest on 21 April (SS, DW) was probably an overwintered survivor from the 1995 invasion. A battered individual found on washing at Flitton on 15 August (M&AB) was probably part of a small late-summer invasion as others were seen in Essex and Hertfordshire around that time.

Peacock *Inachis io*

Much more common in 1996 than in 1995 (totals for 7 transect sites were 1752 and 244 respectively; increased at 7 out of the 7 sites but the numbers were exceptionally high in Potton Wood where 1214 were counted). Overwintering individuals were also found during surveys of bat hibernation sites (JEC).

Comma *Polygonia c-album*

Rather less common in 1996 than in 1995 (totals for 7 transect sites were 78 and 120 respectively; increased at only 2 out of the 7 sites but most of these are not the most favoured habitat for this species).

Fritillaries

Dark Green Fritillary *Argynnis aglaja*

One or more individuals were seen at Sharpenhoe Clappers (BMC, D&LC) and singles in Luton (LRJ) and at Pepperstock (DA).

Silver-washed Fritillary *Argynnis paphia*

Only two in the county this year, one in Chicksands Wood on 21 July (JA, RR) and another in Bedford on 19 August (NP).

Browns

Speckled Wood *Pararge aegeria*

Less common in 1996 than in 1995 (totals for 7 transect sites were 236 and 459 respectively; increased at only 1 out of the 7 sites).

Wall Brown *Lasiommata megera*

Rather scarce in the county this year and less common on the transects than in 1995 (totals for 6 transect sites were 39 and 50 respectively; increased at only 1 out of the 6 sites).

Marbled White *Melanargia galathea*

More common in 1996 than in 1995 (totals for 5 transect sites were 1032 and 459 respectively; increased at 5 out of the 5 sites). Continues to be recorded at new sites away from the chalk.

Gatekeeper *Pyronia tithonus*

More common in 1996 than in 1995 (totals for 7 transect sites were 2713 and 1509 respectively; increased at 6 out of the 7 sites).

Meadow Brown *Maniola jurtina*

More common in 1996 than in 1995 (totals for 7 transect sites were 4862 and 2861 respectively; increased at 5 out of the 7 sites). On Whipsnade Downs there were almost too many to count at times, the total there was 2529!

Ringlet *Aphantopus hyperantus*

Less common in 1996 than in 1995 (totals for 6 transect sites were 919 and 1364 respectively; increased at only 1 out of the 6 sites).

Small Heath *Coenonympha pamphilus*

More common in 1996 than in 1995 (totals for 6 transect sites were 1116 and 660 respectively; increased at 5 out of the 6 sites).

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CHARLES BAKER

THE IMPORTANCE OF HEDGES IN THE THERMAL REGULATION OF BUTTERFLIES

by Brian Anderson

Introduction

Many field guides contain references to the topography of habitats in respect of their suitability for various butterfly species (e.g. Thomas and Lewington 1991). Other works (Pollard *et al* 1974, Dunbar 1993, Feltwell 1986) refer to the importance of hedges as sites where butterflies can seek nectar sources, larval foodplants and shelter, and some mention the usefulness of hedges as providers of shade and basking sites. Yet other studies have dwelt extensively on the mechanisms of thermal regulation in butterflies (Shreeve 1992).

However, there seem to be no quantitative assessments of the degree to which hedges, or hedge-like structures, benefit butterflies by regulating their thermal environment.

This paper presents case studies on three common species observed during 1996 on Hill Rise Local Nature Reserve in Bedford (TL 046510), and assesses from measurements taken the quantitative effect of hedges on their thermal requirements.

The site

Some aspects of the site have been described elsewhere (Anderson 1996). Other parameters relevant to this paper are (i) it has a southerly aspect with a mean slope of 15°, varying between 0° and nearly 35°; (ii) there are approximately 900m of hedge, some bordering paths only 1–1.5m wide, others facing across open grassland – some 330m of hedge face north; (iii) the hedges vary in height from 1.5m to over 15m and (iv) are composed largely of Brambles *Rubus* sp., Hawthorn *Crataegus monogyna*, and Blackthorn and Plum *Prunus* spp., with Elms *Ulmus*, Roses *Rosa* and Privets *Ligustrum* being well represented. (Plate 7)

Warming up the Small Tortoiseshell

The Small Tortoiseshell *Aglais urticae* is a species that hibernates as an adult, and emerges early in the year to seek nectar and mates. In common with other butterflies it requires a thoracic temperature of around 36°C before it engages in voluntary flight. This roughly corresponds with air temperatures of 13°–17°C, depending on the amount of sun. Any butterfly that can achieve voluntary flight earlier is in a strong position to seek nectar, mates and larval foodplants and is more likely to avoid predators.

In April 1996 it was noticed that Small Tortoiseshells were tending to congregate on the Hill Rise reserve compared with the numbers observed in surrounding gardens. It was unlikely that nectar sources were the attraction as the number of suitable inflorescences was at least four times greater per unit area in the gardens compared with the reserve. On one particular day the figures were 15 Small Tortoiseshells in 20 minutes over an area of 0.6ha for the reserve, and 3 Small Tortoiseshells in 4 hours over an area of 0.1ha for the gardens. This reduces to 75.8 per ha per hr for the reserve and 7.5 per ha per hr for the gardens, which is a rate ten times greater for the reserve. It was also observed that within the reserve, the butterflies were more likely to be found on paths that were hedged on both sides, were sunny and sheltered from the wind (e.g. A in fig. 1).

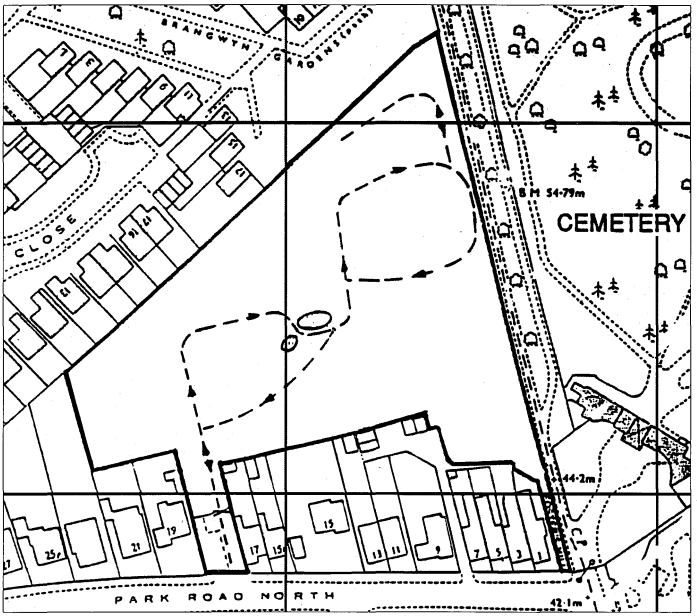


Figure 1: Hill Rise

A mathematical exercise was undertaken to see if heat gain in these sheltered areas could account for the greater numbers. It seemed likely that heat gain would come from radiative and conductive processes, with convection accounting for heat loss. Standard formulae are available for these radiative and conductive processes, and the amount of solar heating at our latitude in April was obtained from Johnson (1961a, 1961b). Making some necessarily approximate assumptions about the mass, thermal conductivity and specific heat capacity of a Small Tortoiseshell thorax, it was clear that an initial temperature rise of 0.25°C per second could be attained quite easily.

The next step was to conduct some experiments. A model Small Tortoiseshell was constructed from paper and card (coloured appropriately with the black wing markings and thorax being of synthetic indigo, more or less equivalent to the melanin found in butterflies (Ford 1945) and a good infrared absorber). Temperatures were measured with a digital thermometer. The model was placed with dorsal surface uppermost on the chipped bark substrate in a sunny sheltered section of the path (A in fig. 1). The air and substrate temperatures were 14.9°C and 22.2°C respectively. The temperature rise of the model was then measured. The model was then placed on a similar substrate in an unsheltered part of the reserve (B in fig. 1) and a similar test conducted. In this case the air and substrate temperatures were 14.0°C and 18.1°C respectively. There was a light breeze at B and effectively still air at A. The temperature change with time for the two cases is shown in table 1.

There is a clear suggestion that butterflies basking in the sheltered region have a 4.8°C advantage after 12 minutes. In fact a live butterfly has a dynamic physiological response to thermal conditions and will produce, by changes in posture and wing

angle, the best compromise between radiative and conductive heating and convective cooling (Polcyn and Chappel 1986) .These adjustments can be seen quite easily in a basking Small Tortoiseshell, as it presses its body to a heated substrate and makes small lateral movements of its fully opened wings in order to reduce convective cooling from the underside of the thorax (see also Heinrich 1996).

Elapsed time (minutes)	Temperature (°C)	
	Sheltered (A)	Unsheltered (B)
0	14.9	14.1
1	16.5	15.0
3	18.1	15.6
5	19.4	16.1
8	21.4	16.5
12	22.0	17.2

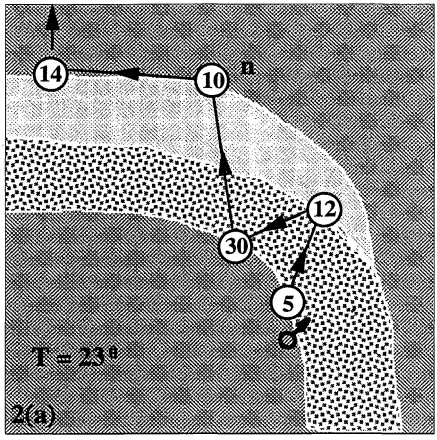
Table 1. Change of temperature with time of a model Small Tortoiseshell in sheltered and unsheltered sunny locations.

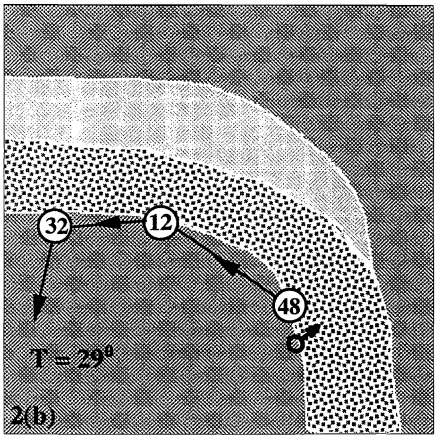
Cooling down the Gatekeeper

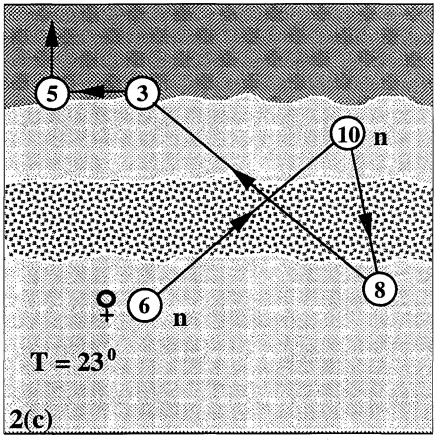
During the early part of the 1996 emergence of the Gatekeeper *Pyronia tithonus*, it was noted that the normally smooth increase in numbers recorded day-by-day was reversed on any day that the count was conducted in temperatures over 27°C. In the "worst case" numbers were 40 per cent below that which might have been expected. Mobility studies (where an individual butterfly's movements are continuously tracked) conducted later in the season showed that Gatekeepers were significantly less mobile at these higher temperatures. Of 24 Gatekeepers monitored in July, the total mean perching time for temperatures between 23°C and 25°C was 8.1 minutes compared with 22 minutes for temperatures of 28°C or over. Some examples of mobility tracking are given in fig. 2. Careful inspection of the shrubs along the transect route showed numbers of Gatekeepers fluttering, or more often perching, within the bushes (C and D in fig. 1), usually in full shade. This allows them to lose heat by convection, probably assisted by the circulation of body fluid (haemolymph) from the thorax into the abdomen. Temperature probe measurements showed that the shady interior of the Bramble shrubs was at 24°C when the surface of the vegetation on the sunny side of the path was at 36°C. This retreat to shade is not confined to Gatekeepers. Studies of the Ringlet *Aphantopus hyperantus* in Hertfordshire shows that this species behaves in a similar way (Warrington 1997, personal communication), and such behaviour is apparently common amongst dark-coloured species.

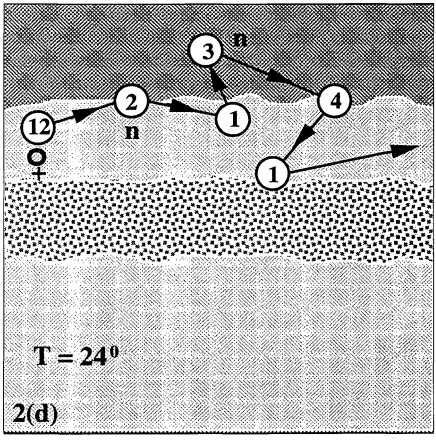
Drying out the Holly Blue

During May 1996, it was noticed that most of the Holly Blues *Celastrina argiolus* seen on the reserve were in a sunny corner at the north-west edge (E in fig. 1). One of the most prominent features of this area is a curtain of Ivy *Hedera helix* that covers sections of wall and fence and is about 3m long and 2m high. It seemed reasonable to assume that the Ivy had been used as the foodplant by the previous year's larvae and that what was being observed were the first flights of the freshly emerged adults. It was not possible to observe the adults emerging from the pupae as a large stand of Bramble









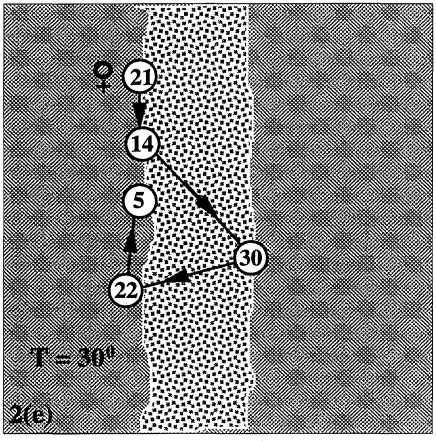


Figure 2: Mobility and temperature studies on *P. tithonus*

Scale: 1m N

Key: path

tall grass and herbs

hedge

⑥ : Time perching in minutes

n : individual nectaring

prevented a close approach to the foot of the Ivy (it is an event rarely observed anyway). Holly Blues are presumed to pupate low down on the foodplant or in leaf litter at the plant base. In common with other butterflies, they take a certain amount of time to emerge, inflate their wings and dry them ready for flight. It is reported that Holly Blues take between 30 minutes and an hour to complete this process, depending on the weather (Revels 1997, personal communication).

The southward-facing location of the Ivy would certainly produce a microclimate conducive to accelerated drying, and butterflies would be a flight-ready condition sooner.

As a trial, 8 pieces of paper , each 10 x 10mm were moistened with water until damp. Four were allowed to dry in still air at 18°C – the other 4 were allowed to dry similarly, but at a temperature of 24°C. The mean time to dry for the first group was 12 minutes, but for the second group was only 7.5 minutes, i.e. only 63 per cent of the time. Whilst these absolute figures are of little practical use, the ratio between the two groups does indicate a positive benefit for those butterflies whose drying perches are at a higher temperature. In addition, the Ivy leaves warm up to a surface temperature of over 40°C, when the air temperature was 20°C (as measured at another growth of Ivy near the reserve). This caused a slightly turbulent updraught of velocity approximately 2mm per second, measured by dropping talc into the airstream. This updraught will accelerate drying. These butterflies also gain in that they can bask as they dry, raising the thoracic temperature to a sufficient level for flight. Basking was observed in four individuals who sat with wings partly closed at an angle and at an orientation where the sun would provide most heat. The leaves of Bramble and Ivy allowed them to select basking perches with an optimum angle to the sun. The partly closed wings have been suggested as a means whereby the butterfly minimises convective losses (Heinrich 1996) and enhances heat gain by "reflectance basking" (Shreeve 1996), although this latter explanation has been challenged by Heinrich (1990). A consideration of the physics of reflectance basking suggests that it contributes little to thoracic heating (Anderson 1996, unpublished data).

Discussion

The mechanisms described for the three species individually apply of course to all three, and in varying degrees to all other butterfly species.

In warming, the presence of the hedge clearly allows the butterfly to more nearly optimise radiative heat gain. It has been reported that substrates in the neighbourhood of hedges can rise to 45°C when the ambient temperature is only 20°C (Shreeve 1992). The exact mechanism of heat transfers to and within butterflies is still the subject of controversy. Shreeve (1992) and Watt (1968) suggest that melanin in the wings speeds the heating process, but Heinrich (1996) states that the transfer of heat from the wings to the thorax is so slow that the direct heating of the thorax is the only significant process.

The behaviour of the Gatekeeper is clearly responsive to the ambient temperature. We can hypothesise that the energetics work roughly as follows:

(i) At "low" temperatures the Gatekeepers bask in order to gain enough thoracic heat for flight. Flights are of short duration as convective cooling in flight reduces the thoracic temperature.

(ii) At "moderate" temperatures the butterflies can maintain thoracic temperatures during flight. Flights are more frequent and of longer duration.
(iii) At "high" temperatures the butterflies risk overheating from exposure to the sun. Thus perching times increase and are invariably in shade.

Whether the Gatekeepers adopt the most efficient posture for cooling as they generally sit with wings fully closed to reduce visibility (i.e. crypsis); but this is another advantage provided by the hedge.

It must not be assumed that these results on the Gatekeeper can be generalised to other species, as a closely related American species, the Inornate Ringlet *Coenonympha inornata* continues to increase the frequency and duration of its flights to the limit of temperatures recorded (33°C) during a mobility study by Heinrich (1986).

An intriguing possibility posed by the Holly Blue concerns the differences between the spring and summer broods. The spring emerging brood has Ivy as its larval foodplant, whereas the summer emerging brood uses Holly *Ilex aquifolium*. The primary reason for this must be that the flower buds (the preferred part of the plant) are available at the right times of the year. The macroscopic structure of these plants is quite different. Once the Holly has grown enough to produce the flower buds, it is quite discernibly a tree. If the freshly emergent adult is to benefit from the thermal environment of the leaves, it has some way to climb. But the summer brood emerges in generally warmer conditions than the spring brood, and maybe does not need the advantages available to (and possibly required by) the earlier generation.

Some of the other benefits of hedges were outlined in the introduction. What is often not realised is that these effects can be synergistic. The ability to find nectar sources easily increases survival chances and fecundity. Larval survival is enhanced by an optimum density and distribution of foodplants. The hedge protects against spray drift, reinforcing survival chances further. The hedge can act as a corridor for the movement of species, encouraging genetic diversity and colonisation. These effects combine in a way that is more than additive and to these we may now join a quantifiable assessment of thermal benefits. Effective thermal regulation allows longer flights and a greater ability to utilise the other resources provided by hedges. And what is true for hedges is truer for green lanes, where a double hedge provides better sun traps, more wind shelter, more protection from spray drift and in all likelihood a greater density of nectar and larval foodplants.

What has not been determined by this study is whether butterflies use topographical cues to find thermally suitable habitats, or whether they come upon them by chance and then utilise them appropriately.

ACKNOWLEDGEMENTS

I am grateful to Yvonne Anderson, Shalaine Crook and Tom Greenwell for the supply of records during the 1996 season.

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Address: 64 Eagle Gardens, Bedford MK41 7FE.

MACRO-MOTHS (Lepidoptera)
Report of the Recorder

After 20 years as Macro-moth recorder, I have decided that it is time for a change, so this is my last annual report. During these 20 years, I have changed the method of recording from a rather archaic system using the numbers and English names as per I.R.P. Heslop's Checklist, to those by Bradley and Fletcher. I have also concentrated on recording the distribution of moths throughout the county. I was encouraged to do this by the late John Heath in the late 1970s. He had produced a map of Bedfordshire showing the number of records, per 10Km square, which was held at Monk's Wood. There were 11 squares with under 100 species recorded in them and 16 squares with a number less than the lowest figure shown in the map published with this report.

Most of my usual recorders carried on with their garden moth trapping. Nearly everyone recorded at least one new record, but D.V. Manning and H.A. Smith produced, between them, 12 new 10Km records from Sharnbrook and Carlton respectively. This proves that despite the amount of fieldwork that has been carried out in the county, our knowledge of the distribution of Bedfordshire's Macro-moths is still far from complete.

SPECIES LIST

The following list contains new species and comments on species of particular interest. 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.

382 **Six-belted Clearwing**
One specimen was swept from chalk grassland, by Dr B. Nau, at Sundon Quarry on 22nd August, 1996.

1633 **Small Eggar**
Thanks to a number of enthusiasts, a concentrated search for the larval webs of this species took place in the north of the county during late June. Altogether eleven different locations were found for this nationally rare moth; all were on Hawthorn, Blackthorn or Elm: Thurleigh Cutting (TL05I); Bletsoe Village (TL05J); Felmersham N.R. (SP95Z); north of Little Staughton (TL16C); Little Staughton village (TL16B); north of Thurleigh (TL05P); near Souldrop (SP96V); near Thurleigh (TL05I); Wollaston Roman Road (SP96F); near Odell Great Wood (SP95P); and Colworth House, Sharnbrook (SP95Y). Although D.V. Manning also searched TL06 and TL15, none were found in either of these two 10Km squares.

1699 **Least Carpet**
Recorded from the Rothamsted trap at Cockayne Hatley on 8th and 9th August, 1996. This species was last recorded, at the same location, in 1980.

1703⋆ **Rusty Wave**
A specimen was reared by A.J. Riley, in October 1996, from a larva found in Stopsley on a dried flower arrangement which had probably been imported.

1755 **The Chevron**
H.A. Smith recorded a specimen of this uncommon moth in Great Hayes Wood, on 30th July, 1996.

1844 **Ochreous Pug**
During research for *The Butterflies and Moths of Bedfordshire* it was discovered that some of the records of this species were in doubt, due to the lack of specimens or from dates that were too late in the year. The only records now accepted are from the Rothamsted trap at Old Warden (31/5/1979) and Maulden Wood (1/6/1983).

1973 **Death's-head Hawk-moth**
Two specimens were reported in 1996, one from Sandy Railway Station, on 1st August, 1996 and the other from a private house in Stotfold during the second week in November, 1996.

2040 **Four-dotted Footman**
One, at light, at Stockgrove Country Park, on 21st June. 1996, by V.W. Arnold.

2370 **Twin-spotted Wainscot**
Recorded from Sharnbrook and Carlton by D.V. Manning and H.A. Smith, at light on 21st August, 1996, also at Northwood End Road, Haynes on 17th August, 1996, by J. Childs.

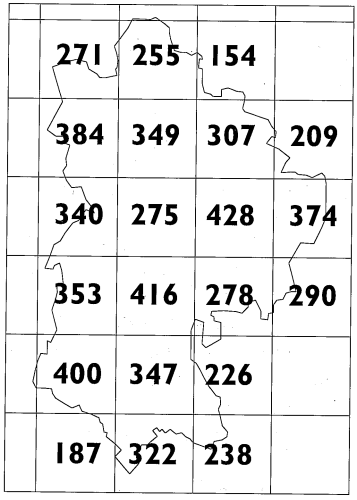
2377 **Fen Wainscot**
At light, at The Lodge, Sandy, on 24th July, 1996 and 6th August, 1996, by J. Childs.

2385* **Small Mottled Willow**
Recorded from the Rothamsted trap at Cockayne Hatley between 18th and 20th August, 1996. This migratory species could turn up anywhere in the county.

2403 **Bordered Straw**
J. Childs recorded this migratory species from The Lodge, Sandy on 7th August, 1996 and Ian Woiwod reported another from the northern part of Potton Wood on 21st August, 1996.

NOTE: For those people who would like to annotate their copy of *The Butterflies and Moths of Bedfordshire* the following records will be of use:

Species	10km Squares	1932	SP95
1662	SP95,96	1944	TL24
1755	SP96	1973	TL23
1757	TL01	2279	TL01
1808	TL23	2360	SP95
1856	SP95	2370	TL14
1864	SP95	2403	TL14



Number of species recorded in each 10km square – as at 31/03/97

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VIC ARNOLD

SOME HISTORICAL MOTH RECORDS FOR BEDFORDSHIRE PART 5

by V.W. Arnold

During the early part of 1996, the notebooks of Colonel S.H. Kershaw D.S.O., were obtained, on loan, from Brighton Museum. These notebooks cover the years between 1932 and 1960 and have proved to be a valuable source of information. The following list of species were all extracted from these notebooks, but no voucher specimens have been found, so this throws doubt on the authenticity of most of these 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 marked with an ★ are moths that had not been recorded in the County before. However, they should not all be considered genuine Bedfordshire species.

1656★ **Satin Lutestring**
Aspley Heath, 7-8 May 1934.

1694★ **Smoky Wave**
Aspley Heath, 21-22 July 1950 - recorded as 'fumata'.

1740★ **Galium Carpet**
Aspley Heath, 31 August 1954 and Totternhoe, 23 May 1956.

1770★ **Chestnut-coloured Carpet**
Aspley Heath 1937, 1946 and 1948. Skinner (1984) does not list Bedfordshire as a county that this species is likely to occur in. It is considered that Kershaw mis-identified this moth. It is not included in *The Butterflies and Moths of Bedfordshire* for this reason.

1787★ **Argent and Sable**
King's Wood, Heath and Reach, 26 May 1956.

1861★ **Bilberry Pug**
Aspley Heath, 31 July 1936 and 11 June 1947.

2051★ **Four-spotted Footman**
Aspley Heath, 31 July 1946, probably an immigrant.

2080★ **Square-spot Dart**
Aspley Heath, 8 August 1933. Skinner (1984) states that this species inhabits coastal cliffs. It is considered that Kershaw mis-identified this moth.

2090★ **Crescent Dart**
Aspley Heath, 1935, 1946 and 1953 as 'lunigera'. Skinner (1984) states that this species inhabits coastal cliffs. It is considered that Kershaw mis-identified this moth.

2096★ **Tawny Shoulder**
Aspley Heath, 24-25 June 1934. The most likely explanation for this record is that Kershaw muddled up his English names when he wrote this American migrant in his notebook!

2257 **Orange Upperwing**
Aspley Heath, 1932. This information was omitted from *The Butterflies and Moths of Bedfordshire*. No specimen has been seen to confirm this record.

2329★ **The Confused**
Aspley Heath, 1947 and 1953. Specimens in Kershaw's collection for June 1947 and 1948 are wrongly labelled. It is considered that Kershaw mis-identified this species, and this is the reason why it is not included in *The Butterflies and Moths of Bedfordshire*.

2373* **Webb's Wainscot**

Aspley Heath, 3 August, 1960 "by our pond". This is not a Bedfordshire moth, the most likely explanation is that either Kershaw mis-identified this species, or that this individual may have been imported with pond plants from elsewhere.

Finally, a species that has so far eluded positive identification. This comes from the Journal of Margaret Emily Shore (1819 - 1839).

"21-6-1832, 'Palmer worm'. It has long, thick tufts of black and red hair and a very minute gold spot on each ring. It seems to eat chiefly the leaves of the dock, the vine and the lilac."

A 'palmer' was an itinerant religious man who spent his time on pilgrimages, sometimes carrying a palm-leaf, if he had been to the Holy Land. It is assumed that the 'Palmer worm' is the larval form of a common moth, possibly the Garden Tiger, so named after its wandering habit, but no one, so far, has come up with a conclusive answer!

During my 20 years as Macro Moth recorder, I have tried to publish, in the Journal, information on every species that has been recorded in Bedfordshire. I would like to thank Charles Baker for his hard work and dedication in deciphering Kershaw's notebooks. How much more information would we have had, if W.S. Brocklehurst and W. Gifford Nash had left their collections and/or notebooks to Bedford Museum?

REFERENCES

ARNOLD, V.W., BAKER, C.R.B., MANNING, D.V., WOIWOD, I.P. 1997 *The Butterflies and Moths of Bedfordshire* Bedfordshire Natural History Society 408pp.

ANON (Ed.) 1891 *Journal of Emily Shore.*

SKINNER, B. 1984 *Colour Identification Guide to Moths of the British Isles*, Viking, London.

ERRATUM

Please note that in the *Bedfordshire Naturalist* 50 (Part 1) pages 92 and 93, the correct number for the Lace Border is 1687 and species number 1798 is Small Autumnal Moth.

Address: 96, St. Augustine Avenue, Luton, Bedfordshire LU3 1QE

MICRO-MOTHS (Lepidoptera)
Report of the Recorder

The most significant item in this year's report is to record the publication, in January 1997, of the Society's book *The Butterflies and Moths of Bedfordshire.*

During preparation of the book a number of old records have come to light, mainly through extensive efforts by Charles Baker in obtaining sight of diaries and collections of some of our earlier entomologists.

Species added to the county list and included in the book are:

Elachistidae

Biselachista utonella (Frey), Cockayne Hatley (TL24P), 23–29 July 1995

Gelechiidae

Monochroa lucidella (Steph.), Cockayne Hatley (TL24P), 9–15 July 1995

Pexicopia malvella (Hb.), recorded in the county in 1936 by Neville Birket (on vice-county distribution maps kept by A.M. Emmet)

Phthorimaea operculella (Zell.), Studham (TL01I), larvae found in imported potatoes by Charles Baker (old record – no date noted)

Anarsia lineatella (Zell.), Studham (TL01T), larvae in imported peaches found by Charles Baker. (old record – no date noted)

Cosmopterigidae

Sorhagenia rhamniella (Zell.), Cockayne Hatley (TL 24P), 16–22 July 1995

Tortricidae

Dichrorampha sedatana (Busch), Biggleswade (TL 14X), 7 June 1996, a colony on garden Tansy (R. Revels)

Pyralidae

Pyrausta ostrinalis (Hb.), Mill's Field, Woburn Sands (SP 93), 1 August 1949, noted in diary by S.H. Kershaw

Microstega hyalinalis (Hb.), Totternhoe (SP 92W), 17 June 1947, noted in diary by S.H. Kershaw

Dioryctria schuetzeella (Fuchs), Cockayne Hatley (TL 24P), 26/27 July 1996 (I.Woiwod)

Pterophoridae

Marasmarcha lunaedactyla (Haw.), Totternhoe Knolls (SP 92), 11 July 1986 photographed by A. Outen, but not recognised until 1996

Platyptilia calodactyla (D. & S.), Aspley Heath (SP93H), 23 June 1936 and 4 June 1950, noted in diaries by S.H. Kershaw.

Leioptilus carphodactyla (Hb.) Cockayne Hatley (TL 24P), 6–12 August 1995

I mis-identified one species, which is included in the book as:

Monochroa conspersella (H.-S.). (739)

This entry should be amended to read

Monochroa lutulentella (Zeller) (742), Cockayne Hatley (TL 24P), 9–15 July 1995

Larval foodplant: Dropwort

& in Larval Foodplant Index (p.401) Dropwort (*Filipendula vulgaris*)

A further five species have been identified since the text of the book was completed, and entries for these species are as follows:

Caloptilia populetorum (Zeller) (281)
Post VCH: A single record from the RIS trap at Cockayne Hatley in October 1991.
Flight: August to May
Larval foodplant: Birches
(note: my microscope slide has only recently been identified)

Monochroa hornigi (Staudinger) (740)
Post VCH: Seven specimens in the RIS trap at Cockayne Hatley in 1996.
Flight: July, August (weeks 26–29, 33)*
Larval foodplant: Pale persicaria.
& in Larval Foodplant Index (p.403) Pale persicaria (*Polygonum lapathifolia*)

Cnephasia genitalana Pierce & Metcalfe (1023)
Post VCH: A single record from the RIS trap at Cockayne Hatley in August 1996.
Flight: July, August (week 32)*
Larval foodplant: Polyphagous on herbaceous plants.

Endothenia ericetana (Humphreys & Westwood) (1103)
Post VCH: A single record from the RIS trap at Cockayne Hatley in September 1996.
Flight: June to September (week 36)*
Larval foodplant: Marsh woundwort.

Crocidosema plebejana Zeller (1157)
Post VCH: A single record from the RIS trap at Cockayne Hatley in August 1996.
Flight: July to October (week 34)*
Larval foodplant: Mallows and Tree mallow.
& in Larval Foodplant Index (p.402) Mallows (*Malva* spp.)
(p.404) Tree mallow (*Lavatera arborea*)

*Flight times recorded in Bedfordshire.

ACKNOWLEDGEMENTS

I would like to thank the following for records and assistance: P. Almond, V. Arnold, C. Baker, Mrs B. Bowskill, J.E. Childs, B. Dickerson, A.M. Emmet, J.R. Langmaid, A. Outen, R. Revels, H.A. Smith, I. Woiwod.

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ARNOLD, V.W., BAKER, C.R.B., MANNING, D.V. and WOIWOOD, I.P. 1997 *The Butterflies and Moths of Bedfordshire* Bedfordshire Natural History Society 408pp.

D.V. MANNING

FUNGI
Report of the Recorder

Records have been received from Steve Hawkins, some of which are of a "historical" nature and refer back in time to the autumn of 1986. Most of these earlier records are contained in two foray lists from Burnt Wood TL135214, and although these lists do not include any outstanding rarities the following species have been abstracted from them, since they are not often recorded from Bedfordshire: *Boletus piperatus*; *Clitocybe clavipes*; *C. odora*; *Lactarius pubescens*; *Mycena oortiana.*

Additional records are as follows:

BASIDIOMYCETES
AGARICALES

**Agaricus bernardii*: roadside near Old Warden Warren, on east side of the road, 15th July 1997. [TL13654350].

This is a large white *Agaricus* in which the cap surface becomes deeply fissured to form thick plaque-like, greyish brown scales; there is a conspicuous, inferior, sock-like ring, and the flesh when cut changes to a reddish or brownish colour. The spores are roundish, black, and measure 5.5 – 7.0 x 5.0 – 6.0 μm; the cheilocystidia are narrowly elongate and irregularly cylindric or fusoid. In this particular collection the pilei were up to 15cm diameter.

Agrocybe molesta [= *A. dura*]. River Ivel Walk, near Stratford, 31st August 1996 [TL180477].

A pale ochraceous or cream coloured species, with smooth flattened-convex pileus, to about 6cm diam.; the lamellae are clay-brown, and the pale stipe, which bears a delicate membranous or cottony annulus, tends to be rather tall and elongated reaching about 9cm in height, and 0.7 – 0.8cm in width. Spore print snuff brown; the spores are brown, measure 11 – 14 x 7 – 8 μm, are broadly ellipsoid with a thickened wall, and have a distinct germ pore. Both cheilo- and pleurocystidia are present as thin walled, hyaline, cylindric, utriform or vesiculose elements. This species is not often recorded, probably as a result of it fruiting in late spring or early summer.

†*Boletus impolitus*: From derelict site, Moor Street, Luton, 1st Nov 1990.

A species with a buffy-brown, minutely felty pileal surface, lemon yellow pores, and a very pale buffy-brown stipe, devoid of any reticulum, but becoming darker brown at the base. The flesh is whitish, except at the base of the stipe, where it is conspicuously lemon yellow in the cortex. This bolete shows no blueing when cut or bruised. This record confirms an ancient report in the Victoria County History from Ampthill in 1904. It was not seen by the Recorder.

Lentinus lepideus Growing out of railway sleepers on a disused track, south of Luton Station. 6th September 1990.

This record is additional to that reported from the same site in Bedf. Naturalist **50** 105, 1996.

Lacrymaria velutina: Amongst small patch of various young willows, Redlands Sand Quarry, 8th September 1996 [TL199487]

**Russula subfoetens*: Flitwick Moor. 31st September 1986.

This species is a new addition to the County. It is a fairly robust *Russula* with an ochre-brown pileus, initially almost globose, which in wet weather may be somewhat glutinous. With age the cap expands, but often remains downwardly curved at the conspicuously tuberculate-striate margin for a considerable time. The lamellae are thick, distant, and dirty white to pale cream. The more or less acrid flesh becomes yellowish when broken or when treated with KOH, unlike that of the closely similar *R. foetens*, which is unaffected. A further distinction between the two taxa is that in *R. subfoetens* the spores are slightly smaller, more ellipsoid, and have a less prominent ornamentation of spines, which are often interconnected by fine lines. In *R. foetens* the spores are globose to subglobose, and ornamented with more strongly developed and mostly isolated spines. Both species have the same unpleasant smell, which is rancid and oily, with a fruity component. It is interesting that Rayner (1970) in Keys to British species of Russula (Part III) in *Bull. Brit. Myc. Soc.* **4**, 19–46 writes of these taxa... they are possibly not worthy of specific rank since intermediates apparently do occur. The collection was not seen by the Recorder.

ASCOMYCETES
DISCOMYCETES

Mitrophora semilibera: three specimens found in two separate locations at Barton Hills Reserve: 23rd April 1990 One Leet Wood, TL085298. Two beside footpath in elder scrub TL089303. Also Leighton Buzzard, 3rd May 1996 [SP91752400].

Verpa conica: Leighton Buzzard, north of Stonehenge Works, 28th April 1996.

† Confirmation of old record
* Species new to the county

The Recorder is very grateful to Steve Hawkins for these records.

DEREK A. REID

THE FUNGUS FORAY 1996
WHITE WOOD, EVERTON

About 20 members of the Society attended the annual fungus foray, which was held at White Wood, Everton, on 22 September 1996, with Dr D.A. Reid as leader. This venue was one which had not previously been selected as a site for the fungus foray, and since its potential was unknown, permission had been obtained from the Forestry Authority to visit nearby Potton Wood after lunch, should fungi prove scarce at the first locality.

White Wood

White Wood had the appearance of a rather unpromising area, comprising a mix of native and exotic trees, including some conifers, surrounded by pasture. However, even allowing for, what was basically, an unproductive area, numbers of fungi were far fewer than would normally be expected, due to the prevailing dry conditions. This was reflected in the total number of species collected – a mere 76 species, of which only 28 were agarics. Even so five species proved to be new county records.

Of these novelties the most spectacular were fine specimens of *Volvariella bombycina*, found growing on old trees dotted around the pasture. This species has a large pileus, up to 20 cm across, which is initially ovoid then campanulate, and densely covered with long silky, often slightly upturned, fibrillose hairs. The colour of the pileus is usually white, but may be distinctly yellow in some specimens; the stipe is white to pale cream and faintly striate, while the lamellae are pale salmon. Apart from the strikingly silky shaggy pileus, the most striking feature of this agaric is the presence of a tall, very well developed, tough leathery, sheathing, brown volva, which is often marked with darker brown scales. Microscopically this fungus, which has a salmon pink spore print, has ovoid to ellipsoid spores, measuring 8 – 10 x 5 – 6 μm, and variously shaped cheilo- and pleurocystidia, ranging from clavate or fusiform to lageniform.

Pluteus pellitus is another pink-spored agaric, belonging in the same section of the genus as the well known *P.cervinus*, i.e. it has on the gill face, thick-walled fusiform metuloidal pleurocystidia, provided with two or more apical hooks. However it differs from this common species in having a pure white pileus and a slightly less robust stature.

Psathyrella prona is a small nondescript agaric which, when mature, has a strongly striate, greyish, acorn-shaped pileus, usually 8 - 10mm high and wide. The stipe is white to whitish and fragile, while the lamellae finally become purple-black. Microscopically it has large, dark brown ellipsoid spores, 12 – 15 x 6 – 8 μm, with a conspicuous germ pore. Both cheilo- and pleurocystidia are present as thin walled, hyaline, fusiform organs.

Rutstroemia echinophila is a small, easily recognised cup fungus, restricted in occurrence to old fallen cupules of Sweet Chestnut (*Castanea sativa*). The apothecia are stipitate, with a flattened, reddish brown disc, up to 7mm diameter; several apothecia may occur on a single cupule. The ascospores, 16 – 20 x 4 – 6 μm, are narrowly ellipsoid, slightly curved and become 3-septate, budding off minute spherical secondary spores. This fungus is fairly common wherever the host occurs, but a diligent search is often required to find it.

Orbilia inflatula is an unfamiliar name, as specimens were previously determined as *O. auricolor*, following the interpretation of Dennis (1978) *British Ascomycetes* Cramer. However, Spooner (1987) *Helotiales of Australasia....* Bibliotheca Mycologica **116**, Cramer, Berlin, Stuttgart, has shown that the correct name for this taxon is *O. inflatula*. There was a previous report of its occurrence in Bedfordshire (as *O. auricolor*) from Odell Great Wood, 8th October 1972 [*Bedf. Naturalist* **27**, 8, 1972]. The species is recognised by its small, pale orange discs, about 1mm diam., which are flattened to shallowly convex. Microscopically it has paraphyses which are only slightly enlarged at the apices, but these are agglutinated and encrusted to form an epithecial layer. The ascospores, 4.5 – 7.0 x 0.6 – 1.0 µm, are hyaline, cylindric to slightly curved.

Finally *Trimmatostroma betulinum* is a blackish-brown mould, which forms pulvinulate or effused colonies on fallen branches of birch. The conidia, which are brown, variously shaped and septate, are produced in branched chains. This is an extremely common fungus, but one which is usually overlooked on fungus forays when more conspicuous species are in abundance.

The list of species follows:

Agaricus arvensis; *Agrocybe erebia*; *Amanita muscaria*; *Boletus badius*; *B. subtomentosus*; *Collybia dryophila*; *C. fusipes*; *C. peronata*; *Coprinus atramentarius*; *C. comatus*; *Crepidotus variabilis*; *Crinipellis stipitarius*; *Hypholoma fasciculare*; *Lepiota cristata*; *Macrolepiota procera*; *M. rhacodes*; *Marasmius oreades*; *M. rotula*; *Oudemansiella radicata*; *Pluteus cervinus*; ★*P. pellitus*; *Psathyrella hydrophila*; ★*P. prona*; *Russula cyanoxantha*; *R. parazurea*; *R. sororia*; *Tephrocybe anthracophila*; ★*Volvariella bombycina*.

Bjerkandera adusta; *Coriolus versicolor*; *Daedaleopsis confragosa*; *Fistulina hepatica*; *Hapalopilus nidulans*; *Hirschioporus abietinus*; *Junghuhnia nitida* [=*Chaetopus euporus*]; *Meripilus giganteus*; *Phanerochaete velutina*; *Phellinus ferreus*; *Piptoporus betulinus*; *Schizopora paradoxa*; *Sparassis crispa*; *Stereum hirsutum*; *S. rameale*; *S. rugosum*; *Tyromyces stipticus*.

Calocera pallidospathulata; *C. viscosa*; *Dacrymyces stillatus*.

Auricularia auricula-judae.

Puccinia glechomatis (On *Glechoma hederacea*).

Bovista plumbea; *Lycoperdon perlatum*; *L. pyriforme*; *Scleroderma verrucosum*.

Orbilia inflatula; *Rhizina undulata*; *Rhytisma acerinum*; ★*Rutstroemia echinophila*; *Trochila ilicina*.

Chaetosphaerella phaeostroma; *Daldinia concentrica*; *Diatrype stigma*; *Hypocrea pulvinata*; *Hypoxylon fragiforme*; *H. multiforme*; *Leptosphaeria acuta*; *Nectria cinnabarina*; *Rhopographus filicinus*; *Uncinula bicornis*.

Pycnostysanus azalae; *Ramularia calcea*; ★*Trimmatostroma betulinum*.

Fuligo septica; *Physarum cinereum*; *Stemonitis fusca*; *Tubifera ferruginosa*.

Total 76 species

★ Species new to the County

Potton Wood

After lunch a small party visited Potton Wood, but this was even less productive than White Wood, yielding only 34 species of which only 4 were agarics. None of these was noteworthy.

List of species for Potton Wood:

Agaricus augustus; *Gymnopilus junonius*; *Hypholoma fasciculare*; *Marasmiellus ramealis*.

Bjerkandera adusta; *Byssomerulius corium*; *Coriolus versicolor*; *Daedaleopsis confragosa*; *Hymenochaete rubiginosa*; *Inonotus hispidus*; *Schizopora paradoxa*; *Skeletocutis nivea* [=*Leptotrimitus semipileatus*]; *Stereum hirsutum*; *S. rugosum*.

Calocera glossoides.

Auricularia mesenterica.

Puccinia glechomatis (on *Glechoma hederacea*); *P. graminis* (on *Agrostis* sp.); *P. menthae* (on *Mentha aquatica*); *P. punctiformis* (on *Cirsium arvense*).

Cyathus striatus.

Chlorociboria aeruginascens (=*Chlorosplenium*).

Chaetosphaerella phaeostroma; *Claviceps purpurea*; *Daldinia concentrica*; *Diatrype stigma*; *Erisiphe sordida*; *Hypoxylon rubiginosa*; *Microsphaeria alphitoides* (cleistothecia present!); *Sphaerotheca pannosa*; *Uncinula bicornis*; *Xylaria polymorpha*.

Fuligo septica; *Trichia decipiens*.

Total 34 species

DEREK A. REID

LICHENS
Report of the Recorder

Bedfordshire possesses very few natural habitats, such as natural rock outcrops or old deciduous woodlands, for lichen growth . As a result much of the lichen recording in the county has centred on man-made substrates such as old walls and churches, churchyards and other old buildings. In terms of species richness, Sharnbrook Church tops the list with 59 species, but this is a long way behind some of country's churches which have recorded over 100 species.

Lichens growing on trees and soil are particularly vulnerable and there has been a decline in the diversity of these lichens as a result of neglect, air pollution from local and distant sources and adverse changes in land and woodland management. However, many corticolous and lignicolous lichen species may be found in the parkland sites that surround large houses and stately homes. Both Woburn Park and Wrest Park are good examples of mature parkland sites and the total number of corticolous and lignicolous species for these areas are 58 and 32 respectively.

A total of 181 species have so far been recorded in Bedfordshire and of these four species are considered nationally scarce; *Aspicilia subcircinata*, *Caloplaca variabilis*, *Lepraria lesdainii* and *Leptogium plicatile*.

CHECKLIST

Acarospora fuscata
Agonimia tristicula
Amandinea punctata
Anaptychia ciliaris
Anisomeridium nyssaegenum
Arthonia spadicea
Aspicilia calcarea
Aspicilia contorta
Aspicilia subcircinata
Bacidia arnoldiana
Bacidia caligans
Bacidia sabuletorum
Bacidia saxenii
Belonia nidarosiensis
Buellia aethalea
Calicium viride
Caloplaca aurantia
Caloplaca citrina
Caloplaca crenularia
Caloplaca decipiens
Caloplaca ferruginea
Caloplaca flavescens
Caloplaca holocarpa
Caloplaca isidiigera
Caloplaca luteoalba
Caloplaca ruderum
Caloplaca saxicola
Caloplaca teicholyta
Caloplaca variabilis
Candelariella aurella
Candelariella medians
Candelariella vitellina
Catillaria alba
Catillaria chalybeia
Catillaria lenticularis
Chaenotheca ferruginea
Chaenotheca trichialis
Cladonia chlorophaea
Cladonia coccifera
Cladonia coniocraea
Cladonia conoidea
Cladonia fimbriata
Cladonia floerkeana
Cladonia furcata - one record H.Meyer 1934 from Sutton not seen since
Cladonia macilenta
Cladonia polydactyla
Cladonia portentusa
Cladonia pyxidata
Cladonia squamosa
Cladonia subulata
Clauzadea monticola
Cliostomum griffithii
Coelocaulon aculeatum
Collema auriforme
Collema crispum
Collema tenax
Collema tenax v. ceranoides
Cyphelium inquinans
Dimerella pineti
Diploica canescens
Diploschistes muscorum
Diploschistes scruposus
Diplotomma alboatrum
Dirina massiliensis f. sorediata
Evernia prunastri
Foraminella ambigua
Fuscidea lightfootii
Haematomma ochroleucum var. porphyrium
Haematomma var. porphyrium
Hypocenomyce scalaris
Hypogymnia physodes
Hypogymnia tubulosa

Lecanactis premnea
Lecania erysibe
Lecania erysibe f. sorediata
Lecanora albescens
Lecanora campestris
Lecanora chlarotera
Lecanora conferta
Lecanora conizaeoides
Lecanora crenulata
Lecanora dispersa
Lecanora expallens
Lecanora intricata
Lecanora muralis
Lecanora orosthea
Lecanora polytropa
Lecanora rupicola
Lecanora saligna
Lecanora sulphurea
Lecanora symmicta
Lecanora varia
Lecidea erratica
Lecidea fuscoatra
Lecidea fuscoatra v grisella
Lecidella elaeochroma
Lecidella scabra
Lecidella stigmatea
Lepraria incana
Lepraria lesdainii
Lepraria lobificans
Leproloma vouauxii
Leproplaca chrysodeta
Leptogium plicatile
Lobaria pulmonaria recorded by Abbot (18th century) from Maulden Woods
Micarea prasina
Microcalicium disseminatum
Ochrolechia parella
Ochrolechia subviridis
Ochrolechia turneri
Opegrapha niveoatra
Opegrapha vulgata
Parmelia acetabulum
Parmelia caperata
Parmelia elegantula
Parmelia glabratula
Parmelia glabratula var. fuliginosa
Parmelia mougeotii
Parmelia polydactyla
Parmelia revoluta
Parmelia saxatilis
Parmelia subaurifera
Parmelia subrudecta
Parmelia sulcata
Peltigera canina
Pertusaria albescens v corallina
Pertusaria amara
Pertusaria coccodes
Pertusaria hymenea
Pertusaria pertusa
Phaeophyscia orbicularis
Phlyctis argena
Physcia adscendens
Physcia aipolia - recorded from Woburn Park (1968) Tree felled 1972
Physcia caesia
Physcia distorta
Physcia tenella
Physconia grisea
Placynthiella icmalea
Placynthiella uliginosa
Placynthium nigrum
Platismatia glauca
Polysporina simplex
Porina chlorotica
Porpidia crustulata
Porpidia macrocarpa
Porpidia tuberculosa
Protoblastenia rupestris
Psilolechia leprosa
Psilolechia lucida
Pyrrhospora quernia
Ramalina exigua
Ramalina farinacea
Ramalina fastigiata
Rinodina gennarii
Rinodina teichophila
Sarcogyne regularis
Schismatomma declorans
Scoliciosporum umbrinum
Solenospora candicans
Stereocaulon nanodes
Stereocaulon pileatum
Tephromela atra
Toninia aromatica
Trapelia coarctata
Trapelia involuta
Trapelia placodiodes
Trapeliopsis granulosa
Usnea subfloridana
Verrucaria baldensis
Verrucaria dolosa
Verrucaria glaucina
Verrucaria hochstetteri
Verrucaria muralis
Verrucaria nigrescens
Verrucaria viridula
Xanthoria calcicola
Xanthoria candelaria
Xanthoria elegans
Xanthoria parietina
Xanthoria polycarpa

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I would like to thank B.Coppins, T.Chester, A.O'Dare, G. Hooper, C. Hitch, K.Palmer for all their help, visits, specimens and specimen lists over the past years.

FRANCES B.M. DAVIES

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

1996 was another excellent year for recording in the county with several interesting finds. Progress in the recording schemes, both national and local, has been good with the members of the Flora Group maintaining their enthusiasm for the flora of Bedfordshire. Coverage for the BSBI Atlas2000 scheme in the 10km2 is good and I fully expect the final totals for each square to be excellent. An analysis of the records from 1987 to 1996, entered into the database at Bedford Museum by Patti Phillips, shows that TL02 and TL03 have, respectively, 627 and 596 taxa recorded. In the Bedfordshire Plant Atlas (Dony, 1976) these squares have 673 and 685 records. This indicates about an 88% re-record rate. However, many of the additional species not recorded are casuals which may not recur.

Over recent years most new county records (NCRs) have been alien species which are in the process of spreading across the country, often from south to north. One such species is New Zealand Pigmyweed Crassula helmsii which had its first record in 1988 (Boon, 1989) and has since been recorded from several ponds throughout the county. It is unusual, therefore, to report the occurrence of a native British species as an NCR. A thriving colony of Navelwort Umbilicus rupestris was found by David Tyler along the verge of a lane near Sandy (TL 14Z). The plants had the dried spikes of the previous year's flowers and were distributed along some 20m of the sandy bank which constituted the verge. There was considerable shade from the nearby trees but the plants were very healthy. (Plate 3) It is difficult to believe that this somewhat unprepossessing species would be deliberately introduced. It is not recorded within 100 miles. except there was also, last year, a new record from Cambridgeshire. I consider that we can welcome this species as a new native to the flora of the county.

A plant which was observed in 1996 but had not been recorded for many years was the Lesser Chickweed Stellaria pallida. There are no records in the *Bedfordshire* Plant Atlas (Dony, 1976) and it is not clear whether it has been overlooked, or whether the very dry conditions allowed this rather insignificant looking annual to flourish this year. Certainly it flowers early in the year (March–April) and may have been missed. In the Flora of Bedfordshire (Dony, 1953) it is stated to be "Probably not infrequent on the Lower Greensand", which implies that it is often overlooked. The first record for 1996 was sent by a visiting botanist (Tim Rich) who recorded what he termed "...an opportunistic card..." when he stopped on a journey along the A1 road and visited Biggleswade Common (TL 14X).

Two species considered no longer to occur were refound during the year. Firstly, the Broad-fruited Cornsalad Valerianella rimosa was in some quantity at its original site near Barton (TL 02 Z). This cornfield weed is classed nationally as Endangered in the Red Data list of threatened plants. When seen previously the site was on the edge of a field of corn, but in succeeding years the crop was Oil-seed Rape. However, this year the crop reverted to corn and there were hundreds of plants of V. rimosa present. Among the plants were a few specimens of the Narrow-fruited Cornsalad V. dentata. Along the edge of the adjacent field the situation was reversed with, probably,

thousands of V. dentata and a few *V.* rimosa. The second refind was of Greater Duckweed Spirodela polyrhiza (SP 95G). South of the bridge over the R. Ouse at Turvey there is a small portion of Bedfordshire on the far bank and PP noticed that among the duckweed at the edge of the river where the water was sluggish there were some rather large specimens. These were clearly S. polyrhiza and on closer investigation were definitely identified.

Among a remnant of chalk downland flora at the top of a cliff formed by quarrying near Kensworth (TL 01J) PB and CRB found a colony of Juniper Juniperus communis. There were seven old trees up to 2m high but with no evidence of regeneration and, according to information received, there may be many other specimens in the vicinity of the quarry. The trees seen did not look obviously planted – they were randomly situated. However, pending further investigation, the present status of this species in the county must be considered as doubtfully native. The last record of this species as a native from Barton Hills was in 1889 (Saunders, 1889). (It should be added that the trees seen at Kensworth were noted earlier in the year by Trevor James.)

Another tree has recently been given some attention in the county. Until recently the Large-leaved Lime Tilia platyphyllos was assumed to be present only as planted specimens. However, the magnificent trees in Leet Wood, Barton (TL 02Z) have been investigated and are considered to be a native population (G. Bellamy – pers. comm.).

During the year CRB studied the populations of some of our rarer plants. Information on two of these is worth presenting. Firstly, Greater Pignut Bunium bulbocastanum, now classed nationally as a Near Threatened species was present in tens of thousands on Blows Downs (TL 02F). Secondly, the Crested Cow-wheat Melampyrum cristatum was present in some quantity at its Honeydon location (TL 15J). In fact I have never seen so many plants at this site before. Unfortunately I was unable to locate the plant at any of its other sites in the county and I believe that Honeydon must be considered now as its only location.

Finally I would like to thank Gordon Hanson for his continued interest in the wool aliens. His article (Hanson, 1997), elsewhere in this journal, shows that some of these aliens are still present in quantity. One of the species in the list has not been published previously. This is Medicago turbinata (L.) All., of Mediterranean origin, which was found at Flitwick.

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CHRIS BOON

UPDATE ON THE WOOL ALIENS OF BEDFORDSHIRE

by Gordon Hanson

Dr John Dony first discovered the presence of Mediterranean and Australasian weeds at Sundon refuse tip in 1946. He soon realised that the source was dumped wool waste which a local farmer had ordered as a slow acting nitrogenous fertilizer and then disposed of in disgust without realising its great usefulness on the Lower Greensand soils; grey shoddy can look and smell foul when wet. Mr Sharpe, who used this manure on his land at Flitton until 1980, told me that his sandy fields brought on their salad crops two weeks earlier if "shoddied" the previous autumn. In those days before mass importation from abroad this was an important economic factor.

John Dony first exhibited fresh specimens of Bedfordshire wool aliens at the Annual Exhibition of the Botanical Society of the British Isles in 1953 and, of course, these plants feature largely in the alien section of his *Flora of Bedfordshire* (Dony, 1953) and paper (Dony, 1969). By 1980 John had recorded a total of 366 wool alien species from the county (Dony, 1980), many found jointly with J. E. Lousley who made annual pilgrimages to the shoddy fields until his death in 1976. In his last paper on the Bedfordshire flora (Dony & Dony, 1986) there were only ten additional wool alien records. The reason for this sudden reduction was simply because shoddy almost ceased to be used by the local growers in 1978. Only a single farmer near Flitwick still uses shoddy manure and ironically it was John himself who recommended the use of this fertilizer here around 1960 because of the extreme sandiness of the soil. In 1996 I was shown mini-ravines on the steeper fields due to water erosion.

Since joining up with John and Chris Dony and their little red Mini in 1970 at The George pub at Maulden, I have searched the fields in this area annually and found nearly 150 different wool aliens although, since 1984, the only sites worth visiting have been the one near Flitwick mentioned above and another at Flitton where shoddy was last spread in 1980. Good wool aliens still occur here mainly from the families Fabaceae, Solanaceae, Malvaceae and Poaceae. 1995 was an extraordinarily good year with 49 species observed – this is about double the usual number seen each September during a single visit. Listed below are the post-1984 records for the two farms only at Flitton and Flitwick, with the status of each taxa given.

The nomenclature, both Latin and English, are as given in Clement & Foster (1994) and Ryves, Clement & Foster (1996). Also, the countries and regions of origin are as in these two publications. If the species is naturalised, or a fodder crop, in the country of origin then the area is given in parentheses, the term "widespread" indicating naturalised over several regions. At the end of each account **Flk** and/or **Fln** indicate respectively whether the species was recorded from Flitwick and/or Flitton post 1984.

Chenopodiaceae

Fig-leaved Goosefoot *Chenopodium ficifolium* Smith

Overlooked in earlier years, a few plants turn up regularly. (Flk)

Tree Spinach *C. giganteum* D.Don

N. India. Although not seen as a wool alien since 1979, seed then collected is a source of an infestation in my Ware (Hertfordshire) garden.

Probst's Goosefoot *C. probstii* Aellen
N. America. Several well-grown plants were noted at Flitwick in 1994 and 1996. Probably overlooked in previous years. (Flk, Fln)

Amaranthaceae

Green Amaranth *Amaranthus hybridus* L.
Tropical and N. America. Many thousands every year, often infesting the crops as in 1993 when a field of cabbages was completely hidden. (Flk)

Mucronate Amaranth *A. quitensis* Kunth
S. America. Only a single specimen seen once at Flitwick in 1985. Never seems to set seed in this country. (Flk)

Common Amaranth *A. retroflexus* L.
Tropical and N. America. Seen only occasionally until 1994, after which it clearly seeded itself all over the fields at Flitwick. By 1996 there were thousands infesting a maize field where it was the only weed – native or alien. (Flk)

Malvaceae

Bladder Ketmia *Hibiscus trionum* L.
S. E. Europe, S. W. Asia, Africa, (Australasia). Seen only once at Flitton in 1995 when the farmer pointed it out in a field of cabbages. This shows how many good aliens are probably being missed. (Fln)

Lavatera ?thuringiaca group.
A single immature plant was seen in 1985 at Flitton. (Fln)

Small Mallow *Malva pusilla* Smith
Europe. About a dozen plants seen most years. (Flk, Fln)

Dwarf Mallow *M. neglecta* Wallr.
A few plants scattered over the fields seen most years, possibly a native here. (Flk, Fln)

Least Mallow *M. parviflora* L.
Mediterranean, S. W. Asia. A few plants seen most years. (Flk)

Malvastrum multicaule (Schldl.) Britton
S. America. A single plant was found at Flitton in 1985 and identified later by E. J. Clement. (Fln)

Pavonia urens Cav.
Tropical Africa. The British climate is not suitable to allow this perennial to mature in the field but a transplanted specimen from Flitwick in 1983 did flower and fruit in a spectacular fashion under glass a few years later. Under such conditions it now flowers in February every year. Immature single plants were also seen in 1989, 1990, 1991 and 1995. (Flk, Fln)

Brassicaceae (Cruciferae)

London Rocket *Sisymbrium irio* L.
Eurasia, N. Africa. Occurs every year at Flitwick in huge numbers turning some fields pale yellow, clearly naturalised as thoroughly as around London Wall. (Flk, Fln)

Fabaceae (Leguminosae)

Spotted Medick *Medicago arabica* (L.) Hudson
About a hundred plants were seen every year up until 1995 but then suddenly in 1996 hardly a single *Medicago* of any species was seen. This genus was always an indicator plant when looking for possible shoddy fields but the herbicide spray has apparently been 100% efficient. (Flk, Fln)

Tattered Medick *M. laciniata* (L.) Miller
N. Africa, S. W. Asia, (Australia). Quite common in 1985 and between 1988 and 1990. A few specimens survived in 1994 and 1995. (Flk, Fln)

Bur Medick *M. minima* (L.) Bartal
Status as *M. arabica*. (Flk, Fln)

Toothed Medick *M. polymorpha* L.
This was the original indicator for shoddied fields. Status as for *M. arabica* although four or five specimens did flower in 1996. In cultivation under glass at Ware, 95% of all germinating wool aliens are of this species. (Flk, Fln)

Early Medick *M. praecox* DC.
Mediterranean. Several plants observed in each of the years 1985, 1988, 1990 and 1995 but probably overlooked in the thousands of *M. polymorpha* then occurring. (Flk, Fln)

Snail Medick *M. scutellata* (L.) Miller
Mediterranean, S. W. Asia, (Australia). A single plant of this very rare alien was spotted in 1985 at Flitwick during a joint inspection with Brian Wurzell. (Flk)

Strong-spined Medick *M. truncatula* Gaertner
Mediterranean, S. W. Asia, (Australia). One plant was found at Flitton in 1994, the first for ten years. (Fln)

M. turbinata (L.) All.
Mediterranean. Two plants were found at Flitwick in 1985, previously only seen in 1978 and 1984. (Flk)

Narrow Clover *Trifolium angustifolium* L.
Mediterranean, S. W. Asia, (Australasia). An extremely attractive wool alien seen around every five years, sometimes in dozens, in 1985, 1990, 1994 and 1995. (Fln)

Hare's-foot Clover *T. arvense* L.
A British native but also a wool alien at Flitwick in 1985 and Flitton in 1990. (Flk, Fln)

Clustered Clover *T. glomeratum* L.
A single plant occurred at Flitwick in 1985. (Flk)

Rose Clover *T. hirtum* All.
Mediterranean. Seen almost every year until 1984 then just two or three specimens were seen in the years 1988, 1990 and 1995 mostly at Flitton. Another very photogenic wool alien. (Flk, Fln)

Reversed Clover *T. resupinatum* L.
Mediterranean, S. W. Asia, (Australia). One very robust specimen appeared at Flitton in 1990. (Fln)

Knotted Clover *T. striatum* L.
Native in Cornwall and Jersey. The occasional plant appeared in 1985, 1990 and 1995, but they were small and others were probably overlooked. (Fln)

Subterranean Clover *T. subterraneum* L. var. *oxaloides* (Bunge ex Nyman) Rouy
S. E. Europe, Turkey, Caucasia. *T. subterraneum* s.s. is a British native. About a score of specimens of var. *oxaloides* were seen every year at Flitton until 1995, often forming dense mats. The following year none was seen. (Flk, Fln)

Woolly Clover *T. tomentosum* L.
Mediterranean, Atlantic Is, (Australasia). Only seen as single specimens at Flitwick in 1983 and 1985. (Flk)

Geraniaceae

Mediterranean Stork's-bill *Erodium botrys* (Cav.) Bertol.
Mediterranean, (Australia). Scores of plants every year, naturalised on farm tracks but sprayed out of existence from 1995 onwards. (Flk, Fln)

Hairy-pitted Stork's-bill *E. brachycarpum* (Godron) Thell.
N. Africa, (Australia, California, Chile). Several dozen plants every year except for a strange absence between 1990 and 1993. (Flk, Fln)

Common Stork's-bill *E. cicutarium* (L.) L'Hér.
Extremely common as a naturalised alien with hundreds of plants seen every year. (Flk, Fln)

Eastern Stork's-bill *E. crinitum* Carolin
Australia. Less common than formerly when a few specimens were seen most years. Large mature plants however were observed in1989 and 1996, setting mature seed on both occasions. (Flk) (Plate 4)

Western Stork's-bill *E. cygnorum* Nees
Australia. The second beautiful blue-flowered *Erodium* from Australia which occurred in the same area at Flitwick in 1989, 1990, 1995 and 1996; only two or three plants were seen in these years. (Flk, Fln)

Soft Stork's-bill *E. malacoides* (L.) L'Hér.
Mediterranean, S.W. Asia, (Australia). A large number of plants appeared in one field at Flitwick in 1984 and lingered on in ever-decreasing numbers until 1988. (Flk)

Musk Stork's-bill *E. moschatum* (L.) L'Hér.
British native near the sea but here a common wool alien seen in large numbers every year except between 1990 and 1993 when it was sprayed out for a time. *Erodium* fruits are designer-built for getting caught in sheep's wool and humans' socks. (Flk, Fln)

Small-flowered Crane's-bill *Geranium pusillum* L.
About a dozen plants seen most years, possibly a native here. (Flk, Fln)

Short-fruited Dysentry-herb *Monsonia brevirostrata* Knuth
S. Africa. A beautiful annual restricted to a small area in Africa but seen fairly regularly up until 1984, since then it has occurred only in 1990 at Flitton. (Flk, Fln)

Apiaceae (Umbelliferae)

Toothpick-plant *Ammi visnaga* (L.) Lam.
Mediterranean. A few scattered specimens at Flitwick appeared in 1986 and 1989 while a dozen mature plants growing in close proximity in 1994 clearly originated from the same batch of shoddy manure. (Flk)

Solanaceae

Datura ferox L.
China, (widespread). A rare Bedfordshire wool alien, a single magnificent plant setting copious seed was found at Flitwick in 1996, and again at exactly the same spot in 1997. Previously only seen in 1973 when John Dony showed me a plant in the adjacent field. (Flk)

Thorn-apple *D. stramonium* L.
N. America, (widespread). Thoroughly naturalised at Flitwick where thousands of huge plants appear every year. They have to be hand weeded and put into plastic sacks to prevent even more seeds reaching the soil. (Flk)

D. stramonium var. *tatula* (L.) Torrey
This variety with lilac flowers and chocolate coloured stems has recently become established at Flitwick as one of the more attractive wool aliens. (Flk)

Black Nightshade *Solanum nigrum* L.
A British native but also a wool alien at both Flitwick and Flitton where it often reaches epidemic numbers unless regularly sprayed. Often ruining the crop. (Flk, Fln)

Green Nightshade *Solanum physalifolium* Rusby
S. America, (Australasia). Occurs annually at both Flitwick and Flitton where until recently it was even more numerous than *S. nigrum*; a special herbicide spray had to be used as it was resistant to the one used to supress the latter. (Flk, Fln)

S. × *procurrens* Leslie
A hybrid between the above two nightshades which can be detected most years since its discovery in Bedfordshire in 1977 (Leslie, 1978). (Flk, Fln)

Rubiaceae

False Cleavers *Galium spurium* L.
An introduced arable weed but probably as a wool alien at Flitwick in 1995 when spotted by Ann Boucher during our annual visit. (Flk)

Asteraceae (Compositae)

Spanish-needles *Bidens bipinnata* L.
S. America, (widespread). Many hundreds of plants appeared at Flitwick, obviously from fresh shoddy, in 1994 but only ten plants were seen the following year and none in 1996. This plant is now a weed in my ware garden from seed collected in 1994. (Flk)

Black-jack *B. pilosa* L.
S. America, (widespread). Three or four plants were found growing with the previous species in 1994 and just one in 1995. This pair of aliens were last seen at Flitwick in 1973 and 1974 in exactly the same circumstances. (Flk)

Plymouth Thistle *Carduus pycnocephalus* L.
Eurasia, N. Africa, (Australasia). Single plants occurred at Flitwick in 1985 and 1995. (Flk)

Downy Safflower *Carthamus lanatus* L.
Eurasia, N. Africa, (Australasia, N. America). A sudden outbreak of 30 plants in 1984 setting copious seed, this handsome alien had been absent from the shoddy fields since 1977. The same number of specimens were growing in 1995 but none the following year. (Flk)

Gallant-soldier *Galinsoga parviflora* Cav.
S. America, (widespread). A really serious nuisance at Flitwick where it occurs in huge numbers every year often swamping fields of lettuce, beetroot and onions. (Flk)

Shaggy-soldier *G. quadriradiata* Ruíz Lopez & Pavón
Tropical America, (widespread). Not such a serious weed as the previous species but many thousands were seen at Flitwick in 1996. (Flk)

Dwarf Marigold *Schkuhria pinnata* (Lam.) Thell.
Tropical America, (widespread). A very small immature specimen was seen at Flitwick in 1995, previously only seen in 1971 and 1973 when John Dony showed me single specimens at Maulden. (Flk)

Southern Marigold *Tagetes minuta* L
S. America, (widespread). Many hundreds of plants appeared at Flitwick in 1994 but the numbers dwindled to three by 1996. Previously fairly common in the early seventies when, as later, some specimens reached two metres in height; it is the flowers which are minute. (Flk) (Plate 5)

Argentine Cocklebur *Xanthium ambrosioides* Hook. & Arn.
Argentina, Patagonia. A rather rare wool alien in Britain but up to 15 plants persisted in one field at Flitwick between 1985 and 1993 but it has not survived since. Perhaps the only place in Europe where it could be seen annually. (Flk)

Spiny Cocklebur *X. spinosum* L.
S. America, (widespread). Originally a very common wool alien seen every year up to 1985 but it was then almost eradicated by hand weeding and did not make a comeback until 1994 when dozens of huge plants were allowed to mature. In 1995 and 1996 it had become almost as common as 20 years previously. (Flk)

Poaceae (Gramineae)

California Brome *Ceratochloa carinata* (Hook. & Arn.) Tutin
Western N. and S. America. A single plant was seen at Flitwick in 1994. (Flk)

Button-grass *Dactyloctenium radulans* (R.Br.) P.Beauv.
A rather rare wool alien, a single magnificent plant of which appeared at the edge of a cabbage field at Flitwick in 1995. Only previously seen in 1973 at Maulden with John Dony. (Flk)

Hairy Finger-grass *Digitaria sanguinalis* (L.) Scop.
Mediterranean, Asia, (widespread). Surprisingly only seen once at Flitwick in 1995, the first time since 1973. Common as birdseed and thence naturalised in my garden. (Flk)

Cockspur *Echinochloa crus-galli* (L.) P.Beauv.
A widespread weed in warm countries. One plant appeared at Flitton in 1991, the first since 1978. (Fln)

Eleusine indica (L.) Gaertn. subsp. *africana* (Kenn.-O'Byrne) S.Phillips
Tropical Africa. A single plant was seen at Flitwick in 1995; there previously in 1975. (Flk, Fln)

Transvaal Millet *Panicum schinzii* Hack. ex Schinz
Tropical and S. Africa, (India, Australia). A single plant was found at Flitwick in 1995 and grown on to maturity under glass by Ann Boucher at Hoddesdon (Herts). Previously seen in 1983. (Flk)

Green Bristle-grass *Setaria viridis* (L.) Beauv.
Eurasia, N. Africa (widespread). A common bird seed alien but only seen once as a wool alien at Flitwick in 1996. (Flk)

Johnson-grass *Sorghum halepense* (L.) Pers.
Mediterranean, S.W. Asia (widespread). A dozen widely spaced huge plants were seen at Flitwick in 1994 but nearly all had disappeared the following year as this perennial grass is rather tender. (Flk)

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Address: 1 Coltsfoot Road, Ware, Hertfordshire SG12 7NW.

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Meteorology: Mr M.C. Williams, 2 Ivel Close, Barton-le-Clay, Bedford MK45 4NT
Geology and Palaeontology: Mr P. Smart, 46 Brecon Way, Bedford MK41 8DD
Mammals: Mr C. Tack, 1 Gate Cottage, Whipsnade Wild Animal Park, Dunstable LU6 2LR
Mammals (Bats): Ms J. Childs, 16 Judith Gardens, Potton SG19 2RJ
Dr A. Aldhous, 16 Judith Gardens, Potton SG19 2RJ
Birds: Mr D. Odell, 74 The Links, Kempston, Bedford MK42 7LT
Mr M. Palmer, 48 Gilbert Close, Kempston, Bedford MK42 8RN
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Sites: Miss R. Brind, 46 Mallard Hill, Bedford MK41 7QS

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.

BEDFORDSHIRE NATURAL HISTORY SOCIETY

The Bedfordshire Natural History Society was formed in 1946 and its main function is to record the fauna and flora of the county. For this purpose it has over twenty active Recorders who cover many branches of natural history study and whose annual reports are published in *The Bedfordshire Naturalist.* Members also receive a quarterly newsletter, *The Muntjac,* and programmes of meetings. These latter include field meetings to sites having a natural history interest within the county and occasional meetings further afield. During the winter months there are illustrated lectures, normally held at one of the following places: Toddington, Elstow, Haynes and Maulden. The Society depends on the annual subscriptions which are devoted to carrying out its work, as all officers are honorary. Membership is open to everyone, whether resident in the county or not.

THE BEDFORDSHIRE BIRD CLUB

The Bedfordshire Bird Club was set up in 1993 by birdwatchers, from both inside and outside the Society, to cater for their specialist needs. Its main functions are to record and document the avifauna within the county and to provide a forum for local birdwatchers. Members receive the annual bird report as Part 2 of *The Bedfordshire Naturalist* and also receive a bimonthly newsletter, *The Hobby*, and programmes of indoor and outdoor meetings. The winter meetings are held on the last Tuesday of the month between September and April at Maulden Village hall. Field meetings are equally spread between venues with a bird interest within the county and much further afield. The Club has a very active core of its membership participating in both locally and nationally organised surveys.

PUBLICATIONS

The Society has an excellent record of publications in addition to its annual Journal. *Bedfordshire Wildlife* published in 1987 gives a broad overview of our wildlife habitats, flora, fauna and geology. The *Bedfordshire Bird Atlas* maps the distribution of breeding birds within the county from 1968 to 1977, and this was followed by extensive field-work to produce the more recent *Atlas of the Breeding Birds of Bedfordshire 1988 – 92. The Butterflies and Moths of Bedfordshire* published in 1997 is the most comprehensive survey of the butterflies and moths of Bedfordshire ever produced, summarising the history and current distribution of more than 1,300 species found in the county as well as looking at changes in habitats and recent population studies.

MEMBERSHIP

For membership details of the Bedfordshire Natural History Society and the Bedfordshire Bird Club, write to:

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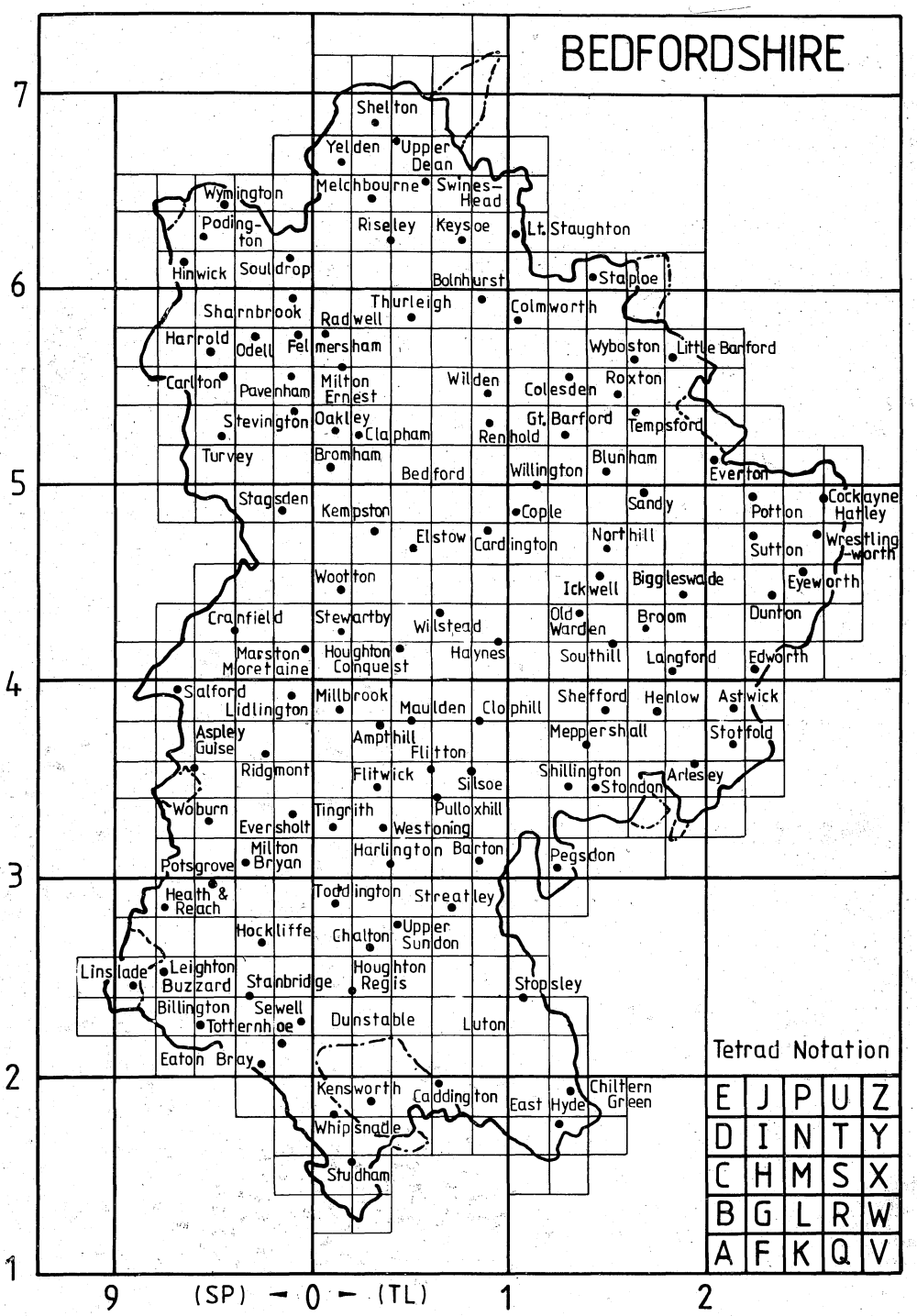

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