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Nature in Avon

Volume 65

Bristol Naturalists' Society

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Front Cover. Red Admiral on Hemp Agrimony (D Davies)

NATURE IN AVON

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Edited by Richard Bland



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Editorial

The article written by Tony Smith in Volume 64 on the effects of Mechanical Beach Cleaning at Sand Bay cited original research carried out by Hazel Willmott in 1999. Hazel's work was requested by English Nature for her MSc Dissertation in Ecology and Management of the Natural Environment and can be found in the University of Bristol's library. Her dissertation is entitled 'The Impact of Mechanical Beach Cleaning on the Invertebrate Fauna and Associated Bird Life at Sand Bay with Recommendations for the Management of this Ecosystem by North Somerset County Council'. It was as a result of this work that mechanical beach cleaning ceased. Tony carried out follow up research to measure the effects of this on the invertebrate fauna.

This number contains details of important research into the prehistoric flora of the region, features a second article on local nature reserves, the first of what is intended to be a series of profiles of local naturalists, and the results of local surveys into toad migration and plants on walls. It also contains a good deal of information about weather, its impact on wildlife, and the local climate, because the subject has become controversial, and hard facts are often rather difficult to come by. The colour section contains a few pictures relevant to articles, and a number of excellent pictures by members. Digital illustrations for all articles in future are encouraged.

We ought to be treating the world as if we meant to stay, to use a striking phrase from the Times business news. We are consuming all the available resources of our earth at a rate which will leave none for our descendants, and very little for all the rest of creation, which has as much right to them as we do. It is also clear that we depend on the rest of creation, and not the other way round, and that when we are gone, they will remain.

Those of us who understand the natural world bear a heavy burden of responsibility to revolutionise the thinking that dominates society today. Endless economic and population growth, is impossible. We must settle for stability. That is what sustainability means.

Richard Bland, Editor.

Weather report for 2005

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2005 was characterized by an exceptionally warm January, dry February and August, and warm and wet October. Both temperature and rainfall for all other months lay very close to the long term average since 1853 for rain and 1881 for temperature. The overall mean maximum temperature was 14.4C, just above 2004, and just 0.6C above the average since 1881. Overall rainfall was 870mm compared with the average since 1853 of 907mm.

Year	1996	97	98	99	00	01	02	03	04	2005
Avg Max C	13.0	14.6	14.2	14.6	14.1	13.8	14.3	15.0	14.3	14.4
10 yr avg C	13.6	13.7	13.8	13.8	13.8	13.8	14.0	14.2	14.3	14.2
Rainfall mm	774	877	1065	1106	1250	860	1178	758	951	870
10 yr av mm	921	927	942	966	1003	995	1010	978	970	954

Table 1 Annual and decadal mean maximum temperature and rainfall

Seasons The average for the **Winter** (Dec-Feb) was 8.3C, despite the warm January, a little above the average of 7.7C, and there were just 27 frost nights, 2 days with snow lying, and 8 days with ice on ponds. The coldest spell was from Feb 20th to March 3rd. **Spring** (March-May) was identical to the long term average, though there was a cold spell from May 8th to 14th with northerly winds which clearly caused problems for single brooded species. **Summer**, at 20.9C, was almost a degree hotter than average. There were two dry weeks in July and three in August, and reservoir levels fell sharply. **Autumn**, at 15.2C, was just over a degree warmer than average, mainly because of the exceptionally warm October, only just cooler than 2001, which caused trees to keep their leaves longer than normal. The first frost did not come until Nov 14th, and was followed by a very sharp cold snap from Nov 17th-21st.

Monthly temperatures in 2005. Nine months were warmer than the long term, average, three, February, May and November, were colder. Chart 1 shows the percentage differences.

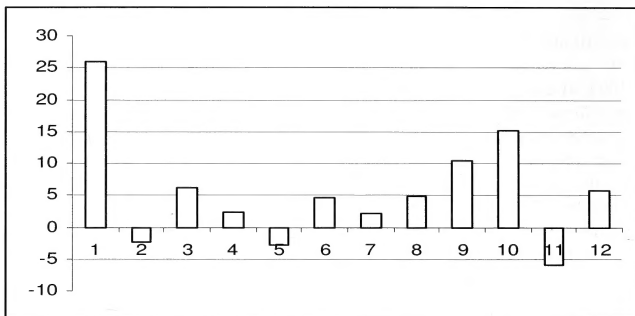


Chart 1 Monthly mean maximum temperature;percentage variation from long term average.

Monthly rainfall. Six months were drier than the long term average, six wetter. Chart 2 shows the percentage differences.

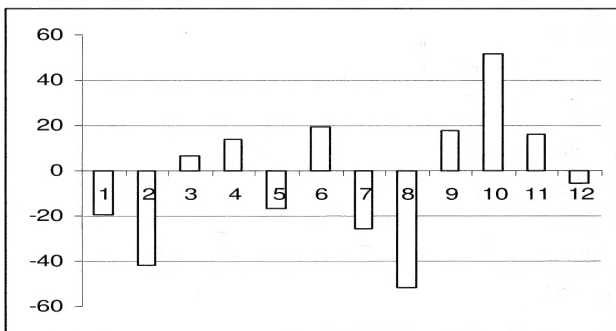


Chart 2 Monthly rainfall, percentage variation from long term average

Monthly summary

For each month the average maximum temperature and the total rainfall in mm is given followed in brackets by the average of each since 1881 and 1853 respectively.

January Temp C, 9.1 (7.2C). Rain 67 mm (83mm). Frost nights.5. First two weeks dominated by succession of depressions and strong SW winds, with temperature up to 13C. Colder from 21st as winds shifted to NE or NW round an Atlantic high.

February Temp C, 7.4 (7.6C). Rain 36mm (62mm). Frost nights, 7. Dominated by low pressure until 12th when winds turned northerly with low pressure over Baltic and high in Atlantic, producing a cold spell with minima of 3C in 24th.

March 2003. Temp 10.6C (10.0C). Rain 64mm (60mm). Frost nights 4. Dominated by Atlantic high until 12th, bringing northerly winds and low temperatures. Southerly winds set in on 14th to 23rd with low pressure in Atlantic and high in Mediterranean. Temperatures reached 17C on 19th and remained high to 25th when winds turned East.

April Temp 13.0C (12.7C). Rain 66mm (58mm). Frost nights 1. Began cool, 8C on 8th, and winds set in to north on 14th and then east, with temperatures down to 10C on 20th. A switch to southerly winds on 22nd released a pent up wave of migrants as temperatures rose to 18 on 30th.

May Temp 15.7C (16.2C). Rain 51mm (61mm). Low pressure over UK dominated first week, then winds turned north and east from 7th to 14th, as high pressure took control over UK from 9th and temperatures fell to 13C. From 18th SW winds and low pressure took over and temperature rose to 22 on 27th. The cold spell damaged single brooded species.

June Temp 20.2C (19.3C), Rain 73 mm (61mm). High pressure over UK brought easterly winds and high temperatures from 16th to 12th, and again from 17th, when six days of blue skies and light winds saw temperatures rise to 26C on 22nd.

July Temp 21.2C (20.8C). Rain 53mm (71mm). High pressure and light winds produced another hot sunny spell from 10 to 17th. The last week was controlled by a low pressure system and a little rain.

August. Temp 21.4C (20.4C), Rain 41mm (85mm). A month dominated by high pressure, good temperatures and dry bright days, the best August for sun since 1998.

September Temp 19.9C (18.0C), Rain 93mm (79mm). Temperature stayed above 20C until 16th, with light and variable winds, and the month was very dry except for 10th when a low pressure system dumped 47 mm of rain, the record daily figures for the year

October Temp 16.2C (14.1C) Rain 144mm (95mm). A warm month that only fell below 15C four times. High pressure over the Baltic from 13 to 20th produced ideal conditions for migration, and huge numbers of birds were on the move. There was a lot of rain from 19th, when conditions were dominated by a succession of lows and moderate SW winds.

November. Temp 9.6C (10.2C). Rain 101mm (87). Frost nights 9. Dominated by warm SW winds until 11th when northerlies, then easterlies round a high pressure system, pulled cold air from Russia and a low of 3C on 20th.

December. Temp 8.3C (7.9C), rain 81mm (86mm). Frost nights 3. Began with low pressure, but from 9th high pressure over UK, Europe or the west Atlantic dominated conditions with generally light winds, temperatures around 8C, and cloudy days except for a spell of fine sunny days from 10th to 17th. A north east wind from 26th brought snow to eastern England at the end of the month.

Weather extremes of 2005.

Coldest day	24 Feb 3C ; 20 Nov 3C
Hottest day	19 June 30C
Wettest day	10 Sep 47 mm
Sunniest day	14 July 14.8 hrs
Longest cold spell	20 Feb to 3 Mar (Temp 3-6C)
Longest Hot spell	10-14 July (Five days at +27C)
Longest dry spell	14-28 Feb (14 dys) 12-26 Nov (14 dys)
Longest wet spell	19-25 Oct (7 days)
Frost nights, annual total	29 nights
Days snow lying	Two
Storms	8 Jan

Phenology 2005

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If phenology is a science it ought to be able to make testable predictions, and at a time when there is much interest in the processes of climate change, and when some absurd statements are produced by the press, it is important to try to understand what are the effective limits of the impact of climate on our fauna and flora. In what follows I have tried to draw a few testable conclusions from my observations over the past five years.

Conditions in 2005 were very similar to those in 2004, but the slight differences had an important impact on the timing of events. In particular January was an exceptionally warm month, but February had a cold snap in the last week that extended into early March. March 19th-26th was exceptionally warm, as was the first week in May. May 8th-14th was cooler

than normal, there were hot spells between June 17th-29th, and July 9th-17th which will have assisted ripening, and October was exceptionally warm and very wet, which delayed the onset of leaf turning and leaf fall. A sharp cold spell from Nov 15th to 29th which included eight frost-nights, brought an abrupt end to the flowering period of almost all plants. Overall the annual mean maximum temperature at 14.4C was almost identical to 2004.

The impact of these differences was that Spring events occurred on average earlier than I have recorded since 1997, the ripening of fruit was similar to 2004, but not as early as 2003, and leaf fall was two weeks later than average, and very similar to 2001 which also had a warm October. The sight of Oak trees still hanging on to their leaves just before Christmas was remarkable.

These phenology records are based on a weekly 2km walk across Clifton Down, done since 1997, during which I note every species in flower, and successive changes throughout the year. Dates are given as Julian days, that is days since January 1st. Over time I have become increasingly skilled at knowing what to look for, but the records demonstrate the annual variation in the date of spring and autumn events.

Measured by 13 events for which I have consistent records back to 1998, the average date of Spring events in 2005 was day 65 (March 6th), ten days earlier than 2004, but very heavily influenced by two exceptionally early dates for the flowering of Celandine (Dec 26th 2004) and Alexanders (on Jan 1st). Chart 1 illustrates this pattern based on the events listed in Table 1. All the events are the date the first flower is seen open except for bud-break in Whitebeam. The species are not all native, but are the best indicators on my walk of the onset of Spring, and they were also recorded by Gilbert White, so I have few qualms in using them.

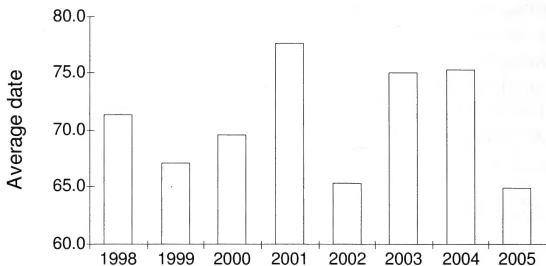


Chart 1. Average date of 13 spring events, 1998-2005

	1998	1999	2000	2001	2002	2003	2004	2005	Avg
Celandine	53	23	45	11	39	46	32	-5	31
Prunus pisardii	38	30	40	34	42	29	36	29	35
Daffodil	43	51	48	36	43	46	40	22	41
Almond	53	58	47	55	52	66	39	37	51
Wallflower	67	37	56	84	34	69	82	79	64
Alexanders	53	37	63	84	48	69	82	1	55
Blackthorn	67	58	50	91	69	75	67	72	69
Ash	74	87	70	84	76	74	82	86	79
Laurel	81	87	72	92	82	96	88	83	85
Whitebeam bb	116	101	98	96	83	96	95	100	98
Lilac	98	102	106	116	88	97	110	110	103
Horse Chestnut	87	107	111	112	97	103	112	110	105
Hawthorn	98	95	99	115	97	110	115	120	106
Average	71.4	67.2	69.6	77.7	65.4	75.1	75.4	64.9	71
Jan temp	8.6	9.5	7.9	6.3	9.2	7.3	8.1	9	8

Table 1 Dates in Julian days of 13 spring events 1998-2005, with the average, and January temperatures.

Chart 2 shows the relationship between the average date for these 13 species, and January temperature. A one degree change in the average temperature of January produces a five day change in the average date of spring events. The range of January temperatures since 1881 is from 0C to 13.2C, with an average of 7.2C. This suggests that the average for the 13 events listed could in theory be as early as day 45, (Feb 14th) and as late as day 110 (Apr 20th), a range of just over two months. However the

relationship is unlikely to be linear because it takes no account of the impact of increasing day length, and the simultaneous increasing elevation of the sun. In colder climates, such as North America, there are no early spring events as the land is entirely frozen, but they all come with a rush in early March, which is how I recall the spring of 1963, when frost was continuous until the end of February. Looking at ten-year trends, the coldest figure for January is 5.5C and the warmest 8.6C, (the last ten years have averaged 7.8C), and the implication is that the average variation of spring events lies between day 68 (March 9th) at the earliest, and day 83 (March 24th) at the latest, a period of just over two weeks. Hence 2005 was an example of an unusually early spring

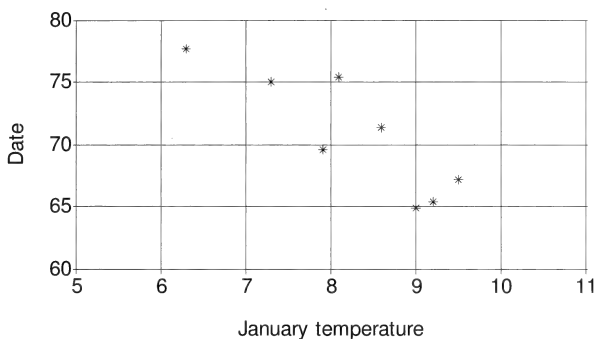


Chart 2 Relationship between average date of 13 spring events and January temperature, 1998-2005

Autumn events.

Fruit ripening

Recording the point at which fruits are ripe is less precise than the date the first flower opens, but Table 2 below shows the ripening dates for 13 species, 2002-2005 and their average, illustrated in Chart 3. The species range from Apple falling from trees in 2005 on day 198 (July 17th) to Ivy, ripening on day 334 (Nov 30th). As the chart shows 2003, the year with an exceptionally hot summer, has much the earliest average ripening date, and 2005 is very similar to 2004.

	2001	2002	2003	2004	2005	Avg
Apples falling	196	216	201	200	198	202
Ash	244	258	229	242	238	242
Blackberry	188	202	201	200	198	198
Blackthorn	231	230	215	214	219	222
Elder	217	223	215	214	219	218
Hawthorn	238	230	215	234	246	233
Hazel	266	258	213	220	210	233
Holly	259	265	256	249	261	258
Ivy	335	328	342	333	330	334
Laurel	231	223	215	220	213	220
Rose	244	237	236	234	238	238
Rowan	217	202	194	207	212	206
Yew	240	230	222	234	220	229
Average	239	239	227	231	231	233
Temperature	19.5	19.4	21.7	20.3	20.7	

Table 2 Ripening dates of 13 species 2001-2005

Chart 4 below plots these dates against the average temperature for the four months June to September, which gives much the best correlation. The chart implies the same relationship as in spring, a five day change in average date for every degree change in average temperature of those four months. June to September temperatures since 1881 have ranged between 17.5C and 22.5C, with an average of 19.5C. The implication from the chart is that the average ripening date for the species mentioned would vary from as early as day 220 (Aug 8th) in the hottest summer to as late as day 250 (Sept 8th) in the coldest, with an average of day 240 (Aug 28th), as in 2000 and 2001.

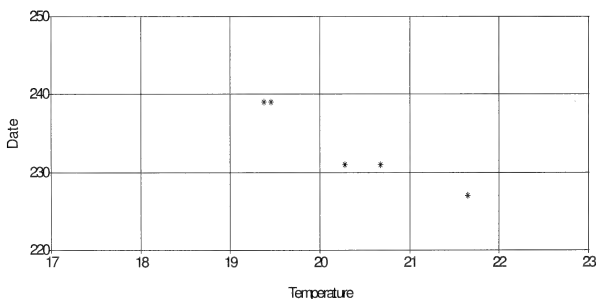


Chart 4 Average ripening dates, 2001-2005 plotted against June to September temperature

Leaf fall.

Total leaf fall was late in 2005, fifteen days later than the average of the previous four years. Although many trees began to lose leaves at a normal date, the warm and wet weather in October, and the complete absence of night frosts, encouraged many species to continue building up their buds. Table 3 lists the dates when 13 species lost their leaves, ranging from Whitebeam, the earliest to fall (Average day 296, 23th Oct), to Oak, the last (Average day 334, Dec 1st).

	2001	2002	2003	2004	2005		Avg
Whitebeam		313	285	290	303		296
Ash	314	300	292	298	303		301
Small-leaved Lime	321	300	285	298	311		301
Silver Birch	314	300	312	312	323		310
Sycamore	328	300	312	312	330		313
Beech		307	312	312	339		310
Norway Maple	335	300	292	319	345		312
Balsam Poplar		334	320	312	311		322
Field Maple	335	313	312	312	330		318
Horse Chestnut	335	307	312	312	339		317
Common Elm	335	313	312	319	339		320
Rowan	328	313	320	326	345		322
Common Oak	342	348	320	326	353		334
Average	329	311	307	311	329		317
Oct Temp	16.6	13.8	13.5	13.8	16.2		14.8

Table 3 Dates when 13 species lost their leaves, 2001-2005

These figures correlate neatly with the October temperature as Chart 5 shows. There are only four points shown because the figures for 2002 and 2004 were identical in both temperature and date. The implication is that a one degree change in October temperature produces a seven day change in the date trees become bare. As the average October temperature since 1881 is 14.0C the normal date would be day 310 (6 Nov).

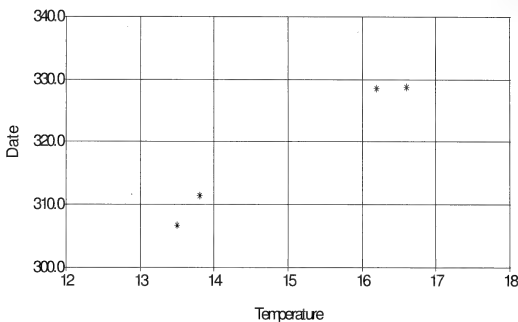


Chart 5 Relationship between October temperature and average date of leaf fall for 13 native species.

Annual activity.

By comparing the dates of bud-break in the spring and that of going bare in the autumn, a figure can be calculated showing the period of the year when each tree species is active. This is shown in Table 4 for 11 species since 2000. A combination of early spring and late autumn had the result that the overall average for these species in 2005 was nine days longer than the previous average.

	2001	2002	2003	2004	2005	Avg
Whitebeam		230	189	195	203	204
Common Lime	224	205	196	209	227	212
Ash	230	224	218	190	203	213
Beech	216	203	208	224	237	218
Poplar		219	223	217	253	228
Maple	230	224	223	224	253	231
Oak	235	251	223	218	253	236
Silver Birch		252	239	230	227	237
Sycamore	244	231	243	266	245	246
Horse Chestnut	269	244	243	237	261	251
Common Elm	267	252	223	273	280	259
	239	230	221	226	240	230
Avg Jan, Oct temp	11.5	11.5	10.4	11	12.6	11

Table 4. Annual active period in days for 11 tree species, 2001-2005

Chart 6 shows the relationship between the average active life of these trees and the average of the January and October temperatures, which seem to control the onset of spring, and the duration of autumn. The average of these two temperature since 1881 is 10.5C, so that recent years have seen unusually long periods of tree activity. A one degree change in this average seems to alter the active period by ten days. The minimum average since 1881 is 6.7C and the maximum 14.7C, with the implication is that the minimum tree active period for these species would be 180 days, and the maximum 260.

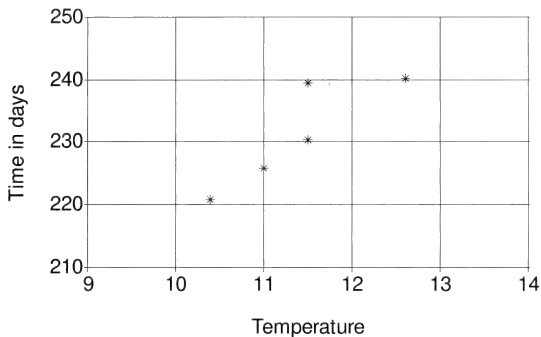


Chart 6 Average tree activity time in days compared with the average of January and October temperatures

Survival in flower

Since 2000 I have noted on the last day of the year the species in flower on my standard walk. The species are listed in Table 5. In 2005, despite the November cold spell and a below-average December, 15 species were found still in flower, two of them, Holly and Alkanet, for the first time. The Holly had clearly been brought into flower by October warmth. There is only a rough correlation between the total number of species and December temperature.

	2000	2001	2002	2003	2004	2005	Total
Adria Bellflower	y	y	y	y	y	y	6
Alexanders					y		1
Alkanet						y	1
Barren Strawberry					y		1
Blackberry			y		y		2
Celandine					y		1
Daisy	y	y	y	y	y	y	6
Dandelion		y		y	y		3
Gorse	y	y	y	y	y	y	6
Groundsel	y	y	y	y		y	5
Herb Robert	y						1
Hogweed			y				1
Holly						y	1
Ivy	y		y	y			3
Ivy-leaved Toadflax	y	y	y	y	y	y	6
Oxford Ragwort		y				y	2
Petty Spurge						y	1
Ragwort					y		1
Red Nettle		y				y	2
Red Valerian		y	y	y	y	y	5
Shepherds Purse				y	y	y	3
Field Scabius						y	1
Smooth Sowthistle		y	y	y	y	y	5
Snapdragon					y		1
Trailing Bellflower		y	y	y	y	y	5
Wallflower		y					1
Yarrow				y	y		2
Yellow Fumitory	y	y	y	y	y		5
Total 28	8	13	12	13	17	15	

Table 5. Species in flower on December 31st on Clifton Down

An alternative way to look at survival is to note the average total flowering period of all species. 103 species for which I have records from 2002 had an overall average of 15.1 weeks in flower. Fourteen species, listed in Table 6, were in flower for more than 26 weeks.

	In Flower
Daisy	52
Dandelion	49
Red Valerian	48
Adria Bellflower	44
Yellow Fumitory	44
Trailing Bellflower	43
Groundsel	42
Ivy-leaved Toadflax	41
Smooth Sow-thistle	39
Gorse	37
Green Alkanet	37
Herb Robert	34
Clary	30
Blackberry	26

Table 6 The average flowering period, 2002-2005, of the 14 species that are in flower for more than 26 weeks.

The hottest year, 2003, had the shortest average flowering period, 14.4 weeks. Hot summer weather accelerates the flowering process, but so does a long dry period. A warm autumn will sustain plants in flower, and a warm winter will bring them into flower early, so that there are many factors affecting flowering period. The most remarkable feature of the results is the huge variability from year to year in the flowering period. The average difference for all 103 species between the longest and shortest annual flowering period is 6.2 weeks, and the variation was from zero (for Hornbeam) to 17 weeks (for Snapdragon). This illustrates the capacity of many plants to react rapidly to the changing situation that temperature, sunlight and rain offer them.

Gordano Valley National Nature Reserve

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The Gordano Valley will be a familiar, but perhaps unvisited, feature of the landscape to anyone travelling west of Bristol on the M5. Below them the flat-bottomed valley, much of it only a few metres above sea level, stretches for about 10km from just east of Clevedon, gradually broadening out to reach the Severn Estuary near Portishead. At the head of the valley is the Gordano Valley National Nature Reserve, over 100ha of fen peatland containing a wide variety of semi-natural habitats including rhynes, fen meadows, tall fen, scrub and woodland.

First declared a National Nature Reserve in 1987 this mosaic of habitats is managed by Natural England. However, only a quarter of the reserve is owned by the organisation, which succeeded English Nature in October 2006. The remainder is owned by the Walton Manor Estate and is included in the reserve either through a lease or by agreement with the estate's tenants.

Peat

The peatland owes its existence to the particular circumstances of the valley's geology, geomorphology and hydrology. The valley is enclosed by two ridges composed mainly of Carboniferous Limestone, the southernmost of which connects with the well-known limestone of the Avon Gorge. This permeable limestone continues beneath the valley floor but is overlain by impermeable Triassic Mercia Mudstones, which aided the development of waterlogged conditions at the head of the valley when, at the end of the last glaciation, a sandbar formed across the valley south of the present-day Weston-in-Gordano. In these waterlogged conditions a layer of peat up to 3m deep was gradually formed from the partially decayed remains of reed, sedges and other vegetation.

Rhynes

Today the reserve is drained by an extensive network of rhynes dating from the 1800s. These empty into the Portbury Ditch, a wide channel that carries water on to the Severn Estuary at Portbury Wharf. It is these rhynes that provide one of the most important features of the reserve. Because they are largely supplied by groundwater that has percolated through the limestone their water is calcium-rich and largely unpolluted. This benefits a wide range of aquatic plants that includes the scarce Whorled Water Milfoil (*Myriophyllum verticillatum*) and Fen Pondweed (*Potamogeton coloratus*). Other plants of interest include Frogbit (*Hydrocharis morsus-ranae*), Lesser

Water Plantain (*Baldellia ranunculoides*), Arrowhead (*Sagittaria sagittifolia*) and a good selection of Stoneworts (*Chara spp.*).

The margin of one rhyme is one of the few remaining localities in Britain for the Brown Galingale (*Cyperus fuscus*), a Red Data Book species. This annual plant benefits from a certain amount of disturbance to the ditch edge, either by livestock or ditch-cleaning machinery. Its occurrence, however, is unpredictable; it is often scarce, sometimes abundant.

Rhynes on the reserve are cleaned of vegetation, or 'keetched', at varying intervals. Some, such as the Portbury Ditch and Walton Brook, which are classified as a Main Rivers, are cleaned annually by the Environment Agency. Others, such as the delightfully named Cat Squint are the responsibility of the local Internal Drainage Board. The majority of the rhynes, however, are cleaned out at intervals of several years, so that each of the different phases of recolonisation by plants is always present. If left alone some rhynes can quickly become full of Common Reed (*Phragmites australis*) and Willow (*Salix spp.*) attracting species such as the Reed Bunting (*Emberiza schoeniclus*). Yellow-flag Iris (*Iris pseudocorus*) adds a splash of colour to rhynes that have become choked with vegetation. Such rhynes are often the most important for vertebrates such as *Asilus crabroniformis*, one of Britain's largest flies. More obvious along the rhynes, however, are the dragonflies and damselflies. 16 species have been recorded on the reserve, the most notable of which are the Hairy Dragonfly (*Brachytron pratense*) and the Ruddy Darter (*Sympetrum sanguineum*).

The overall water level in the valley is controlled by the Environment Agency's sluice on the Portbury Ditch at Middle Bridge near Portishead, and this pens back the water in the summer so that levels are, contrary to what one might expect, higher than in the winter. The main reason for doing this is to ensure that the rhynes fulfil their principal functions, to act as barriers between individual fields, which are largely unfenced, and to provide a source of drinking water for cattle.

Fields

The fields are generally grazed by cattle through the summer or cut for hay, it being too wet for any sort of farming in the winter. Unfortunately their relatively low agricultural value and proximity to centres of populations led to a few of being used for waste tipping in the 1960s and 1970s. However, they escaped much of the agricultural improvement that occurred on peat moors elsewhere in Somerset.

Most of the fields on the reserve can be classified as fen meadow and characteristic species include Crested Dog's-tail (*Cynosurus cristatus*), Purple Moor Grass (*Molinia caerulea*) and Carnation Sedge (*Carex*

panicea). In fact sedges can be more common than grasses in the sward giving the fields a distinctive blue hue. Against this backdrop a sequence of flowering plants colour the fields through the spring and summer, starting with the Marsh Marigold (*Caltha palustris*) and Cuckooflower (*Cardamine pratensis*). These are followed by, amongst others, Bugle (*Ajuga reptans*), Ragged Robin (*Lychnis flos-cuculi*), Meadow Thistle (*Cirsium dissectum*), Purple-loosestrife (*Lythrum salicaria*), Southern Marsh Orchid (*Dactylorhiza praetermissa*) and Devil's bit Scabious (*Succisa pratensis*).

The fields are enlivened in the spring by boxing Hares (*Lepus europaeus*) and, on Weston Moor, by breeding Lapwing (*Vanellus vanellus*) and the occasional Snipe (*Gallinago gallinago*), a species that is more commonly seen as a winter visitor. In the summer the keen butterfly watcher may find these fields disappointing although Meadow Browns (*Maniola jurtina*) and Gatekeepers (*Pyronia tithonus*) can be abundant.

Tall Fen, Scrub and Woodland

The Scarlet Tiger (*Callimorpha dominula*), a day-flying moth, can be seen on the wing in a group of fields that were abandoned long ago and which have developed a tall-fen vegetation that is dominated by Common Reed (*Phragmites australis*), and dotted with Meadowsweet (*Filipendula ulmaria*) and Valerian (*Valeriana officianalis*). In places natural succession has progressed further to give substantial clumps of Birch (*Betula spp.*) and Willow (*Salix spp.*). The Birch provides a food source for another day-flying moth, the Orange Underwing (*Archiearis parthenias*), while deadwood in the Willows attracts the impressive Musk Beetle (*Aromia moschata*) which can occasionally be seen sitting on logs and fence posts alongside the rhynes.

The mosaic of tall fen and scrub in this area is also attractive to birds and a ringing station has been monitoring bird populations for over fifteen years. Data gathered here suggests that the Gordano Valley is a major migration corridor for a range of warblers. The most abundant species is the Blackcap (*Sylvia atricapilla*) many of which are ringed on their autumn passage, and birds from the reserve have been recovered in France, Spain and North Africa. Occasionally vagrant species such as the Common Rosefinch (*Carpodacus erythrinus*) turn up at the ringing station.

The area around the ringing station cannot be maintained without some form of management and so periodic clearance of the scrub prevents natural succession progressing too far. Significant parts of the reserve, however, have gone beyond the scrub phase and have developed into woodland, helped in some instances by the planting of non-native conifers and broadleaves in the 1920s. The woodland is generally left to its own devices, and although its conservation value is not great it does add to the overall diversity of the reserve.

Beyond the National Nature Reserve

The reserve as a whole is also contributing to the overall diversity of Gordano Valley, of which it is just a part. Other stretches of the valley are not without their own wildlife interest and there are several Avon Wildlife Trust reserves nearby. These include Weston Moor, which immediately adjoins the National Nature Reserve, and Clapton Moor which lies further down the Portbury Ditch. These are overlooked by Walton Common and Weston Big Wood, which both sit on the northern limestone ridge. Together these reserves add a further 160ha of land in the valley that is managed for nature conservation. All are worth a visit.

Visiting arrangements

Because of the complex ownership of the National Nature Reserve, and the need to protect breeding waders from disturbance, access, other than on two rights of way, is by permit only. These are available on request from Natural England on 01823 283211. Details of the visiting arrangements for the Avon Wildlife Trust Reserves are available from the Trust on 0117 9177270 or on their website at www.avonwildlifetrust.org.uk .

Bristol Botany in 2005

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“Perhaps Mr White will search the quarries he knows so well for confirmation of this” (Wayfarer, in Science Gossip in 1889, referring to a disputed record of *Clinopodium calamintha*)

Introduction

Pride of place as regards Bristol Botany in 2005 must go to the discrimination of a whitebeam new to science, **White’s Whitebeam**, named after JW White, author of the Flora of Bristol (1912), and a President of the BNS from 1907 to 1909. It is surely a rare occurrence for a member of our Society (as Libby Houston is) to take part in naming a species after another member of the Society. White himself named a bramble, *Rubus bucknellii* after the finder, his close friend and fellow BNS member Cedric Bucknell.

Sorbus whiteana TCG Rich & L Houston is described and typical leaves are illustrated in the February 2006 part of the BSBI Journal, *Watsonia* (Vol. 26 pages 1-7). This is the species formerly confused with *Sorbus wilmottiana* on the floor of the Great Quarry in the Avon Gorge, **G**, and it is also known in the Gully and the slopes between these sites, and also in three places on the slopes below Leigh Woods, **S**. Remarkably, Libby Houston has also identified it in the Wye Valley. White collected the species in 1920 and this is the first record so far recognised (Kew Herbarium; none at Bristol).

Several plants new to the area (or one half of it) are highlighted below. Two stand out as seemingly previously overlooked very rare natives, *Poa infirma*, **Early Meadow-grass** on the sea lawns at Weston-super-Mare (Paul Green, in 2004) and *Carex filiformis*, **Downy-fruited Sedge**, in a hay meadow near Cheddar (Liz McDonnell in 2003). Amongst the aliens more are or seem to be new to v.c. 6: *Dorycnium hirsutum*, **Canary Clover**; *Fatsia japonica*, **Fatsia**; *Cerintho major*, **Greater Honeywort**; *Linaria arenaria*, **Sand Toadflax**; *Arctotheca calendula*, **Plain Treasureflower** and *Pistia stratiotes*, **Water Lettuce**. For v.c.34 the following are new: *Pinus radiata*, **Monterey Pine**; *Cotoneaster baccularis*, **Open-fruited Cotoneaster** and *Gaudinia fragilis* **French Oat-grass**.

At a finer scale, several records are additional 10 km squares to those recorded (up to 2000) in the BSBI Atlas or additional 1km squares to those in the Flora of the Bristol Region maps. Pam Millman is surveying the Tyntesfield, **S**, squares for which access was denied at the time, and Richard Bland continues to show that plants that are neither rare nor ubiquitous can be under-recorded

Bassia scoparia, **Summer-cypress** seems to be spreading along the M5, as is *Echinochloa crus-galli*, **Cockspar**, at least to the south, according to papers by Simon Leach and (for *Bassia*) Liz McDonnell. Garden escapes remain a good source of records, particularly for someone like Richard Bland prepared to systematically walk 150 km in one 10 km grid square. Even the well-studied Avon Gorge produces new records most years, *Hippophae rhamnoides*, **Sea-buckthorn** appearing below Leigh Woods, **S**, and *Conyza sumatrensis*, **Guernsey Fleabane** in the Great Quarry, **G**. Edward Niblett is producing some good records in the Clevedon area.

Bob Cropper combines repeated observation (as in *Gagea lutea*, **Yellow Star-of-Bethlehem** at Stoke St Michael, **S**, or *Cyperus fuscus*, **Brown Galingale**, of which he could find no plants at all this year on Walton Moor, **S**) with discrimination of more difficult plants such as *Erophila glabrescens*, **Glabrous Whitlowgrass** at Weston-super-Mare, **S**. The inseparable Kitchens provide quality rather than quantity as in their observation of some very old pollard **Black-poplars** in Victoria Park, Bristol, **S**. Mr Nethercott, in his single record of an old **Pear** tree below the Bristol Downs, **G**, from 2004 proves, in this instance at least, the outrageous Victorian allegation that Bristol botanists look out for plants like Bristol men were reputed to sleep- that is with one eye open (and in my case, averted downwards).

It is also a pleasure to note that the hybrid of the Bee and Fly orchids has again been found in North Somerset, though outside our area, south of Castle Cary. As White remarked, finality in field botany is fortunately unattainable.

Bristol botanists

In December 2005 a gentle giant of European and British botany passed away. **S Max Walters** was perhaps best known as a prolific co-author including two New Naturalist books the first BSBI Atlas, and Flora Europaea. As a pacifist, he worked in Bristol hospitals during the Second World War, and during that time he published an account of variation in violets in our Proceedings, as well as drawing the attention of members to *Sorbus eminens*, as it was later named. He was the Curator of the Cambridge Botanic Gardens during my time there. He retained his early interest in violets and many years later (BB 1980) he kindly confirmed my identification of *Viola canina* from the Downs. An obituary by Peter Grubb appeared in the Guardian on 22 December 2005 and an 80th birthday tribute (with a recent photograph) was written by John Akeroyd for the magazine Plant Talk no 21 (April 2000).

Dr J Hugh Davie was by all accounts a classic unmarried eccentric who died about five years ago. He is only mentioned in the Flora of the Bristol Region as the finder of the introduced *Thlaspi macrophyllum* in a Failand wood in 1964, on which he co-wrote a paper in the Botanical Journal of the Linnean Society in 1983, with another on plant invasion at Edford Wood (1997). He was for many years a Science Master at Clifton College having been 'dressed' in swimming trunks at the time of his recruitment. The proceedings of their Scientific Society in the late 1940's included local plant records and around 1980 I arranged for his (equally eccentric) herbarium to be transferred from the College to Bristol University. His copy of Murray's Flora of Somerset (1896) and its supplement are, at the time of writing, available for sale at a Bristol bookseller. He was old enough to have recalled attending a lecture on palaeobotany by Marie Stopes, who later pioneered family planning, and was a fellow of the Linnean Society of London for some 60 years. I am grateful to his co-author John Akeroyd and former teaching colleague Richard Bland for these and other anecdotes.

In BB 2004 I drew attention to a **Miss Elizabeth Emily Bell** whose un-seen herbarium book of the late 1860's included plants from Clifton and Weston-super-Mare. The doubt concerning her identity as a lady from Coldstream, Berwickshire who died in 1876 has been adequately dispelled. Lord Minto of nearby Hawick gave her a copy of Withering's Systematic Arrangement of British Plants (5th edition, 1812) in 1815. In 1850 she noted, "Where the species are marked with crosses, the specimens have been given me for my collection but where dates are added to the crosses the plants have been examined and chiefly found by myself". The annotations cover a long period but none could immediately be seen relating to the Bristol area. I am grateful to Anthony Bianco, a book collector and dealer, for this information and for withdrawing the book from sale. There is still no trace of the herbarium, which presumably comprised a number of volumes such as the one mentioned above.

Bristol botany bibliography

As usual, several publications relevant to Bristol botany appeared during the year. With thanks to the Editor, I have also been able to mention papers appearing with this one in the 2005 Nature in Avon.

New Naturalist 97, Mosses and Liverworts by Ron Porley and Nick Hodgetts, is a well-illustrated account of British Bryology, principally arranged by habitat. It includes (pages 262-265) a short account of Mendip specialities and the finds of the late Joan Appleyard, author of the Bryophyte Flora on North Somerset (1970). The moss named in her

honour, *Brachyhegium appleyardiae*, the authors suggest, may not be a valid species.

The Bath Royal Literary and Scientific Institution published Leonard Jenyns- Darwin's Lifelong Friend in 2005. Jenyns (1800-1893; later Blomefield) famously turned down the offer of the voyage on the Beagle, which Darwin took up, and he later moved to Bath and founded a Field Club in 1855. It is a valuable source book on Victorian Natural History as practiced in the provinces, and includes a biography and compilation of some of his writings, and an autobiography, and an obituary of his close friend Christopher Edmund Broome (1812-1886), a noted British mycologist. As Jenyns explains, Broome lived in Clifton for a few years after 1845 and reportedly made, with GHK Thwaites, "many expeditions in the neighbourhood in search of truffles". The Jenyns and Broome herbaria of vascular plants are at the Institution and both include specimens from the Bristol (as opposed to Bath) area. The book has includes portraits of them both.

In Nature in Avon for 2004 (page 62) Richard Bland estimates the age of an ancient hawthorn on the Bristol Downs. A branch was estimated as 90 years old, and the trunk 200 years old, but as it was one of four from a coppiced base, the tree must have been much older. In another article (pages 55-60) he examines the distribution of 15 invasive alien plants in the 10 km square from Nailsea, S, to Filton, G, based on 150 km of footwork, adding over 30% to their combined 1 km square records in the Flora of the Bristol Region.

His continuing phenological records are based on a weekly 2 km walk on the Bristol Downs and combine observation and analysis. There was a similar series in these Proceedings in the early 1890's. He has also continued to compile annual reports on the Bristol weather thus obviating any comment in Bristol Botany itself. Nonetheless, it remains clear that even at a distance of 150 years, good weather records and good botanical records can be usefully correlated. The first record of *Allium sphaerocephalon*, **Round-headed Leek**, from the Avon Gorge was in 1847, and it was "re-discovered" in 1869. These were each a year after the two hottest years (by mean annual temperature) between 1771 and 1868, according to London weather records in the 1869 Flora of Middlesex (see my note in the BNS Bulletin for March 2006).

In a marvellous paper in these Proceedings, The Middle Holocene woodlands of the Avon Valley: palaeoecological evidence from Deanery Road, Bristol, by HM Tinsley and KN Wilkinson, the authors analyse a peat

sample from a freshwater marsh environment radiocarbon dated to about 4000 BC to 3250 BC. Pollen samples from the Gordano Valley reported in 1968 had already shown (after allowing for its low pollen productivity), the preponderance of lime in the regional woodland canopy at the time, but this sample gives more local evidence of the vegetation. Alder Carr initially surrounded the hollow, there was Bracken presumably from the Downs and Lime from the woodlands on and near the slopes, which decreased in frequency with man's clearances as evidenced by charcoal, with oak and hazel increasing. Cherry and whitebeam pollen were also found but no real evidence of enough Elm to show the 'typical' anthropogenic decline. As the writers note, their paper confirms the nature of the wildwood of early Neolithic times and what remains in the Avon Gorge today. White saw more peat 3 km eastwards at St Philip's Marsh when the foundations for the electricity works were being dug (Flora of Bristol, page 15) so the possibility of further studies remains.

Plant records

The area covered by this report remains that defined by JW White in his Flora of Bristol (1912); in turn this reflected the scope of interest of the Society almost from its inception. White described the area as an irregular right-angled triangle of 720 square miles from Dursley in the north southwards to the east of Bath to Frome, and thence west to the Severn at Huntspill, south of Burnham. Following White, the portion north of the Avon, falling into the Watsonian vice-county of West Gloucestershire (v.c.34) is designated **G**. The southern portion, **S**, falls within North Somerset (v.c.6). The Flora of the Bristol Region (2000) mapped the vascular plants of the former administrative county of Avon and therefore excluded a strip of White's triangle some 10 miles or so south of Brean Down; that area is mapped in the Atlas Flora of Somerset (1997). At present, this report does not include grid references but they may be obtained from the author or the Society's library or office bearers of the Botanical Section.

The plant records are arranged into two broad groups, Natives and Archaeophytes, and Aliens. Archaeophytes are plants that behave as natives but were or seem to have been anciently introduced by man. Aliens are plants found "in the wild" but which are recent introductions. Bristol botanists have had such a substantial interest in alien plants that failure to separate the lists would be a disservice. Comments on the categories and the difficulty of application at a local level are included in BB 2004.

The plant names and the sequence within the two lists are in accordance with the second edition of the new Flora of the British Isles by Clive Stace

(1997) and are therefore compatible with the Flora of the Bristol Region. Accordingly the Latin names, which necessarily take precedence despite the standardisation of English names, can now be unambiguously cited without authors' names, except for the rare occasions where a record relates to a species not recorded therein.

Names of the principal contributors of plant records are abbreviated as below. Un-attributed comments are those of the author.

RLB	Richard Bland	CML	Clive Lovatt
RSC	Bob Cropper	PM	Pam Millman
PH	Peter Hilton	EN	Edward Niblett
CK & MARK	Clare and Mark Kitchen	AS	Tony Smith

NATIVES AND ARCHAEOPHYTES

Ranunculus lingua **Greater Spearwort** Well distributed in several yards of rhynes on Clapton Moor, S, RSC, who adds that since its discovery in 1986 it has increased greatly: he therefore doubts its possible native status there, though it had been collected on the adjacent Walton Moor in 1865.

Ranunculus ophioglossifolius **Adder's-tongue Spearwort** None flowered at Inglestone Common, G, in 2005; accordingly the pond was scraped in the autumn by the conservation body, Plantlife, Dominic Price, through CK and MARK. Although annual, the seed is persistent.

Betula pubescens **Downy Birch** By the edge of a path in the northern part of Leigh Woods, Bristol, S, PH. Extraordinarily, there is no record in the 10 km square in the Flora of the Bristol Region, though Atlas 2000 has a recent one. GW Garlick recorded it in BB 1956 in the (northern) quarries and on the Leigh Woods plateau. His specimens include one from the valley beyond the last quarry, determined by EF Warburg, which is probably the site now recorded. There are some strong trees there.

Atriplex laciniata **Frosted Orache** In good numbers flowering along the fore-dunes, Berrow and Sand Bays, S, RSC.

Spergula arvensis **Corn Spurrey** A patch in an arable field, Stone, G, CK and MARK, in 2004.

Malva moschata **Musk-mallow** Tyntesfield, S, with white flowers, RLB. In the Bristol Flora, White mentions it at Abbots Leigh and Failand and it is recorded in the Floras of Berkshire, Glamorgan and Wiltshire.

Populus nigra ssp. *betulifolia* **Black-poplar** A row of ancient pollards, Victoria Park, Windmill Hill, Bristol, S, MARK and CK in 2004. Also *Rumex pulcher*, **Fiddle Dock**, but in improved grassland. Old maps studied by the Kitchens suggest that the pollards survive from a field boundary predating the park. It was known to White at the bottom of the new Zigzag under Clifton Down, G, but I have traced no later record than 1914 (Hb. Bucknall). The Flora of the Bristol Region has only one record of the true

Black-poplar in this 10 km square. An account of the history, distribution and status of the tree by the late Edgar Milne-Redhead is published in *Watsonia* 18, 1-5 (1990). The tree is thought to be native on lowland floodplains but has been planted too, though much less often than other poplars. Mr. Milne-Redhead wrote to me (30 April 1983) mentioning a photograph of a tree at Nailsea by Mrs Sandwith, a tree near Pulteney Bridge, Bath, and an unconfirmed record near Cheddar. He agreed that two trees in the foreground of J B Pyne's painting, Clifton from Ashton Meadows, 1836, (on display at the Bristol Museum and Art Gallery) may be this evocative tree: "no other native tree can compare with it in rugged grandeur" writes Oliver Rackham.

Rorippa palustris **Marsh Yellow-cress** Railway line, Bristol Industrial Museum, **G**, covering 10m by 1m, **PM**.

Cardamine pratensis **Cuckooflower** A double form on the Tyntesfield Estate in 2004, **S**, **PM**

Erophila glabrescens **Glabrous Whitlowgrass** Several colonies at Weston-super-Mare, **S**, on beach lawns mid way along bay and on walls by the pavement, **RSC**. Formerly, Whitlowgrasses were segregated on pod size and shape. This is now regarded as irrelevant. This one has leaves and stems which are (as the name suggests) only sparsely if at all hairy. The Flora of the Bristol Region has but three records but careful search should reveal more sites.

Thlaspi arvense **Field Penny-cress** Road verge by lay-by, Rudgeway, **G**, **BNS** Excursion, reported by **CK** and **MARK**; also a single plant of *Rumex pulcher*, **Fiddle Dock**.

Lepidium campestre **Field Pepperwort** Horton Court, **G**, **RLB**, several km from Yate, the nearest site in the Flora of the Bristol Region.

Pyrola rotundifolia **Round-leaved Wintergreen** 175 scapes in full bloom at site in Ham Woods, Croscombe, **S**, **RSC**, where reported as new in **BB** 2004. **RSC** adds that the patch is spreading vegetatively, but there is no evidence of seed production, and there are no new plants in the quarry.

Anagallis tenella **Bog Pimpernel** Walton Moor, **S**, flowering in some quantity in a field, **RSC**. **White** mentions Weston and Clapton Moors, immediately to the east, but it is mapped here in the Flora of the Bristol Region.

Agrimonia procera **Fragrant Agrimony** Leighton Hanging, near Asham Wood, **S** (wood border close to where marked Heale Ladder on **OS** map), **RSC**, known since 1995. This rarer species of Agrimony has been known since 1917 at Asham Wood where it occurs on woodland rides (**Somerset Atlas Flora**). It was first recorded in the Bristol area only in 1915 though it had been anticipated in the Flora in 1912. **White's** "only valid excuse" was that it was briefly described in British floras, though he then gave its distinguishing features which match those of **Babington's Manual of British**

Botany, at least from the second edition of 1847 to the ninth of 1904, which defines the order and content of White's Flora. None of the five sites then noted were White's own discoveries; three were due to HS Thompson, who wrote to White at the time, "you know how sharp my eyes are". Is it still at Miss Roper's site, Court Hill, Clevedon?

Pyrus pyraeaster **Wild Pear** Hedgerow, south of railway, Hallen Marsh, G, RLB.

Pyrus communis **Pear** A tall tree, fruiting in 2004, at the bottom of Bridge Valley Road, close to the River Avon, Avon Gorge, G, PJMN. Mr Nethercott credibly suggests that this might be the tree seen by White in 1909. The Sandwiths also knew it from 1915 to 1918. However, some time around 1930, judging from the aged handwriting, White noted on his specimen of the pear tree collected in flower in 1893, that "this tree was destroyed a few years later".

Vicia bithynica **Bithynian Vetch** Twelve flower spikes in grass near the sluice, close to the outlet of the River Parrett, West Huntspill, S, a new site, RSC; also 100 or so on a roadside bank below Shute Shelve Hill, S and a few plants in roadside scrub just north of the M4 between Yate and Mangotsfield. Several records in White's Bristol Flora are associated with the enigmatic Thomas Bruges Flower. His herbarium (which White did not cite on this occasion) only has specimens collected in 1862, from a site between Keynsham and Pensford. They have a rare annotation, "this is the station referred to by Swayne for his *Lathyrus hirsutus*". Typically, the note fails to add that Flower himself claimed in 1838 to have confirmed Swayne's (mis)identification.

Lathyrus nissolia **Grass Vetchling** On a grassy drove, Weston Moor, S, RSC.

Mriophyllum spicatum **Spiked Water-milfoil** Clapton Moor, S, PM, in corner of field overlooked by bird hide.

Epilobium tetragonum **Square-stalked Willowherb** Tyntesfield National Trust land, S, PM in 2004, in an area not accessible to recorders for the Flora of the Bristol Region (ST 5071, as queried in my review in Watsonia, 24 (2002) 116-117).

Epilobium roseum **Pale Willowherb** A small patch flowering on the north side of the B4057 road, Great Stoke, Stoke Gifford, G, RSC.

Epilobium palustre **Marsh Willowherb** Black Down on Mendip, S, RSC. Recorded here in the Somerset Atlas Flora, but unnoticed there by White and his co-workers. I have only recently recognised (and collected) it in damp species-rich ditches in the northern part of Leigh Woods, S.

Viscum album **Mistletoe** RLB has provided close to 100 mistletoe host records in the Bristol region in over 50 1 km squares not reported in the Flora of the Bristol Region. In order of decreasing frequency he found it on Lime, Black Poplar, Apple, Hawthorn and Acacia, with isolated

occurrences on Field Maple (Hallen, **G**), Silver Maple (Congresbury, **S**) and Chestnut (Iwood, near Congresbury, **S**).

Euphorbia exigua **Dwarf Spurge** In two places in 2004, arable fields near the Little Avon, north of Stone, **G**, **CK** and **MARK**.

Geranium robertianum **Herb-Robert** White-flowered plants near Walton-in-Gordano church, **S**, **EN**. White's Flora has a number of localities and so does Grose's Wiltshire Flora. Both refer to it coming true from seed and its delightful light green foliage. I saw it in the Avon Gorge in 1980 in and below Burwalls Wood, **S**, and for some years by the parish boundary wall in Leigh Woods, **S**, and also on Clifton Downs at the roadside opposite the Zoo, **G**.

Erodium moschatum **Musk Stork's-bill** Several large plants, at their best on a grass verge, Southridge heights, the site close to where marked Combe Farm on the Ordnance Survey map, half a kilometre northwards of the long established site on Purn Hill, **S**, where it still thrives, **RSC**. Also on waste ground, Crook's Marsh, close to the estuary three kilometres south of Severn Beach, where White knew it, **G**, **RLB**.

Sanicula europaea **Sanicle** Weston Big Wood, **S**, and East Wood, Portishead, **S**, **EN**

Apium graveolens **Wild Celery** By the river Frome, north-west of Fishponds, Bristol, **G**, **RLB**. This seems to be a first recent record for this 10 km square.

Sison amomum **Stone Parsley** Tyntesfield Battleaxes field, **S**, fifty plants, **PM**. Also near Saltford, **S**, **RLB**.

Centaureum pulchellum **Lesser Centaury** A few plants flowering in a damp spot on a grassy path, Weston Moor, **S**, **RSC**. In the Bristol Region it has more commonly recorded on calcareous grassland and rocky cliffs, but then only rarely. It was found "near the Big Oak" in Leigh Woods, **S**, by Rev. Ellman (and later collected by White) in 1915, probably above Paradise Bottom; but it has never been recorded there since.

Gentianella amarella **Autumn Gentian** Several large plants in flower on a ride, Stock Hill Plantation, north-west of Priddy Mineries, **S**, **RSC**, who notes that when he first saw them in 1992, there were several white-flowered plants. Also a single plant on Walton Common (Down), **S**, in 2004, where reported by White, and seen there for seven years in a square additional to those shown in the Flora of the Bristol Region, **EN**.

Hyoscyamus niger **Henbane** A single plant at the A38/ M5 junction, Almondsbury, **G**, **JP** Martin, through **CK** and **MARK**.

Echium vulgare **Viper's-bugloss** A single plant on Walton Down, **S**, in 2004, **EN**, in a place where it had not been seen for some years. On a footpath inside the southern edge of Asham Wood, **S**, **RSC**, scattered at intervals over a kilometre, some taller than the one metre allowed in Stace's Flora, and one six feet high. Apparently not previously recorded there.

Myosotis discolor **Changing Forget-me-not** A few plants, Tyntesfield water catch, S, PM.

Plantago coronopus **Buck's-horn Plantain** At a lay-by on the A38, seen whilst leading a BNS meeting, Rudgeway, G, CK and MARK. Apparently new to the 10km square as it is primarily coastal or estuarine in the Bristol Region, though also occurring in dry grassland.

Kickxia elatine **Sharp-leaved Fluellen** A single plant appeared in polytunnel, Landcare Nursery, Old Sodbury, G, PA Wilson, through CK and MARK. Also below Sheepcombe Brake, Old Down, G, a good quantity in cut arable field, CK and MARK.

Kickxia spuria **Round-leaved Fluellen** Tyntesfield National Trust property, S, a few plants in gravel by disabled parking by house, PM.

Veronica agrestis **Green Field-speedwell** Two places at Tyntesfield, S, in 2004, PM.

Lathraea squamaria **Toothwort** Lime Breach Wood, S, and two places in nearby Prior's Wood, EN.

Campanula trachelium **Nettle-leaved Bellflower** Several plants, south of the clearing in Prior's Wood, Portbury, S, EN in 2004, perhaps the Portbury Woods where White records it with white flowers. Also by the Clevedon Road, by the Westpark wood of old maps in 2005, this latter apparently a new 1 km square record.

Rubia peregrina **Wild Madder** South of Regil, near Chew Stoke, S, Margaret Webster, through TS, who remarks he has never found it near Winford, a few km north. A glance at its national distribution shows just why it was so often remarked upon by old botanical writers at Bristol; for other than near the south coast it hardly occurs further east. The younger Withering in 1830 remarked that it can be a low trailing plant, whose branches seldom exceed six inches in length, or one climbing over the hedges and attaining a length of many feet, as in Leigh Woods, S.

Dipsacus pilosus **Small Teasel** In good quantity in 2004 on the north bank of the Avon, G, downriver from Hanham Lock, CK and MARK. Also on the south bank, nearby at Eastwood Farm, RLB, within the area recorded by White in 1892 and 1903.

Cirsium eriophorum **Woolly Thistle** Ten plants in upper part of field, Tyntesfield water catch, G, PM. Also on Clifton Down, above the Great Quarry, G, RLB. The few recent Downs records seem to be casual occurrences.

Gnaphalium uliginosum **Marsh Cudweed** Felton Common, S, Margaret Webster.

Aster linosyris **Goldilocks Aster** Uphill, S, 28 flowering stems in two patches (13 and 15 respectively), RSC. English Nature has photographs taken before 1982 of three colonies here. In 1983 I found a single shoot low down on the cliffs, appearing dead due to drought. Small transplant

colonies were established in 1955 at Burrington and Goblin Combes, both **S**, as described in the Flora of the Bristol Region for the other six study species. They were still present in the 1980's at least.

Seriphidium maritimum **Sea Wormwood** Still in good quantity at St Thomas's Head, Woodspring Bay, **S**, RSC.

Senecio vulgaris **Groundsel** A radiate form, waste ground, Crook's Marsh, between Avonmouth and Severn Beach, **G**, RLB. This was presumably var. *hibernicus*, a weedy plant rather than the short fleshy coastal ecotype mentioned in White's Bristol Flora under var. *radiatus*.

Bidens tripartita **Trifid Bur-marigold** A single plant on the harbour side of a wall, opposite Canon's Marsh, the Floating Harbour, Bristol, **G**, PM.

Baldellia ranunculoides **Lesser Water-plantain** At least five plants at edge of rhyne, Clapton Moor, **S**, PM.

Potamogeton coloratus **Fen Pondweed** Two clumps in "Rhyne 22" on Clapton Moor, **S**, PM with TS, a site not specifically mentioned in the published floras, though Walton Moor is.

Cyperus fuscus **Brown Galingale** RSC, a "site guardian" under a Plantlife scheme, reports that the site on Walton Moor, **S**, had become overgrown and no plants of this protected nationally rare species were found in 2005. Conservation work is expected in 2006. This annual is known to have a long-lived seed bank and a temporary absence does not signify its permanent loss to the Bristol flora.

Carex strigosa **Thin-spiked Wood-sedge** About nine plants in fruit along a footpath by the west side of the River Trym, Sea Mills, **G**, and also nearby, both in 2004, CK and MARK. This is a new locality though it has long been known on the Trym.

Carex filiformis **Downy-fruited Sedge** In a damp depression in a neutral hay meadow, between Cheddar Moor and Draycott in 2003, **S**, E McDonnell. **New to v.c.6**. A remarkable find of a rare native sedge: for more information see Somerset Rare Plant Group newsletter no.4.

Poa angustifolia **Narrow-leaved Meadow-grass** Aust Services, **G**, CK and MARK, in 2002, apparently new to the 10 km square.

Poa infirma **Early Meadow-grass** 20 plants or fewer scattered on corner of the sea lawns in 2004, Weston-super Mare, **S**, Paul Green. **New to v.c.6**. A remarkable find of what may well be an overlooked species rather than a recent arrival in the area. It is best known from the Lizard in west Cornwall, where I have seen it on a village green, but increasingly is being found elsewhere in warm places on the south and southwest English coasts.

Gastridium ventricosum **Nit-grass** Noted by PH on a cliff edge at the "Clifton Down" site, **G**, in April 2005, presumably as remains from the prior year. There were about 20 flowering plants with 40 heads there in September 2005 at the base of a warm but north-facing outcrop, some metres below where the plant mainly grew during my regular observations

from 1978 to 1982. I would welcome information for the intervening period. In about half a dozen visits from 1992 to 2004, there was no trace of it. I have not seen it on Black Rocks since 1981. This year there were about 400 spikes above the cliffs, in the place discovered in 1993 (BB 1994).

Gagea lutea **Yellow Star-of-Bethlehem** 38 in flower in 2005 as compared to 71 in 2004 at Stoke St. Michael, S, RSC, who explains that the site (near where marked Stocker Hole on Ordnance Survey map) was misreported in BB 2004 as at Murdercombe, S. RSC has visited the site annually from 1995, finding over 250 in flower then, over 260 in 1996 and 135 in 1998, declining to 34 in 2002. RSC writes that the plants at King's Stag in North Dorset typically flower three to four weeks earlier than do the Stoke St. Michael plants.

Paris quadrifolia **Herb-Paris** 20 very healthy plants in Weston Big Wood, S, EN. Plainly long known there but well worth recording. TB Flower's herbarium has it from Smallcombe Wood near Bath, S.

Neottia nidus-avis **Bird's-nest Orchid** Folly Wood, near Dursley, G, RSC, a single flower spike beneath beech close to where a small colony seen in 1975.

Spiranthes spiralis **Autumn Lady's-tresses** Ten spikes in own garden, Portishead, S, EN, in 2004. Large numbers on the lawns surrounding the National Trust house, Tyntesfield, PM in 2004, and known to Tony Titchen for many years.

ALIENS

Azolla filiculoides **Water Fern** Covering a rhyne at Clevedon, S, RSC. Dominant in rhyne south of White House Rhyne, Pawlett Hams, S, RSC. Roe's Somerset Flora records its establishment in Somerset from several directions since 1931.

Pinus radiata **Monterey Pine** Two or three large trees in shelterbelt above Horton Court, G, CK and MARK, in 2004, **new to v.c.34**, apparently wild but reportedly planted.

Laurus nobilis **Bay** Long Ashton, S, RLB.

Nymphaea alba **White Water-lily** Naish House, Clapton-in-Gordano, S, EN. Also in a pond at Eastwood Farm, near Broom Hill, S, RLB, (seen through binoculars from the other side of the Avon), with an un-named purple Water-lily and *Nymphoides peltata*, **Fringed Water-lily**.

Helleborus argutifolius **Corsican Hellebore** Pavement by tree, Henleaze, G, RLB.

Ulmus x hollandica **Dutch Elm** Good re-growth of ten or so trees at the gorge edge of Clifton Down, G, CK and MARK, in 2004.

Soleirolia soleirolii **Mind-your-own-business** Growing on a gravel path near knot garden, Tyntesfield National Trust property, S, PM, in 2004.

- Alnus incana* **Grey Alder** Portbury, near the M5 Gordano Service Area **S**, RLB.
- Chenopodium bonus-henricus* **Good-King-Henry** The Barton, Hawkesbury Upton, **G**, JPM, and described as persistent at a known site. White (1912) knew it by a farm at Hawkesbury there and also at the top of the hill close to Hawkesbury Upton.
- Bassia scoparia* **Summer-cypress** Three plants on the M5 slip road, Almondsbury, **G**, JPM. The Flora of the Bristol Region has only one record (1984, Weston-super-Mare). A paper by SJ Leach and EJ McDonnell in BSBI News 101 (January 2006) 35-37 shows it in many places late in 2005 on the M5 in Somerset including (in our area) near Weston-super-Mare, Loxton, Edingworth and Burnham-on-Sea, all **S**. In a response in BSBI News 102 (April 2006) PJ Cook reports having seen it in 2003 intermittently as single plants whilst driving between Avonmouth, **G**, and Weston, **S**.
- Polygonum arenarium* **Lesser Red-knotgrass** Tyntesfield NT Garden and Orangery area, **S**, PM, and not apparently known in the Bristol region since 1930, and then on the v.c. 34 side.
- Fallopia baldschuanica* **Russian-vine** On Tyntesfield National Trust land, **S**, in 2004, PM and at Combe Dingle, **G**, rampant, RLB.
- Hesperis matronalis* **Dame's-violet** Avonmouth sewage works, **G**, and Dundry, **S**, RLB.
- Lobularia maritima* **Sweet Alison** On a wall, Ridgeway, Bristol, **G**, RLB.
- Cyclamen hederifolium* **Sowbread** A small patch at northern end of Durdham Downs, **G**, CK and MARK. Also in several places at the edge of scrub on Clifton Down, **G**, between Blackboy Hill and Bridge Valley Road, CML.
- Crassula helmsii* **New Zealand Pigmyweed** A large area of a pond at the Ashton Court Country Club, **S**, covered by this weed. PM has expressed concern that this might become a source for accidental introduction in the area. New to the 10 km square but presumably not considered as "wild" here.
- Sedum album* **White Stonecrop** Tyntesfield National Trust property, **S**, PM, in 2004.
- Rosa rubiginosa* **Sweet-briar** A single bush in scrub woodland above south bank of New Cut, River Avon, Temple Meads, **G**, CK and MARK, in 2004. Considered by the finders to be probably adventive here.
- Prunus lusitanica* **Portugal Laurel** Self-sown at Failand and Long Ashton, **S**, RLB.
- Cotoneaster baccularis* **Open-fruited Cotoneaster** A self-sown plant by the Portway at Sea Mills (but the grid reference is for beneath the old Cook's Folly), **G**, RLB. **New to v.c.34** and the Bristol region.

Cotoneaster frigidus **Tree Cotoneaster** A fine specimen in Almondsbury, G, RLB. New to the 10 km square.

Cotoneaster lacteus **Late Cotoneaster** One or two shrubs at the base of the cliffs, Horseshoe Bend, below the Portway, G, ACT and PH. The Flora has a 1991 record at Lamplighters, just to the north of the present site, but only two others.

Dorycnium hirsutum (L.) Ser. **Canary Clover** A single bush self-sown at the base of a wall, on the front between the pier and Birnbeck Island, Weston super-Mare, S, Paul Green in 2004, det. ML Stephens. **New to v.c.6** and the Bristol region and very rarely reported in the wild in Britain; there are only two records mentioned up to 1994 in Clement and Foster's Alien Plants of the British Isles. There is a photograph of this distinctive species in Polunin's Flowers of Europe.

Hippophae rhamnoides **Sea-buckthorn** Planted in the Cumberland Basin, G, before 1980; a single small sapling growing from the rock underneath the Suspension Bridge beside the Towpath under Leigh Woods, S, CML.

Lythrum junceum **False Grass-poly** Jubilee Drive, Failand, S, PM. First seen July 2004, and again February 2005, but gone by the summer. Derived from birdseed.

Oenothera cambrica **Small-flowered Evening-primrose** I have had records provided for the Great Quarry, Avon Gorge, G, RLB and at the Landcare Nursery, Old Sodbury, G, PA Wilson through CK and MARK. The Flora of the Bristol Region had nine sites and described it as a rare introduction, with *O. glazioviana* (formerly *O. erythrosepala*), a large-flowered species as the most widespread (it was under Cook's Folly in 1980 for instance). When it is realised that *Oenothera* chromosomes engage in a meiotic circle dance rather than in pairs, the taxonomic difficulties in naming these plants becomes apparent. *O. cambrica* has been known at the Great Quarry or thereabouts since 1867 (St Brody in Bristol Museum herbarium det Rostanski) but *O. biennis* and perhaps *O. x fallax* may also, by my reckoning, grow in the Gorge from time to time.

Rhus typhina **Stag's-horn Sumach** Gloucester Road Farm, near Frampton Cotterell, G, suckering along roadside. Also on riverbank, Windmill Hill, S, both RLB.

Oxalis corniculata **Procumbent Yellow-sorrel** Brandon Hill, G, RLB.

Geranium endressii x *G. versicolor* (*G. x oxonianum*) **Druce's Crane's-bill** A small flowering patch in a shady spot on the south side of the Old London road, Wetton Hill, Wotton-under-Edge, G, RSC. Only two records are included in the Flora of the Bristol Region and I doubt its survival on Clifton Down, opposite Worrall Road.

Fatsia japonica **Fatsia** One healthy plant in 2004, growing by a ditch in a small fir wood between Barrow Wood and Barrow Copse, Witham Friary,

S, Gill Read, det. A Stevenson. There are only a few British records and this is **new to v.c. 6**.

Heracleum mantegazzianum **Giant Hogweed** By roadside near pond in 2004, Little Sodbury, G; where reported by Miss IF Gravestock in BB 1975, CK and MARK; also still present in quantity 1 km northwards, at Horton, G.

Lycium barbarum **Duke of Argyll's Teaplant** Hallen Marsh, in a hedge and on a wall, St Michael's Hill, Bristol, both G, RLB.

Solanum sisymbriifolium **Red Buffalo-bur** There is a drawing of this rare casual species from a specimen collected at Avonmouth in the BSBI's newly published Illustrations of Alien Plants of the British Isles. Apparently in error, the species is omitted from the Flora of the Bristol Region, although found at Avonmouth Docks again by the late AL Grenfell (BB 1987).

Polemonium caeruleum **Jacob's-ladder** On the edge of Avon Walkway, north of Saltford, S, RLB.

Symphytum orientale **White Comfrey** Hotwells, Lawrence Weston and Redland, G, RLB.

Stachys byzantina **Lamb's-ear** Roadside, West Town, Backwell, S, RLB. The Flora of the Bristol Region has 1984 as the most recent record before 2000.

Lamiastrum galeobdolon ssp. *argentatum* **Garden Yellow-archangel** The Flora of the Bristol Region had eleven records but admitted it was under-recorded. RLB adds five sites, Arnos Vale, Blaise Castle, Easton (Bristol) and Lawrence Weston, all G, and Clevedon, S. It has occurred in Leigh Woods, S, near the Warden's cottages, since before 1980.

Cerinthe major L. **Greater Honeywort** One plant in 2004 on disturbed soil at the bend in the lane north east of Stockwood, S, Ian Green, det. ML Stephens. **New to v.c.6**. A very rare casual: up to 1994 there was only one British record (and that in a garden!) and it does not appear in the vice county census catalogue of 2003. It is a familiar annual member of the borage family occurring in cultivated or waste ground in the Mediterranean area with glabrous white-spotted leaves and drooping yellow tubular flowers, normally red at the base. It is pictured in many wild flower guidebooks including the new Flowers of Crete.

Syringa vulgaris **Lilac** In a hedge, Ashton Vale, S, RLB.

Linaria arenaria **Sand Toadflax** About 300 plants on Berrow Dunes in 2004, J Lidgate, det. A Hepworth and IP Green. **New to v.c.6**. It was planted on Braunton Burrows over a hundred years ago and is established there. It has few other British sites.

Acanthus mollis **Bear's-breech** By the side of a lane, Long Ashton, S, RLB. The Flora has only two records, both for the 1980's.

Leycesteria formosa **Himalayan Honeysuckle** Horfield and Pitch and Pay Lane, Bristol, **G**, and Long Ashton, **S**, RLB. Also in a garden Failand, **S**, but not planted, **PM**. This plant is proving to be increasing, or more frequent than reported in the Flora of the Bristol Region, with 14 sites reported in the survey period.

Lonicera nitida **Wilson's Honeysuckle** Temple Meads, **G**; Easton-in-Gordano, Failand, Long Ashton and Portbury, **S**, all RLB, extending the distribution in the Flora of the Bristol Region.

Centaurea montana **Perennial Cornflower** On a wall, Cote Lane, Henleaze, Bristol, **G**, RLB.

Lactuca virosa **Great Lettuce** Tyntesfield NT Garden and Orangery area, **S**, **PM**.

Pilosella aurantiaca **Fox-and-cubs** Broom Hill, **G**, RLB.

Arctotheca calendula **Plain Treasureflower** On Glastonbury wool tip in 1971, AC Leslie, in his herbarium, and only reported in 2005. **New to v.c.6.**

Erigeron karvinskianus **Mexican Fleabane** Hotwells and Sea Mills, both **G**, RLB.

Conyza sumatrensis **Guernsey Fleabane** Several plants in the Great Quarry, Avon Gorge, **G**, **PH**. Hitherto only noted (to 2000) in southern half of the region at the Royal Portbury Dock, beside the M5 motorway and at Weston super-Mare.

Calendula officinalis **Pot Marigold** Three or four flowering plants in November 2004, banks of the Little Avon River between Berkeley and Stone, **G**, **CK** and **MARK**. Also near Temple Meads Railway Station, **G**, RLB.

Galinsoga parviflora **Gallant-soldier** Thousands of plants in October 2004 in an old walled garden being cultivated for organic vegetables, Leigh Court Farm, **S**, **PM**.

Arum italicum *ssp. italicum* **Italian Lords-and-Ladies** Roadside near Tickenham, near abrupt bend in road at Stone-edge Batch, **S**, **RSC**. Not recorded in this 10 km square in the Flora of the Bristol Region, but the new BSBI Atlas has a contemporary one.

Pistia stratiotes. **Water-lettuce** A number of plants in a ditch, Burnham Level in 2002, **S**, Phil Brewin, det. S Parker. **New to v.c.6.** Perhaps better known as Nile Cabbage, and a significant pest of open water in Africa. In Britain, it is a rare casual and not included in the standard floras and checklists.

Juncus tenuis **Slender Rush** Several plants fruiting on path, Leighton Hanging, by Asham Wood, **S**, **RSC**

Cyperus eragrostis **Pale Galingale** A garden escape on a wall and pavement, Frome Valley Road, Begbroke, Stapleton, **G**, **TS**. This is a

second recent record for the region. (Previously found by AL Grenfell and CML around 1981 on the railway between the Floating Harbour and the Avon, G.)

Gaudinia fragilis **French Oat-grass** South of Bishop's Hill Wood, Wickwar, G. in a semi-improved grassland cut for hay. **New to v.c.34.** Subsequently CK and MARK found it in several nearby fields.

Polypogon viridis **Water Bent** Forest Road and Stoke View Road, Fishponds, Bristol, G, TS, on pavements and beside walls. These are additional sites to those in BB 2001 and 2002 for this increasing alien grass.

Anisantha madritensis **Compact Brome** Avenue and Castle Roads, Walton St Mary, Clevedon, S, in 2004, CK, MARK and LH. This marks a westward extension of the reported range (Walton and Weston-in-Gordano). I found the var. *ciliatus* with hairy spikelets by the roadside there around 1982 but never in the Avon Gorge. Hubbard (Grasses, 1984) suggests the variety is introduced.

Echinochloa crus-galli **Cockspur** In a short paper on the occurrence of this grass on roadsides in southern England (BSBI News 101 (January 2006) 37-38) SJ Leach reports a number of sites in the southern part of our area on the M5 near Burnham-on-Sea, Brent Knoll, Banwell, Woolvers Hill and Portbury, all S. As he points out, it is better known as an occasional birdseed casual on pavements.

Setaria viridis **Green Bristle-grass** Grove Road, Fishponds, Bristol, G, in pavement cracks, TS.

Sorghum halapense **Johnson-grass** Whapping Wharf, Bristol, G, CK and MARK in 2004. The Flora of the Bristol Region has only four recent records.

Ornithogalum nutans **Drooping Star-of-Bethlehem** Still at Wickwar, S, where naturalised since about 1870. RLB noted just three clumps in 2005 with 11 flowering spikes.

Muscari armeniacum **Garden Grape-hyacinth** Five additional sites have been provided by RLB: Hallen, Henleaze, Horfield, Lawrence Weston and Sea Mills, all G. Eight sites are mapped in the Flora of the Bristol Region, but none close to Bristol itself.

Allium triquetrum **Three-cornered Garlic** A single plant on the southern edge of East Wood, Portishead, S, EN in 2004. Also at Combe Dingle, G, RLB in 2005.

Galanthus nivalis **Snowdrop** At Tyntesfield, S, RLB.

Iris germanica **Bearded Iris** Avonmouth sewage works, G, RLB

Crocus tommasinianus **Early Crocus** Well naturalised in Little Sodbury churchyard, G, CK and MARK in 2004.

Gladiolus communis **Eastern Gladiolus** Lawrence Weston, G, RLB; only three records in the Flora of the Bristol Region.

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I would like to thank all contributors mentioned for their interesting records, and the Editor for assistance and patience. I remain grateful to the Society and its Botanical Section for their delegation of this historic task to me and for the opportunity to make good use of my previous and rejuvenated researches. But let all readers join me in acknowledging the debt to my predecessor. As I was completing the report on 20 June 2006, Professor Arthur J Willis, scholar and naturalist, passed away.

The middle Holocene woodlands of the Avon valley: palaeoecological evidence from Deanery Road, Bristol.

H.M. Tinsley and K.N. Wilkinson

Abstract.

Palaeoecological investigations of a buried peat bed from Deanery Road, Bristol, revealed that the organic sediments accumulated in a freshwater marsh environment close to the River Avon. Around 5174 BP (4220-3790 cal BC), when the peat began to form, the marsh was surrounded by alder woods with lime woods occupying the drier land beyond. The marsh later appears to have been subject to a period of flooding by brackish/salt water, which brought clay to the site and may have been the trigger for a reduction in the fringing alder woods. Following this episode, freshwater conditions seem to have been re-established, but there is some evidence for further tidal flooding towards the end of the period of peat accumulation around 4594 BP (3550-3050 cal BC). The pollen diagram also records changes in the dry-land woodland over time: initially these were entirely dominated by lime, but subsequently lime declined somewhat, although it still remained a co-dominant with oak. The record for microscopic charcoal provides evidence of anthropogenic activity in the area and this may have been a factor in the decline in importance of lime. This pollen diagram provides the first evidence for the history of the forests of the Bristol area prior to the historic period. These forests were the precursors of the ecologically important woodlands which remain today in the Avon Gorge.

Introduction

The history of British woodlands in the present interglacial (the Holocene) has largely been established through pollen analysis of sediments, combined with radiocarbon dating (Roberts, 1998); a vast amount of data now exist in the form of pollen diagrams which reveal a detailed picture of the variation

in the character of British woodlands over time and space. However, the use of pollen analysis to reconstruct past vegetation depends on finding deposits which preserve pollen. Peats and lake sediments are ideal, and in some cases acid soils may also preserve pollen (Moore, Webb & Collinson, 1991), but it is rare to find suitable sites on areas of limestone geology. Lack of acidic, anaerobic sediments in the Avon Gorge has meant that there have been no previous palaeoecological studies of the botanically rich and interesting woods that clothe the valley sides today and are included within the Avon Gorge National Nature Reserve. Such sediments are also lacking in the immediate area to the south and east of the Gorge where the city of Bristol has grown up; the peaty marshlands which once occupied the bottom of the Avon valley have long since disappeared under urban development.

The ancient status of some areas of the Gorge woodlands has, however, been established by studies of their modern ecology (Rackham, 1982; Lovatt, 1989). In Leigh Woods in particular, the canopy layer contains *Tilia cordata* (small-leaved lime), and the other native British lime *Tilia platyphyllos* (large-leaved lime) also occurs (though very rarely) (Green, Higgins, Kitchen & Kitchen, 2000). The presence of native limes (as opposed to the widely planted hybrids) has been identified by Peterken (1981) as one of the characteristic indicators of ancient woodland in England. Many of the small-leaved limes show evidence of past coppicing and in some cases pollarding; some giant coppice stools exist indicating very long-lived trees (Rackham, 1982). Other floristic indicators of ancient woodland include *Sorbus torminalis* (wild service-tree) and the rare endemic whitebeams (*Sorbus* spp.) for which the Avon Gorge is famous. Rare ground flora indicators usually confined to ancient woodland include *Convallaria majalis* (lily-of-the-valley) and *Aquilegia vulgaris* (columbine) (Lovatt, 1989; Green *et al.*, 2000). On the basis of field survey, Rackham (1982) suggested that the original wildwood of the area was probably dominated by lime with some oak and hazel and occasional ash and elm, but this has remained uncorroborated by direct palaeoecological evidence. However, in the Spring of 2000 a buried peat bed was discovered in the course of redevelopment of an area close to Bristol Cathedral, 3-4 km from Leigh Woods. Buried peats have not previously been found in the course of archaeological fieldwork in central Bristol and therefore this site offered a unique opportunity for palaeoenvironmental reconstruction. Radiocarbon dating established that the peat was some 5500-6000 years old and this offered the possibility of using pollen analysis to reconstruct the woodland of this part of the Avon valley in the middle-Holocene and, potentially, to compare its floristic composition with the 'modern' ancient woodlands of the Avon Gorge.

The Deanery Road site

The site of the buried peat bed is close to the junction of Deanery Road and Anchor Road, Bristol (ST 58129 72626). Archaeological evaluation and subsequent excavation in the redevelopment area was undertaken by Cotswold Archaeology on behalf of Beaufort Western Limited (now Crosby Homes (Special Projects) Limited). A geotechnical survey comprising 10 boreholes was carried out at the site in March and April 2000 by Geotechnical Engineering Ltd; this revealed a sequence of estuarine and alluvial deposits up to 5m deep lying beneath 4m or so of 'made ground'. In the south-eastern part of the site, peat was found between 7.1 and 8.2m below ground level. In order to investigate these deposits further, and particularly to examine the buried peat in detail, three additional boreholes were drilled in January 2001 under archaeological supervision (CA1 – CA3 on Fig. 1). The cores were described and CA2 was chosen for detailed palaeoenvironmental analysis and radiocarbon dating (Wilkinson, 2002). Sediments containing organic material occurred between 7.20 and 8.22m below ground surface, the upper part of this sequence comprised an organic clay, which became peaty below 7.38m, with a further clayey band around 7.86m below the ground surface. Below 8.09m the peat became increasingly silty. Sub-samples for pollen analysis were taken from the peaty sediments. Two samples of organic material were sent to the Radiocarbon Dating Laboratory at the University of Waikato, Hamilton, New Zealand and the results established that the peat bed dated from 5174±61 BP (4220-3790 calendar years BC at 95.5% confidence according to the INTCAL 98 curve [Stuiver, Reimer, Bard, Beck, Burr, Hughen, Kromer, McCormac, van der Plicht & Spurk, 1998]) (WK 10946) at its base to 4594±63 BP (3550-3050 calendar years BC) (WK 10947) at the top.

Pollen analysis

Ten samples from core CA2 were prepared for pollen analysis using standard techniques (Moore, *et al.*, 1991). The pollen sum used exceeded 500 land pollen grains at each level counted, with the exception of the lowest sample from 8.21m where the pollen concentration was very low and a total of only 311 land pollen grains was reached in the count. Spores of ferns and of filamentous green algae were counted outside these totals. The preservation of the pollen was somewhat variable, but overall it was good. Pollen types generally follow Bennett (1994) and plant nomenclature is according to Stace (1991). (A Pollen diagram which accompanied the article could not be redrawn to fit. Ed). Two assemblages are recognised, Deanery Road (DR) 1 and 2, these are not pollen assemblage zones *sensu stricta* (Birks, 1986), but are drawn to facilitate description and interpretation. The main features of the two zones are summarised below:-

DR1. (8.22m – 7.90m) *Alnus-Tilia* assemblage

Date at 8.15m: 5174±61 BP (4220-3790 cal BC)

Tree pollen forms between 71% and 82% total land pollen (TLP) in this assemblage. *Alnus* (alder) is the dominant tree taxon with *Quercus* (oak) and *Corylus*-type (hazel). *Tilia* (lime) forms 14-16% TLP. The principal herbaceous pollen types are Cyperaceae (sedges) and Poaceae (grasses). A range of flowering herbs is present, all at values of <1% TLP. Chenopodiaceae (goosefoot family), a taxon associated with both disturbed ground and halophytic environments, is represented at values of <3% TLP. Pollen of wetland and aquatic taxa forms <5% TLP+aquatics. Fern spores, including *Pteridium* (bracken) and Polypodiaceae (polypody fern), form between 15% and 32% TLP+ferns; they are most frequent in the basal sample.

DR2. (7.90m – 7.20m) *Quercus-Corylus* assemblage

Date at 7.32m: 4594±63 BP (3550-3050 cal BC)

Tree pollen is somewhat reduced compared with DR1, fluctuating between 55% and 74% TLP. At the start of the zone *Alnus* declines markedly. *Tilia* declines more gradually to around 5% TLP above 7.85m. *Quercus* and *Corylus*-type increase gradually at the start of the zone, but fluctuate somewhat. Herbaceous pollen increases slightly, principally Poaceae which peak at 25% TLP in the middle of the zone, and Cyperaceae which peak at 18% TLP at 7.50m. The start of the zone is marked by a peak in Chenopodiaceae which reach 11% TLP at 7.86m, then fall to values of <3% TLP before rising to 6% TLP at the top of the zone. Wetland and aquatic taxa peak at 10% TLP+aquatics at 7.50m. Otherwise, the range and frequency of herbs is similar to DR1. Fern spores are present throughout the zone at values slightly lower than those of DR1.

Middle Holocene environments of the central Bristol Avon valley

From the evidence presented in the pollen diagram it is possible to reconstruct both the immediate environment in which the peat bed accumulated and also the vegetation of the wider valley. The site itself appears to have been a damp hollow close to the Avon, surrounded by trees. The deepest sediments examined contain a significant component of inorganic silt, which suggests some active water movement at the site prior to the development of the marsh, and this also accounts for the low pollen concentration in the basal sample. Peat accumulation began around 5174 BP (4220-3790 cal BC), at the transition between the Mesolithic and the Neolithic periods. In zone DR1 the high frequencies of alder pollen suggest

that the marsh was fringed by wet alder woodland and beyond this, probably on higher ground, there were extensive dry land woodlands dominated by lime, with some oak and hazel and occasional elm and ash.

The marsh itself supported a vegetation of grasses (Poaceae) (possibly *Phragmites*, common reed) and sedges (Cyperaceae), with some bur-reed (*Sparganium*). There appear to have been some pools of open water, with aquatic communities that included *Alisma plantago-aquatica* (waterplantain), *Lemna* (duckweed) and *Samolus valerandi* (brookweed), as well as the filamentous green algae *Spirogyra*. The range of other herbaceous pollen taxa, found at low frequency, include types which might have grown on the marsh, such as Brassicaceae (cabbage family – includes watercresses and cuckooflower) and *Ranunculus acris*-type (includes buttercup and spearwort etc). Some other taxa are more likely to have been associated with edge of the carr woodland, for example the Caryophyllaceae (pink family – including red campion), Apiaceae (carrot family – hedge parsley etc) and Fabaceae (pea family – vetches etc).

Another group of herbs represented at low frequency in the pollen diagram is associated with disturbance; this includes *Plantago lanceolata* and *P. major* (ribwort and greater plantain), *Rumex* (sorrels and docks), Lactuceae (dandelion family and related Asteraceae), *Solidago virgaurea*-type (daisy and related Asteraceae) and *Artemisia* (mugwort). These herbs thrive on disturbed ground and their presence in pollen diagrams is often associated with anthropogenic activity (Behre, 1986). However, in the case of waterside or estuarine situations (such as the Avon valley) disturbed ground could very well result from natural processes of erosion, producing unstable soils. The occurrence of occasional grains of cereal-type pollen might appear to be a stronger link with anthropogenic activity, but this pollen taxon, which includes all the cultivated grasses, also includes *Glyceria* spp. (sweet grasses), which are freshwater aquatic or marsh grasses that could have been growing close to the river.

The presence of quite significant amounts of pollen of Chenopodiaceae (goosefoot family) in the peat bed, particularly at the start of DR2, is interesting in relation to the position of the site close to a tidal river. The Chenopodiaceae is a large family with members growing in a wide range of habitats, including disturbed ground and salt marshes. It is very difficult to distinguish pollen of different species of Chenopodiaceae and this has not been attempted here, but in view of the location of the site, it seems likely that the Chenopodiaceae pollen originated from salt marsh plants such as *Suaeda maritima* (annual sea-blight) or *Atriplex portulacoides* (seapurslane) which grow today on the marshes of the Avon estuary (Green *et al.*, 2000). *Solidago virgaurea*-type is another pollen taxon which includes

some species associated with salt marshes such as *Aster tripolium* (sea aster), and this also peaks at the start of DR2, at a level where clay particles were noted in the peat. It seems likely that the site was influenced by an incursion of tidal waters at this stage, which brought in fine mineral material and resulted in the spread of halophytic communities. However, this did not result in elimination of all the freshwater marsh plants (water-plantain, for example, continued to be present) but it may well have been the factor which triggered the decline in alder woodland around the marsh which marks the start of zone DR2. This ecological response to brackish/salt water flooding is similar to that recorded in a pollen diagram from the Somerset Levels (Sweet Track F Site), where a decline in *Alnus* pollen occurred prior to the flooding event which resulted in the deposition of the Lower Wentlooge Clay (Coles, Hibbert and Orme, 1973) (since dated to 5210 - 4800 cal BC [Tinsley, in press]). The high Chenopodiaceae values are not maintained throughout DR2, which suggests that the salt marsh phase was short-lived and that the marine incursion was relatively brief (although there is as yet no dating evidence to give a time scale to this event); however the alder woods did not recover their former extent.

Between 7.75m and 7.31m the deposits are entirely organic and contain no clay; there are increased frequencies of pollen of freshwater aquatics such as *Typha latifolia* (bulrush) and *Sparganium emersum*-type (bur-reeds, lesser bulrush), and peaks in the counts for the filamentous green algae *Spirogyra* and *Mougeotia*, which are associated largely with freshwater conditions (van Geel, 1986). However, at the top of the pollen diagram, above 7.3m, there is a renewed increase in the frequency of Chenopodiaceae pollen and this again correlates with increasing clay in the sediment, suggesting another episode of flooding by salt or brackish water. The peat at Deanery Road is very compressed; the radiocarbon dates indicate that it formed over a minimum of 240 years but a maximum of 1170 years. It is therefore possible, given the resolution of the pollen sampling, that other short-lived marine incursions may have taken place which have not been picked up.

The reconstruction of the dry-land woodland of the Avon valley in the early Neolithic, beyond the marsh and surrounding alder carr, requires some consideration of differences in tree pollen production and dispersal. Wind-pollinated trees such as *Corylus* (hazel) and *Quercus* (oak) produce markedly more pollen than *Tilia* (lime), which is insect pollinated; the pollen grains of hazel and oak are relatively smooth and light and travel easily on the wind, those of lime are large and sticky and are shed close to the tree (Faegri and Iversen, 1992). As a result, the percentages of lime pollen recovered from a site will markedly underestimate its importance in

the former vegetation of the area. Work by Andersen (1970) suggested that pollen percentages for lime needed to be corrected by a factor of x 8, in order to be compared directly with oak. Greig (1982) summarized evidence for the past importance of lime in the mid-Holocene forests of Britain and Europe, using Andersen's correction factor. The pollen sum used by Greig excluded alder and hazel; if the data from zone DR1 at Deanery Road is recalculated in this way, corrected values for lime pollen are between 80% and 90%, and according to Greig (1982) corrected values of *Tilia* pollen >60% indicate lime as the major forest component. It is clear, therefore, that the dry-land woodland around Deanery Road at 4220-3790 cal BC was lime dominated, with oak and hazel present as associated species.

These dry-land woods began to change soon after the start of Zone DR2, this can be seen from the gradual decline of *Tilia* pollen in the upper part of the pollen diagram. This occurs after the fringing alder woods around the marsh were reduced, allowing increasing pollen of oak and hazel to reach the peat surface. The decline in lime does not appear to be related to the changes in the wetland woods, it is a more gradual reduction than that of alder, with lime declining from 14% TLP at the end of DR1 to 5% TLP by the middle of DR2. Using Greig's correction calculations previously referred mentioned, this gives a corrected value for *Tilia* pollen in DR2 of between 40 and 60% suggesting (according to Greig, 1982) that lime formed about half the tree cover by the time the upper part of the peat bed was forming. Compared with the woods of zone DR1, lime had therefore undergone a significant decline. It is possible that this had an anthropogenic cause: a lime decline is a widely recorded feature of mid/late-Holocene pollen diagrams from England and Wales, although the dates at which it occurs vary. In Wales it has been linked with Bronze Age human activity (Walker, 1993). On the Somerset Levels a decline in lime occurs in the Neolithic, after the first evidence for sustained human impact on the dry-land forests of that area, around 3600 cal BC (Caseldine, 1988). The date for the start of the decline in lime at Deanery Road lies somewhere between 4220 cal BC and 3050 cal BC (the extreme limits of the dates from the top and bottom of the peat bed). Despite the decline, lime remained an important forest component along with oak in the woods in the Avon valley until at least 3550-3050 cal BC; indeed, it was probably widespread in the South Gloucestershire and North Somerset area. A pollen diagram from Walton Moor in the Gordano valley, North Somerset, has values for lime of around 10% total pollen (uncorrected for low pollen productivity) in the mid-Holocene (Jefferies, Willis and Yem, 1968), and pollen evidence from a buried land surface on the Avon Levels of South Gloucestershire, dated between 3300-2200 cal BC and 2930-2460 cal BC, suggests that lime was

an important component of the woodland. (Carter, Jones and McGill, 2004).

The evidence of microscopic charcoal throughout the peat bed suggests that people were present in the area while the marsh sediments were accumulating at Deanery Road. Generally, the charcoal frequencies are fairly low so human activity may not have been intense. However, at 7.76m there is a peak in charcoal and it may well be significant that this occurs when lime is declining, supporting the view that this change in forest composition was a consequence of a gradual opening up of the lime dominated woodlands as a result of human activity during the Neolithic. Another feature of early Neolithic pollen diagrams, which is even more widespread and consistent than the decline in lime, is a decline in elm pollen. This is seen throughout north-west Europe around 5000 BP (c.3700 cal BC) and has been linked with both human activity and the spread of pathogens; Rackham (1986) has suggested that Neolithic woodlands which had already been opened up by coppicing may well have been more susceptible to the spread of elm disease. That said, there is no obvious elm decline horizon in the pollen record from the Deanery Road peat bed. Elm pollen frequencies are low throughout and it is clear that elm was only a minor contributor to the early Neolithic woodlands of the Avon valley. On the Somerset Levels, to the south, the first major decline in elm has been dated at a number of sites to around 3600 cal BC, though some dates are earlier than this (Caseldine, 1988). The low values for *Ulmus* pollen in the earliest peat at Deanery Road (4220-3790 cal BC) suggest that the initial elm decline had either already taken place in the area by this time, or that there were only limited numbers of elm trees in the Avon valley woodlands even prior to the first impact by Neolithic farmers. There is a temporary increase in *Ulmus* pollen in the middle of DR2 at Deanery Road, this occurs after the decline in *Tilia* pollen, and it may simply indicate the freer flowering of a small population of elms as the lime woodlands were opened up.

As a result of continued human activity during the later prehistoric period and historic times the lime dominated woodlands of the Avon valley were greatly reduced, so that all that remains today are the patches of ancient woodland on the steep slopes of the western side of the Avon Gorge at Leigh Woods. The present Avon Gorge woodlands include *Prunus avium* (wild cherry) and rare species of whitebeam (*Sorbus*) and it is interesting to note that both *Prunus* and *Sorbus* pollen are recorded at very low frequency in the Deanery Road pollen diagram.

Conclusions

The buried peat bed at Deanery Road represents the sediments of a freshwater marsh which started to form some 5500- 6000 years ago, in a hollow surrounded by alder carr, at the side of the tidal river Avon. The marsh appears to have been subject to occasional small inundations of brackish water, probably at particularly high tides. One of these events was of higher magnitude, causing the deposition of clay on the marsh surface and resulting in the demise of the fringing alder woods. The pollen diagram from the peat bed also provides a record of the woodland which grew on the drier, higher land around the site. It has demonstrated a link between the woodlands which grew in the valley of the Avon in early Neolithic times, and those which persist in the Avon Gorge today. As Rackham (1982) predicted, the pollen data show that lime was indeed the dominant species in the original wildwood of the area, and it was associated with oak and hazel. These lime woods appear to have been exploited by local populations and as a result the composition of the canopy layer changed, with oak and hazel increasing at the expense of lime. The palaeoecological analyses from the Deanery Road site are important in the context of the Bristol area. They provide the first evidence of the pre-settlement vegetation of the Avon valley in the city region and form a record of the history of the Avon valley woodlands in the early part of the Neolithic period.

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The Flora of the walls of Bristol

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Bristol is a city of ancient walls. Most are built of limestone, some of pennant, a very few of brick, but all are set in mortar. Some are capped with copper slag, or have square blocks of slag included, as this was cast for the purpose by an enterprising copper smelter in the 19th century. The slag is usually totally un-weathered, and supports no plants. Most walls date from the 19th century, but a few are much older. All walls have a life history, which begins when they are new built, and have no flora on them. They gradually acquire more plants, and, unless they are then cleaned and re-pointed, or rebuilt, as will certainly happen if they are retaining walls, they are eventually taken over by ivy, and then by trees, usually Ash or Sycamore, whose expanding roots force the wall apart and eventually demolish it completely, so that its course can only be followed as a heap of stones. Every type of wall in that long process can be found in Bristol, including many that began life as field boundaries before the city expanded, a few of which may have been dry-stone walls. There are many differences between walls that affect the plant-life on them. The most important is the distinction between retaining walls, where there is access to water at all times, and boundary walls, which can dry out. Many walls are part retaining and part boundary. There is also a clear difference between the top surface of a wall, which is the easiest site for plants to colonise, and the vertical surface. The top of a retaining wall may be the surface of the soil it is retaining, in which case I have ignored the plants on it. The amount of sun

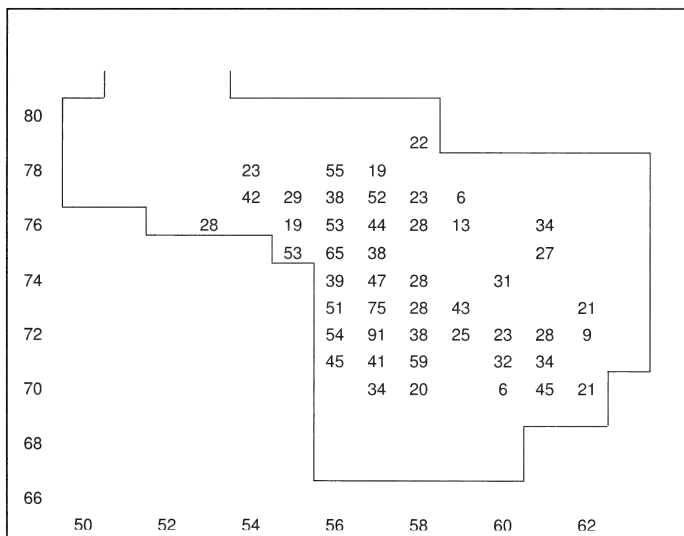
that a wall receives is affected by the way it faces, and by the shadow that affects it. In a town many boundary walls have only one face that can be observed, and I never included the plants on the garden face of walls. Plants of the walls built to retain waterways, especially where the water is saline, have their own special species.

This survey was done in 2002 and 2003, and analysed by 1-km squares to obtain information about the frequency of occurrence of different species. This seemed a better idea than using the individual wall as the basis for the frequency analysis, because walls differed so much in length and type, and using 1-km squares enabled the results to be compared with the general frequency of the species in the Flora of the Bristol Region published in 2000. 46 of the 115 1-km squares of the city were visited, and are shown on the map which shows the number of species found in each square. The survey concentrated on the older parts of the city where walls are most frequent. Square ST 5772, in Clifton, produced the most species (96). More modern areas often use only hedges to divide properties, though some retain walls from former field and road boundaries. Interestingly the development at Bradley Stoke, outside the city boundary, has turned back to having walls as a security feature, though they are too new to have much flora. A total of 206 species were found. Grasses and sedges were excluded from the survey, with the exception of Pendulous Sedge. All species are given their English name, using Stace, 1997. They include a number of escapes from neighbouring gardens, and a surprising number of trees and shrubs. A few groups were not identified to species level- particularly Dock, Currant, Rose, Strawberry, Hawkweed, usually because the plant was too small or not flowering to enable more accurate identification. They are identified by the addition of sp. to the name. All the tables give the percentage frequency of the species concerned

I defined a species as "rare" on Bristol walls if it occurred in 10% or less of the squares visited. Using this definition 110 species were rare and 96 relatively common. Of course more detailed work in some of the squares in which I spent less time might have altered that figure a little, but it emphasises an important point. Almost any species, however improbable, may be found on a wall for the simple reason that on most walls there is little plant competition, and if a seed lodges in a wall, it may germinate. I was able to compare the frequency with which plants occurred with the frequencies on the walls of the Chew valley which were surveyed by RM Payne in 1989. He surveyed 140 square kilometres, and selected 305 individual walls, so that there was at least one in each 1km square, on which he found 291 species, including grasses. Of these 114 species only occurred on one or two walls. For purposes of comparison I used a figure of 5% or

less to define “rare” wall species in Chew valley, because his figures are based on the proportion of walls on which a species was found, not the proportion of squares. His study did not identify the sites of the walls, so that it is not possible to compare the two exactly. In the tables below where there is a zero percentage figure it means the species was present, but on less than 1% of walls. A blank indicates absence.

Thirty of the Bristol “rare” species were aliens of garden origin, having jumped over the wall and begun a journey that might lead to the pavement and then the gutter, and, from there, the world. As the spread of “alien” species is a major cause of botanical change it is important to record when and how a plant moves from the safety of cultivation to the tough world of survival in the wild. Thirty species were tree or shrub seedlings, planted by Jays or Squirrels, deposited by birds feeding on their berries, swept on to walls by wind, or simply fallen on to the wall top. Such trees rarely survive the drought of summer, but, when they do, they can destroy a wall faster than any other plant.



Map. An outline of the city of Bristol, with the number of species observed on walls in the squares visited.

Only 21 species were present in more than 50% of the squares. Below I subdivide the species found into a variety of different groups.

a) Wall specialists.

There were 21 species that specialise in walls as a habitat, many of them rarely being found in other habitats apart from rock faces, pavements and gutters. Unsurprisingly ten of them were in the top 25 commonest wall species. They are listed in frequency order in Table 1, and compared with their frequency in Payne's survey of Chew Valley walls. Ivy was the commonest species of all, though frequently it is an invader of a wall from the ground below rather than growing in it from seed. It is also a major destroyer of walls, partly because once it reaches the top a very heavy flowering head is produced, which can readily cause capstones to topple, partly that its roots run through every interstice. The Ivy-leaved Toadflax was as frequent, a very early coloniser of walls, which has one of the longest flowering periods, typically 42 weeks of the year. Three of the four ferns, Wall-rue, Hart's-tongue and Maidenhair Spleenwort, are next in frequency. Hart's-tongue tends to occupy the darkest and dampest sites, and is happy on brick walls. Rustyback is the rarest of the common ferns, only present in 46% of squares, and it must be a bit more choosy about its habitat.

The two closely related alien Bellflowers, Adria Bellflower, the deeper blue and more bell-like flower, and Trailing Bellflower, lighter and more star-shaped, share with Ivy-leaved Toadflax a very long flowering season. (See colour plates) Adria can usually be found in every week of the year, but Trailing has a brief dormancy between late February and early May. Both bring a dramatic splash of brilliant blue in mid June. Their tiny seeds, and the ability of their roots to find any weakness in the masonry, ensures their spread, but to my surprise they were only found in around 60% of squares. They can totally dominate a wall on occasion. That is also true of Red Valerian and Yellow Corydalis, both also present in around 60% of Bristol squares, both also in flower in almost every week of the year, both with very tough and resistant root systems that make them almost impossible to remove without rebuilding a wall. The combination of the three colours ensures that many walls can be startlingly colourful in mid summer. It is interesting that all these four species were more or less unknown in the Chew Valley study. Why the urban environment suits them so well is a mystery.

Pellitory-of-the-Wall has tiny reddish flowers which become tiny reddish fruit, and it is hard to tell when it has ceased to flower. It seems to like the

shadiest walls. It too was absent from Chew. Wall Lettuce is mainly associated with the tops of walls rather than the vertical surfaces that all the previous species populate, and can be found in bloom from early June to the end of October. It is the most delicate of all the "dandelion type" flowers. The remaining nine species, including Wallflower and three Stonecrop species, were all distinctly infrequent both in Bristol and Chew.

	Bristol	Chew
Ivy-leaved Toadflax	96	46
Ivy	96	52
Wall-rue	89	40
Hart's-tongue	80	23
Maidenhair Spleenwort	67	28
Trailing Bellflower	65	0
Adria Bellflower	61	1
Red Valerian	61	6
Yellow Corydalis	59	4
Pellitory-of-the-wall	50	2
Wall Lettuce	46	30
Rustyback Fern	46	8
Wallflower	15	1
Wall Speedwell	13	11
Polypody	13	13
Biting Stonecrop	11	11
Black Spleenwort	7	1
Navelwort	2	6
Reflexed Stonecrop	2	3
White Stonecrop	2	0
Fairy Foxglove	2	0

Table 1 Wall specialists listed by percentage frequency

b) Wet wall species.

The walls of the city docks, the walls that line parts of the New Cut and Avon estuary, and the walls that confine the Frome and Trym in some areas, have a distinctive flora, listed in Table 2. The estuarine walls have salt tolerant species, especially Sea Aster, Wild Celery, Hemlock Water-dropwort and Sea Plantain, and a few had Greater Sea-spurrey. The fresh water walls usually had Gypsywort, and a few had Himalayan Balsam and Water Figwort, as well as Alder trees mentioned below. Of these species only Gypsywort and Hemlock Water Dropwort occurred in Chew.

	Bristol	Chew
Gypsywort	20	1
Wild Celery	15	
Sea Aster	15	
Sea Plantain	11	
Hemlock Water-dropwort	9	6
Greater Sea-spurrey	7	
Water Figwort	4	
Himalayan Balsam	2	

Table 2 Wet wall species, listed by percentage frequency.

c) Trees and shrubs

There were 53 species of trees and shrubs, 31 alien, including at least four Cotoneaster species, and 22 native. Only 24 of these species were found in the Chew Valley, and there Elder was much the most common. They are listed in Table 3.

The most frequent by far was the Butterfly Bush (*Buddleia*), whose tiny seeds can lodge anywhere. It was almost unknown in the Chew Valley study. Elder, Ash, and Sycamore were the next most frequent, and this suggests that the two quite different methods by which they seek to spread their seeds are equally successful. These three species most often grew in the tops of walls, where seeds had lodged, and were also responsible for the destruction of walls as their expanding roots sought water at the base of walls in dry seasons. They were also three of the commonest tree species that featured on Chew valley walls. Almost as successful was Wall Cotoneaster, and other Cotoneaster species, which also are usually found on wall tops, presumably originating in bird droppings. Firethorn, Hawthorn, Holly and Yew, all similarly spread and with similar sized fruit, were all much less frequent, and are perhaps more fussy about the conditions in which they will germinate. Seedling Elm and Silver Birch were common, but rarely achieved any size. Holm Oak was present, often on vertical faces, in 17% of squares. These trees derive from being planted by Jays. They are very tough and survive well. Common Oak was only found once, and the difference is perhaps caused by the smaller acorn of the Holm Oak, and the fact that it produces a far heavier crop in most years. Common Alder was common on dockside and river walls, as their seeds float, and settle in any convenient niche.

The Duke of Argyle's Tea Tree, an uncommon alien sometimes used in hedging, can readily get into walls, and come to dominate them as it does at Netham in particular. The same is true of Tutsan, which dominates a wall at the top of Redland Hill to spectacular effect. Forsythia, Kerria and Jasmine often penetrate walls from gardens, and send out shoots. These plants are essentially suckers.

	Bristol	Chew		Bristol	Chew
Butterfly Bush	76	2	Wild Privet	9	2
Ash	59	10	Rowan	9	3
Sycamore	54	11	Barberry sp	7	0
Elder	52	37	Hedge Veronica (<i>Hebe</i>) sp	7	0
Wall Cotoneaster	48	7	Summer Jasmine	7	0
Silver Birch	26	0	Laurel	7	0
English Elm	26	3	Hazel	7	2
Flowering Nutmeg	24	0	Bay	4	0
Snowberry	20	2	Himalayan Cotoneaster	4	0
Common Alder	20	9	Common Fig	4	0
Holm Oak	17	0	Fuchsia sp	4	0
Firethorn	17	0	Garden Lavender	4	0
Lilac	17	2	Oregon Grape	4	0
Rose of Sharon	17	0	Rosemary	4	0
Hawthorn	17	10	Duke of Argyle's Tea Tree	4	0
Forsythia	15	0	Wilson's Honeysuckle	4	0
Franchet's Cotoneaster	15	0	Wych Elm	4	1
Tutsan	15	0	Gooseberry	4	2
Yew	15	1	Dogwood	2	0
Holly	15	2	Italian Alder	2	0
Cherry	11	0	Grey Alder	2	0
Kerria	11	1	Winter Jasmine	2	0
Norway Maple	9	0	Common Oak	2	0
Goat Willow	9	0	Grey Willow	2	0
Lawson's Cypress	9	1	Cotoneaster X waterii	2	1
Currant sp	9	1	Horse Chestnut	2	1
			Wayfaring Tree	2	1

Table 3 Tree and shrub species listed by percentage frequency

d) Species present in Bristol and absent in Chew valley.

48 species were present on Bristol walls that were not found in Chew Valley at all. They are listed in Table 4. All but six of them were found in fewer than 10% of squares, including 20 aliens that were mostly garden escapes. The six species that were more widespread were led by three aliens that are all very common in Bristol, but rare outside it. They were Canadian Fleabane, present in 39% of squares, Green Alkanet, present in 33% of squares, and Blue Fleabane, present in 28%. In the Flora of the Bristol Region all three species are only present in 9-12% of squares, and it is probably the existence of so many walls in Bristol that encourages their presence. Mexican Fleabane is another alien that has colonised many city walls. It is a very pretty little plant, which comes into flower in May and lasts until December. It produces copious tiny seeds, but they are not very mobile, so that it has so far only spread to 15% of squares. I suspect it is expanding fast. Two other species are present in more than 10% of squares, Ploughman's-spikenard, normally a plant of limestone rocks, and Wall Rocket whose yellow flowers can be found between April and November.

Canadian Fleabane	39	Field Madder	4	Pot Marigold	2
Green Alkanet	33	Fox & Cubs	4	Wineberry	2
Blue Fleabane	28	Greater Knapweed	4	Spotted Dead-nettle	2
Wall Rocket	20	Harebell	4	Greater Periwinkle	2
Mexican Fleabane	15	Wild Madder	4	Blue-eyed Mary	2
Ploughman's-spikenard	11	Wild Marjoram	4	Alexanders	2
Foxglove	9	Vervain	4	Buck's-horn Plantain	2
Ivy Broomrape	9	Corn Salad sp	4	Common Centaury	2
Sweet Alison	7	Senecio cv sunshine	4	Dog's Mercury	2
Goldenrod	7	Spurge sp	4	Fennel	2
Beggarticks	4	Lady's-mantle	2	Hedge Mustard	2
Canadian Goldenrod	4	Golden Alison	2	Common Knotgrass	2
Japanese Anemone	4	Californian Poppy	2	Red Bartsia	2
Evening Primrose sp	4	Cypress Spurge	2	Violet sp	2
Spread Yellow Sorrel	4	Corsican Hellebore	2	Wood Sage	2
Wild Carrot	4	Fly Honeysuckle	2	Purple Loosestrife	2

Table 4 Species present in Bristol and absent in Chew valley.

e) Species present in both Bristol and Chew Valley.

i) Aliens. Seven alien species, listed in Table 5, were found in both sites, though all were far more frequent in Bristol than Chew. Snow-in-Summer has creeping stems that root readily in any surface, and it frequently escapes garden limits. Aubretia commonly falls over the garden wall and seeds into the outer face. Welsh Poppy is hard to establish in a garden, but once present is impossible to get rid of, and though the heavy seeds simply fall around the plant, something seems to transport them vertically to wall tops, whence they spread to vertical surfaces. Rosa sp were fairly frequent in Chew, presumably mostly Dog Rose, much less so in Bristol, where they can be any species.

	Bristol	Chew
Snow-in-Summer	37	2
Aubretia	17	2
Aster sp	15	1
Welsh Poppy	13	1
Columbine	13	1
Balm	9	0
Rosa sp	4	10

Table 5 Alien species present in both Bristol and Chew

ii) Species rare in both Bristol and Chew

20 species were infrequent in both surveys and are listed in Table 6. Procumbent Pearlwort prefers pavement cracks to wall surfaces.

	Bristol	Chew		Bristol	Chew
Rough Hawkbit	9	4	Cat's-ear	2	4
Ox-eye Daisy	9	2	Common Mallow	2	3
Hedge Bindweed	9	1	Teasel	2	3
Procumbent Pearlwort	9	0	Black Medick	2	2
Great Mullein	7	1	White Clover	2	1
Raspberry	7	0	Grey Field-speedwell	2	1
Perforate St John's-wort	7	0	Creeping Cinquefoil	2	1
Mouse-ear-hawkweed	4	3	Smooth Hawk's-beard	2	0
Greater Celandine	4	2	Enchanter's-nightshade	2	0
Strawberry sp	4	1	Common Figwort	2	0

Table 6 Species rare in both Bristol and Chew

iii) Species common in Bristol and rare in Chew.

There are 20 of these species, listed by their Bristol frequency in Table 7. Nine of them are present in more than 30% of Bristol squares, and thus form a prominent part of the Bristol wall flora, and it is not easy to explain why they should be so infrequent in the countryside. They include Rosebay Willowherb, Hemp Agrimony, Prickly Lettuce, Wood Avens, Snapdragon, and Purple Toadflax. Hawkweed sp are also frequent, as are Pendulous Sedge, and Oxford Ragwort.

	Bristol	Chew
Traveller's-joy	43	2
Rose-bay Willowherb	43	2
Prickly Lettuce	39	0
Wood Avens	37	4
Hemp-agrimony	35	5
Annual Mercury	33	2
Field Bindweed	33	5
Snapdragon	30	1
Purple Toadflax	30	0
Hoary Willowherb	26	5
Mind-your-own-business	26	0
Oxford Ragwort	26	0
Bittersweet	24	4
Hawkweed sp	22	1
Petty Spurge	20	2
Feverfew	17	4
Great Willowherb	17	4
Pendulous Sedge	15	1
Greater Plantain	13	2
Mugwort	13	0
Selfheal	11	0

Table 7 Species common in Bristol rare in Chew

iv) Species Rare in Bristol and Common in Chew

There are eleven species that were rare in Bristol but common in Chew. They are listed in Table 8 in order of their Chew frequency. Cow Parsley leads the list. It is a very common plant of wall edges in the countryside, but not as widespread in urban areas, which may account for the difference. Bristly Oxtongue however is widespread on waste ground in Bristol, and its relative absence from walls, given its wind-borne seeds, is odd. The same might be said of both Groundsel and Prickly Sowthistle. Creeping

Buttercup was highly exceptional in Bristol, but relatively frequent in Chew.

	Bristol	Chew
Cow Parsley	4	30
Bristly Oxtongue	9	21
Hairy Bitter-cress	7	19
Groundsel	9	14
Creeping Buttercup	2	10
Prickly Sow-thistle	7	9
Forget-me-not sp	2	9
Red Dead-nettle	4	7
Hogweed	4	6
Common Chickweed	2	6
Ground Elder	2	6

Table 8 Species common in Chew, rare in Bristol, listed by Chew frequency.

v) Species common in both Bristol and Chew.

There are 21 species that are relatively frequent in both surveys. They are listed in Table 9 by the extent of difference between Bristol and Chew. The proportion of squares in which each species is recorded in the Flora of the Bristol region is also listed. The most striking feature of this list is that it includes a substantial proportion of the most widespread plants in the region. Fourteen of the species were found in more than 80% of squares in the Flora of the Bristol Region. Equally striking is the fact that all except two species are far less widespread on walls than they are in other habitats. In other words they appear on walls, most often on their top surface, simply because they are very common species, but they are ill-adapted to wall life. There are two exceptions. Smooth Sow-thistle was just as widespread on walls as in the wider environment, being present in 74% of each, but it was far more widespread on Bristol walls than in Chew Valley. Secondly Broad-leaved Willowherb is more widespread on Bristol walls than in Chew valley or in the wider environment. Cleavers was the one species that was far more common on Chew Valley walls than it was on Bristol ones.

	Bristol	Chew	Flora	Difference
Broad-leaved Willowherb	83	21	42	62
Smooth Sow-thistle	74	24	74	50
Ragwort	52	6	78	46
Bramble	78	35	95	43
Male Fern	39	6	63	33
Herb Robert	72	45	89	26
Dandelion sp	78	57	100	21
Dock sp	26	10	87	16
Ribwort Plantain	30	16	94	14
Spear Thistle	20	7	94	12
Autumn Hawkbit	15	8	50	7
Nipplewort	28	21	78	7
Creeping Thistle	11	6	96	5
Yarrow	11	7	91	4
Garlic Mustard	13	12	84	1
Common Nettle	52	53	97	-1
White Dead-nettle	13	19	78	-6
Cleavers	11	45	96	-34

Table 9 Species common in both Bristol and Chew, listed by difference between the two

The flora of walls in other areas of England.

I have collated data from five earlier studies that include the frequency of species on walls, though only the Kent's study of Middlesex in 1961 and Payne's of Essex in 1978 were based on substantial samples. The three earlier studies examined up to nine common species, and cannot be compared effectively with the others. I have deleted grass species from the list because I did not include them in my study. Table 10 shows the average frequency of the 29 species recorded elsewhere arranged in order of the difference between this study and the average of the three most recent studies. It is apparent that only nine species lie outside a difference of plus or minus 20%, which, given the variety of dates and methods, suggests broad similarity. The top nine species appear to be commoner in Bristol; Ivy, Ivy-leaved Toadflax, Broad-leaved Willowherb, Buddleia, Wall-rue, Dandelion, Bramble, Herb Robert and Sycamore. There are also of course another nineteen species present in over 30% of Bristol squares that are not mentioned in these other studies at all. It is intriguing that this list only includes six of the 21 species that I would regard as wall specialist. Clearly there is room for further studies of wall flora.

Author	Rishbeth	Grose	Woodell	Kent	Payne	Payne	Bland		
County	Cambs	Wilts	Durham	Middx	Essex	Avon	Bristol		
Author		JR	DG	SW	DHK	RMP	RMP	RLB	
County		C	W	D	M	E	A	BS	
Date		1948	1957	1959	1961	1978	1989	2002	
Sample size		na	18	16	500	650	305	46 km	Avg D
Ivy			78		2	27	52	86	27 59
Ivy-ld Toadflax		25	56		24	17	46	81	29 52
Bd-l Willowherb				15	8	5	21	60	11 49
Buddleia					7		2	49	5 45
Wall Rue			50		2	5	40	60	16 44
Dandelion		29	83	25	13	16	57	67	29 38
Bramble					2	15	35	46	17 29
Herb Robert			50		1	5	45	45	17 28
Sycamore		13		14	8		11	33	10 24
Sm Sow-thistle			44		19	35	24	46	26 20
Hart's-tongue					4	10	23	29	12 17
Maidenhair Spleenwort					1	5	28	27	11 16
Rustyback Canadian Fleabane			63		1	5	30	28	12 16
Silver Birch					9		0	14	5 10
Bittersweet					7		0	13	4 10
Elder		17		20	6	19	37	27	21 6
Snapdragon		25			7		1	9	4 5
Nipplewort					1	5	21	13	9 4
R Willowherb		15		21	24		2	17	13 4
Nettle			67		4	16	53	27	24 3
Oxford Ragwort					25	29	0	12	18 -6
Bracken					13		0	0	7 -7
Male-fern					35	22	6	14	21 -7
Wh Dead-nettle					8		19	6	14 -8
Pro Pearlwort					17	18	0	4	12 -8
Groundsel		16		11	9		14	3	12 -9
Cow Parsley					1	7	30	1	13 -12
Cleavers			56		1	12	45	5	19 -14

Table 10 Wall species in other surveys, listed by the difference between Bristol and the average of the other studies.

G) The significance of Bristol's wall flora.

One of the striking features of the Flora of the Bristol Region is the way the flora of the city of Bristol appears to differ from the flora of the rest of the region. There are a variety of species which are far more frequent within the city than outside it, and vice versa, and this stands out as a distinctive feature of the Flora maps. There are a variety of possible causes of these differences. The habitats in rural areas are often very similar over large areas- they may be arable fields with hedges, grass fields, broad leaved-woodland or coniferous woodland, and in a few areas saltmarsh. The flora may vary with underlying geology, and remnant rare plants may linger in a variety of sites that for whatever reason have not been affected by human activities. The city by contrast is in every way affected by human activity, retains little of its original flora except in a few specific sites such as the Avon gorge, or the Avon estuary, and habitats vary extremely rapidly from place to place. Many areas of the city are uncultivated, and the wide variety of habitats gives opportunity to many species, especially aliens from gardens or commerce, which are absent elsewhere. And walls are a very important part of this habitat variety, often a site free from the competition of other plants where seeds can readily germinate, and sometimes establish themselves permanently. Clearly many of the plants found on Bristol walls are common plants found in all habitats. But many more are species for whom Bristol walls provide a special opportunity unavailable on the same scale elsewhere. They are a vital and fascinating part of the city flora.

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A note on Mistletoe hosts.

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JW White mentions 14 tree species upon which he had recorded Mistletoe. He notes only one or two records for 7 species, with the implication that the rest are relatively common. He says Mistletoe is particularly common in N. Somerset orchards. In the 2000 Flora it is present in 306 one-km squares, 20% of the region, and it is most common in S Gloucestershire. The orchards of N Somerset have largely vanished. It is not easy to explain its absence from so much of the area when its four commonest host species, hybrid Black Poplar, Apple, Common Lime, and Hawthorn (in that order) are far more widespread. Unfortunately the Flora under-records all planted tree species, so that, while Hawthorn is recorded in 97% of squares, the recorded proportion of the other three species is small, but is a fraction of reality. There are very few records of bird species actually eating Mistletoe berries, and it is plain that the vast majority of the ripe berries simply fall from the plants in spring. On the other hand I have found Mistletoe on several quite young trees, aged ten years or less, though I have failed to keep any notes on this. It ought to be possible to age a Mistletoe plant itself. Its initial growth is very slow, taking three or four years to establish. Once a tree becomes a host Mistletoe spreads within it. I have never seen a tree apparently killed by mistletoe, and only once seen dead Mistletoe on a tree. The implication is that the rate of spread is very low, and that a major cause over time of distribution change is the death or felling of host trees.

I have recorded Mistletoe in 107 1km squares, mainly in ST46, ST57, ST58, ST68, and ST69, some of them new to the Flora. I have kept a note of the host species by one-km square, in order to discover some order of preference. It seems to be the case that it is easier for the seed to gain a foothold in some species than others, which is probably related to the nature of the bark, but also to the frequency with which the species occurs.

The species, and the percentage of the total species-squares that they represent, is shown in Table 1. I have found it on 12 species, of which eight are recorded by White. He had it on another 6 species on which I have yet to find it. There could be several reasons for the difference over a century. White's work was the product of thirty years of record-keeping rather than just two winters. The tree species structure of the region has altered a little, as Elm has declined, at least as a substantial tree, and the variety of trees planted in streets has changed. Clearly the substantial orchards of the past have vanished.

But White had only two records for Common Lime, and does not mention it in Penpole Woods, or Ashton Park, with which he was familiar, where it proliferates today. By implication he found it regularly on Ash, Aspen and Elm, on which I have never seen it. The differences in status are listed in Table 1. There is a moral here. The process of botanical change is subtle and continuous, and to understand it our recording methods must be the same.

Species	White status	% Sp/km	Species	White status	% Sp/km
Black Poplar	Common	50	Sycamore	Rare	1
Apple	Common	25	Horse Chestnut	Nil	1
C Lime	Rare	22	Field Maple	Rare	1
Hawthorn	Common	12	Ash	Common	0
Robinia	Rare	6	Aspen	Common	0
Rowan	Nil	2	Elm	Common	0
Silver Maple	Nil	1	Grey poplar	Rare	0
Crataegus	Nil	1	Pear	Uncertain	0
Willow	Rare	1	Whitebeam	Rare	0

Table 1 Mistletoe hosts by frequency

Communication

S. M Taylor, Hon. Archivist, 10 Cheddar Close, Nailsea, BS48 4YA

Items left by the late A. C. K. Fear, a BNS member from 1937 to November 2005 – and an inveterate hoarder of paperwork – triggered reflections on how the flow of information between the Society and its members has developed over that period. Until 1946, members paid a subscription to the Society with an extra sum for each Section they wished to join, and it was the task of a Section Secretary to keep his or her members informed of indoor or outdoor events. Following the reorganisation in that year, all members became members of all Sections, and every full member received a programme card twice a year, listing the winter or summer meetings of the Society and its Sections, and a (nearly) monthly circular, a practice we still follow. Those who declared a particular interest in any Section paid also one shilling (five new pence) per Section, to cover the cost of sending out details of programme changes etc. Postage for “printed papers” was then one (old) penny.

Circulars in the War years, from late 1939 to 1945, revealed signs of austerity. The Ornithological Section met in members' homes, and in view of the ‘blackout’, when all lights visible outdoors were forbidden, chose to meet at or near the full moon, to make walking or cycling easier. The German ‘blitzes’ of November 1940, also making use of the full moon, led

to a speedily communicated decision to change back to darker nights. With petrol strictly rationed, excursions were made by train, so that locations as well as nourishment were limited. Thus in September 1941 members visiting Bitton were advised that "Professor Gordon hopes to arrange for the party to be supplied with cups of tea but regrets that food will not be obtainable", while a year later those going to Farrington Gurney were bidden to "bring sandwiches etc for tea", and on an excursion to the Radstock area, "Tea will be provided at the Lamb Inn, Radstock, bring your own food and sugar." Collection of paper for salvage was a major patriotic duty; in June 1942, members who were contemplating giving copies of the *Proceedings* for salvage were asked to check first with the Librarian as stocks of some parts were low.

There are traces too of the fact that food rationing continued in Britain for seven years after the War. For a general field meeting to the Providence area of Long Ashton in April 1947, the circular announced, "Tea (1/6d) at the Jubilee Inn, Flax Bourton, at 5 pm. Cakes should be brought if desired". An all-day visit by coach to the Quantocks in June 1952 ("provide your own lunch") would cost 12/- (60 p) including tea at St Audries Hotel at 5 pm; a boiled egg for tea could be obtained for an extra sixpence.

By the 1960s, conditions had improved, and the words "a cream tea will be taken" delighted those planning to visit Dunster, Dunkery, Horner and similar Exmoor spots. Both general and ornithological outings would end at the Horner tea gardens, except on one occasion when through use of the informal but efficient Women's Institute communication network, the W. I. at Exford produced an excellent tea for over 40 birdwatchers in their hall.

R. Bassindale, lecturer in the University Geology Department, was the Society's Honorary Secretary for many years. From time to time he would circulate what he called his "Comic Cuts", containing any changes to arrangements, as well as a discursive and enthusiastic account of each forthcoming meeting. (For younger members, "Comic Cuts" was a children's picture comic, appearing weekly from May 1890 until 1953. Brainchild of the press baron Alfred Harmsworth and modelled on his adult "Titbits", it was the first of many imitators. Its title became a generic term, often mildly derogatory, for any routine report.)

As an example, his circular dated February 24, 1948 (a single white foolscap sheet, typed on both sides) gave details of dates and times when our Library would be open, and notes on all the March meetings. The General Meeting was to see four diverse films. The briefest notice, on the Geological Section's meeting, read thus:

“Mr Donovan, who is a member of the University Geology Department’s staff, was in East Greenland last summer and will be talking of the expedition of which he was a member. A talk from the man who was there is always interesting and members can be assured of an authoritative and interesting account.”

After a reminder that the Society was about to change to its summer calendar, for which Field Secretary Miss M. D. Hiley would be sending out notices, came these verses, attributed to Anon - most probably “Bass” himself.

“Winter

In winter time we can’t have walks, Instead we gather to hear talks;
Very rarely the talk is frightful, Much more often, it’s delightful.

Summer

‘What is life if, full of care, We have no time to stand and stare?’
Thus runs the creed of B.N.S. - What ‘joie de vivre’ they possess!
They study nature in the raw And learn to love it more and more.
Each wayside flower, each blade of grass Must be examined ere they pass.
(Especially when the road seems rough, Since Naturalists are not so tough).
In summer time they leave their beds, Throw off their crutches, raise their heads;
In panamas and shorts and things. They make a picture fit for kings.
You can discern them by their dress – Say, “Yonder goes the B.N.S.!”
‘Tis then we look at rocks and flowers, And walk about for hours and hours.”

From 1948 general notices appeared on pink paper, so that they could be readily spotted amongst other documents – the Pink Sheet was born, and continued as the main ten-times-a-year source of information for over fifteen years.

Coach trips were an essential feature of our post-war outdoor programme, as few possessed private cars. For all-day trips, members were sometimes provided with two or three pages of notes on the botanical, entomological, ornithological, geological and sometimes archaeological features they might encounter. The Geological Section was best at this (its subjects were unlikely to be out of bloom or to have migrated) and often provided a booklet of 16 or 20 pages, made up of four or five folded foolscap sheets, containing details of interesting features, together with a sketch map and, sometimes, diagrams of rock sections.

Occasionally, being a Section Secretary could have far-reaching results. Igor Loupekine, son of Russian émigrés, acquired a first-class degree in Geology at Bristol in 1943 and was made an assistant lecturer in the Department and thus a junior colleague of “Bass”, who forthwith drafted him as Secretary of our Geological Section, a post he retained even after 1947 when, now with a doctorate, he was appointed to a full lectureship. Ten years later he left Bristol, the BNS and the Section Secretaryship to become Senior Lecturer and then in 1960 Professor of Geology at the Royal

East Africa Technical College, Nairobi. Here, with a colleague, he set up the successful Geological Club of Nairobi, modelled closely on the BNS, whose members made important discoveries.

In 1957 an additional method of communication appeared, direct to the public. Our Council, concerned to raise membership, sought via April's Pink Sheet a volunteer to act as Publicity Secretary. The task was assumed by an energetic young member who had joined in 1951; as part of his task he wrote a column for the weekly *Bristol Observer* on the Society's doings and other items of current natural history interest, under the pen-name of "Timothy Grass", which continued until the paper ceased publication in 1962. In 1997 the same member, Brian Frost, still energetic though no longer young, succeeded Miss Sheila Garden as Circulation Secretary, responsible for the distribution of all our publications. In 2005 he also took on the role of Honorary Secretary, involving frequent communication with all Council members, made easier as most of them use electronic mail.

In the 1960s the present writer, then Secretary of the Ornithological Section, would from time to time prepare "Occasional News", a foolscap sheet crammed on both sides with notes on birds and other natural history topics. These were typed at home on a "skin" and reproduced after hours on the Roneo duplicator in his employers' Research Library, the Librarian having arranged an adequate supply of paper. C.S. Carlile, for many years the Society's Honorary Secretary, had retired to the country but when increasing infirmity brought him back to Bristol he became Circulation Secretary, inserting Bulletins into envelopes pre-addressed by others by means of the Society's sometimes temperamental Addressograph machine. He had mildly complained that folding and inserting the extra page was onerous, so thereafter newly minted sheets were taken by bicycle during the afternoon to his flat near Durdham Down. While he "put the kettle on" the writer proceeded with envelope stuffing, and being Carlile's junior by at least 40 years, had much of it finished by the time tea and biscuits arrived, and so was able to regain his workplace in good time to go home.

Eventually the Pink Sheet proved inadequate to hold the required information and in May 1964 it was replaced by the Bulletin. Originally edited by Brian Frost, this was at first limited by cost to two, rarely three A4 sheets folded to make a booklet of eight or twelve pages. Its strikingly yellow paper soon earned it the title of Yellow Peril. As time passed and finances improved its colour paled, its size grew and its content expanded to include reports of field meetings, news of library acquisitions, Tree Watch, Phenology and other matters of interest. In April 2003 it assumed its present discreet pale buff aspect. The Bulletin has matured, and become a "good read".

In the mid-1980s the Society moved into the electronic age with adhesive address labels printed from a computerised data base, so that the dreaded Addressograph could be retired. Then, in a millennial leap forward, in 2000 we acquired a presence on the World Wide Web, where matters of interest and significance can be found. What does the future hold - Bulletins on our mobile phones and iPods? "Beam me up, Scotty!"

Bristol & district Invertebrate report, 2005

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Introduction

2005 seemed a fairly quiet year, perhaps because there was very little immigration of insects from the continent compared to some years. The winter was mild until February when there was a period of colder weather, but nothing out of the norm. The mild period over Christmas 2004 led to bumble bee activity very early in the New Year as noted by Robin Williams, Lyndon Roberts and Mary Hill, for example, in sites ranging from central Somerset through Bristol to Gloucester. The spring was rather cool, windy and damp although the rainfall was not heavy. The earliest Orange-tip butterfly noted was on 2nd April by Mike Johnson at Blagdon Lake. The summer continued in a similar vein to the spring and the autumn too was unremarkable.

Of note was the reappearance of the Glanville Fritillary at Sand Point where it had been introduced originally in the 1980s and seemed to have died out a few years ago. It is quite likely that the butterfly was reintroduced from captive stock although no one has admitted to such a deed. The Small Pearl-bordered Fritillary continued to hang on in the region at Sandford, although Kurt Vickery reported numbers down on 2004. The odd example of the Marsh Fritillary cropped up again possibly due to releases of captive stock although remnant native populations may feasibly still be present.

Comment in the press remarked on the paucity of social wasps nationwide. The cold snap in February may have been to blame, catching out many queen wasps as they emerged from hibernation. This followed a very good year for such wasps in 2004. In contrast to common species of wasp, the Hornet had a good year locally and was reported from a couple of sites somewhat away from the known woodland site at Wetmoor in South Gloucestershire. This may suggest that this splendid insect is having a



Trailing Bellflower



Adria Bellflower



Ivy-leaved Toadflax



Maidenhair Spleenwort



2006/4/22 8:43

Mistletoe on Rowan and on Lime



Blue Sow-thistle



Water skaters attack a Wasp and go into frenzy (R Muston)



Emperor Dragonfly and imago



Common Blue (D Davies)



Comma on Fleabane (D Davies)



A female Blackcap has its appearance changed by Phormium pollen (R Symes)



Swallow (D Davies)



Roe Deer (David Davies)



Mandy Leivers and the Society stand at the Harbour Festival



David Cope

resurgence in the region. The queen Hornet emerges later from hibernation than other social wasps and so presumably escaped the frosts of February.

One highlight of the year was the publication of a new identification guide. *A photographic guide to the shieldbugs and squashbugs of the British Isles* was produced by two local experts: Martin Evans and Roger Edmondson, both of whom live in Bristol. It is to be hoped that this book, with its excellent colour photographs, will stimulate more recording of these often ignored insects. Of the 43 species listed, over half can be found in our region.

My thanks to all who have submitted records directly to the Society and particularly to Robert Cropper, to the Bristol Regional Environmental Records Centre (BRERC) and to the Bristol Wildlife e-group. I have listed separately records of note from Robert Cropper for 2004, received too late to be included in last year's report. The importance of receiving, not just the records picked out here, but those of perhaps less noteworthy species cannot be understated in terms of monitoring the ever changing status of the invertebrate fauna.

Scientific nomenclature follows that given in Bradley (2000), Brooks (1997), Chandler (1998), Duff (1993), Fitton *et al* (1978) and Potts (1964).

Additional species of note to the 2004 report

Insecta

Orthoptera (grasshoppers and crickets)

Great Green Bush-cricket *Tettigonia viridissima* (L.) Leaze Drove, Bleadney, Somerset ST486449 – 491447 (vc 6) 31 July 2004 R.S. Cropper, a very good colony in rough fields. (Our largest cricket and found in occasional colonies often fairly close to the Estuary.)

Hemiptera (true bugs)

Tortoise Bug *Eurygaster testudinaria* (Geoff.) Shapwick Heath, Somerset ST422408 (vc 6) 22 May 2004 R.S. Cropper, two on *Carex nigra* heads. (Widespread but local in damp places. Care must be taken to separate it from the similar but rarer *E. maura*.)

Lepidoptera (butterflies)

Marsh Fritillary Max Meadows, Winscombe, North Somerset ST407574 (vc 6) 31 May 2004, R.S. Cropper, a singleton seen.

Coleoptera (beetles)

Hydroglyphus geminus (Fabr.) Long Sutton, Somerset ST483260 (vc 6) 19 June 2004 R.S. Cropper, several in a shallow pool in a limestone quarry. (A Nationally Notable aquatic species found in drainage ditches and ponds locally in Somerset.)

Hydroporus memnonius Nic. Long Sutton, Somerset ST483260 (vc 6) 19 June 2004 R.S. Cropper, one in a shallow pool in a limestone quarry. (Although not Nationally Notable, another scarce species in Somerset found in the same habitats as the previous species.)

Rhantus frontalis (Marsh.) Catcott Heath, Somerset ST4041 (vc 6) 3 July 2004 R.S. Cropper, one in a rhyme. (A Nationally Notable species of brackish and freshwater on the Levels.)

Hymenoptera (bees, wasps and ants)

Bombus sylvarum Cock Hill, Somerset ST378387 (vc 6) 7 August 2004 R.S. Cropper, found at this site where had been seen previously in 1992 and 1994. Also seen nearby at ST375388 21 August 2004, where, as at Cock Hill, seen at *Centaurea nigra*. A further site on the north bank of the Huntspill River, West Huntspill, Somerset ST294457 (vc 6) 14 August 2004 R.S. Cropper, a number of workers and males on *Centaurea nigra*.

Species of note in 2005

Insecta

Odonata (damselflies and dragonflies)

Keeled Skimmer *Orthetrum coerulescens* (Fabr.) A bog on the south side of Blackdown-on-Mendip, Somerset ST477567 (vc 6) 9 July 2005 R.S. Cropper, a few in flight. (In Somerset, previously only known from a few sites on the Blackdown Hills in the south and from Max Bog on the northern edge of the Mendips (first reported at the latter site in 1994 by J.P. Martin). A species associated with acidic bog.)

Orthoptera (grasshoppers and crickets)

Stripe-winged Grasshopper *Stenobothrus lineatus* (Panz.) Leighton Hanging, Somerset ST705445 (vc 6) 11 July 2005 R.S. Cropper, several stridulating males on rocky limestone slope – a new 10km record. (A local species in the region.)

Rufous Grasshopper *Gomphocerippus rufus* (L.) South Drain, Ashcott Heath, Somerset ST445399 (vc 6) 28 August 2005, a single stridulating male in grass on the banks of the drain (An atypical habitat and therefore possibly of casual occurrence, normally associated with dry calcareous grassland.)

Hemiptera (true bugs)

Tortoise Bug *Eurygaster testudinaria* (Geoff.) Pond edge close to Clarkencombe Wood, Ashton Court, North Somerset ST550715 (vc 6) 12 June 2005 R.J. Barnett, one swept from the pondside vegetation. (Widespread but local in damp places. Care must be taken to separate it from the similar but rarer *E. maura*.)

Thyreocoris scarabeiodes (L.) Crook Peak, Somerset ST35 (vc 6) 5 May 2005 Martin Evans and Roger Edmondson. (A rather local species of shieldbug.)

Sciocoris cursitans (Fabr.) Crook Peak, Somerset ST35 (vc 6) 5 May 2005 Martin Evans and Roger Edmondson. (A rather local species of shieldbug.)

Troilus luridus (Fabr.) Chantry, Somerset ST7146 (vc 6) 11 July 2005 R.S. Cropper, one on trees in disused quarry. (A species of trees and bushes and so less commonly noted than some of the other shieldbugs.)

Zicrona caerulea (L.) Crook Peak, Somerset ST35 (vc 6) 5 May 2005 Martin Evans and Roger Edmondson. (A local species found where leaf beetles occur in numbers which form a prey item.)

Scolopostethus pictus (Schill.) Thornbury, South Gloucestershire ST ? (vc 34) April 2005, M. Lush, one found in a blown down bird's nest. (A rare species associated with dry vegetative matter where it is thought to feed on fungal hyphae.)

Lepidoptera (butterflies)

Essex Skipper *Thymelicus lineola* (Ochs.) Trooper's Hill, Bristol ST628733 (vc 34) 2 July 2005 R.J. Barnett, one in long grass. Shapwick Heath, Somerset ST423411 (vc 6) 23 July, R.S. Cropper, visiting blooms of *Lathyrus sylvestris*, a new 10km square record. (Probably still increasing and extending its range in Somerset and Gloucestershire.)

Chalkhill Blue *Lysandra coridon* (Poda) Uphill, North Somerset ST3158 (vc 6) 20 August 2005 R.S. Cropper, several flying. (Still in existence at this site but a species which could easily disappear from the old "Avon" area.)

Small Pearl-bordered Fritillary *Boloria selene* (D. & S.) Sandford Quarry ST4259 (vc 6) 2005, Kurt Vickery. Also several seen freshly emerged at the same site on 31 May 2005 R.S. Cropper. (On the verge of being lost from the old "Avon" area.)

Marsh Fritillary *Euphydryas aurinia* (Rott.) Bathampton Down Golf Course, Bath & NE Somerset ST768651 (vc 34), reported to BRERC. One adult seen, a wandering individual or release?

Glanville Fritillary *Melitaea cinxia* (L.) Sand Point, North Somerset ST3265 (vc 6) 7 June 2005 P. Bowyer, one photographed. (Thought to have become extinct at this site but sightings this year indicate either a resurgence of a residual population or new introductions have taken place.)

Wall *Lasiommata megera* (L.) Crook Peak, Somerset ST35 (vc 6) 5 May 2005 Martin Evans and Roger Edmondson. (A species whose numbers fluctuate from year to year but always locally distributed in our region.)

Grayling *Hipparchia semele* (L.) Brean Down, Somerset ST2858 (vc 6) 18 July 2005 R.S. Cropper, in very good numbers. Crook Peak and Compton Hill, Somerset ST3955 (vc 6) 24 July 2005 R.S. Cropper. (A butterfly which seems to be declining at the present time.)

Lepidoptera (micro-moths)

Stigmella aceris (Frey) Chew Valley Lake, North Somerset ST ? (vc 6) 7 August 2005 R. Andrews, mine in Norway Maple. (Has become much more widespread in the British Isles in recent years.)

Antispila treitschkiella (Fisch. von Rosl.) Chew Valley Lake, North Somerset ST ? (vc 6) 21 August 2005 R. Andrews, mine in dogwood. (Poorly recorded in the region.)

Nemapogon clematella (Fabr.) Chew Valley Lake, North Somerset ST ? (vc 6) 26 August 2005 R. Andrews. (A species which feeds on fungi as a larva.)

Caloptilia populetorum (Zell.) Trooper's Hill, Bristol ST628733 (vc 34) 18 June 2005 Bristol & District Moth Group. (A very local species in southern England of birch woodland, possibly the first record in our region.)

Digitivalva pulicariae (Klim.) Redding Pits, Winford, North Somerset ST535 38 (vc 6) 29 April 2005, Bristol & District Moth Group, one confirmed by genitalia prepn (M. Bailey). (Poorly recorded in the region.)

Batia lambdella (Don.) Trooper's Hill, Bristol ST628733 (vc 34) 18 June 2005 Bristol & District Moth Group. (A specialist on gorse, this is the only known site in the region at present.)

Acompsia cinerella (Cl.) Tucking Mill, Bath ST765616 (vc 6) 22 July 2005, Bristol & District Moth Group. (Poorly recorded in the region.)

Cochylis nana (Haw.) Trooper's Hill, Bristol ST628733 (vc 34) 18 June 2005 Bristol & District Moth Group. (A local species of birch woodland.)

Evergestis pallidata (Hufn.) Tucking Mill, Bath ST765616 (vc 6) 22 July 2005, Bristol & District Moth Group.

Pyrauta ostrinalis (Hb.) Crook Peak, Somerset ST35 (vc 6) 5 May 2005 Martin Evans and Roger Edmondson. (Very similar to the commoner *P. purpuralis*.)

Pyrausta cingulata (L.) Crook Peak, Somerset ST35 (vc 6) 5 May 2005 Martin Evans and Roger Edmondson. (A local species of calcareous grassland.)

Sitochroa verticalis (L.) Trooper's Hill, Bristol ST628733 (vc 34) 2 July 2005 R.J. Barnett. (A local species of disturbed grassland.)

European Corn-borer *Ostrinia nubilalis* (Hb.) Pilning, South Gloucestershire ST556849 (vc 34) 24 June, 28 June & 2 July 2005, J.P. Martin, at light. (The records would suggest a breeding population rather than immigrant examples.)

Phlyctaenia perlucidalis (Hb.) Pilning, South Gloucestershire ST556849 (vc 34) 19 June 2005, J.P. Martin, at light. (An unusual species in the region, possibly only the second record.)

Assara terebrella Durdham Downs, Bristol ST564746 (vc 34) 9 July 2005 Bristol & District Moth Group, one at light. (The first record for the region, a local species in the south of England where Norway Spruce grows.)

Nephoterix angustella (Hb.) Whitchurch, ST66 (vc 6) 29 August 2005 R.Andrews, one found in garden moth trap. (A local species.)

Lepidoptera (macro-moths)

Silky Wave *Idaea dilutaria* (Hb.) Leigh Woods, Bristol ST5673 (vc 6) 2 July 2005 S. Ogden, 6 seen on the Leigh Woods side of the Gorge. The Gully, Durdham Downs, Bristol ST564746 (vc 34) 5 July 2005 R.J. Barnett, many in evidence in the evening and seen again at the light trapping evening on 9 July, Bristol & District Moth Group. (Only known from the Avon Gorge and two sites in Wales, a Red Data Book species.)

Vestal *Rhodometra sacraria* (L.) Portbury Wharf, North Somerset ST47 (vc 6) 18 August 2005, H. Taffs, one in flight in daytime. Pilning, South Gloucestershire ST556849 (vc 34) 27 October 2005, J.P. Martin, at light. (A regular migrant seen in most years.)

Chalk Carpet *Scotopteryx bipunctaria* (D. & S.) Leigh Woods, Bristol ST5673 (vc 6) 2 July 2005 S. Ogden, 3 seen on the Leigh Woods side of the Gorge. (A Nationally Notable species of concern nationally, still present at a couple of sites in the region including the Avon Gorge.)

Royal Mantle *Catarhoe cuculata* (Hufn.) Tucking Mill, Bath ST765616 (vc 6) 22 July 2005, Bristol & District Moth Group. (A very local species which seems to be mainly found around Bath in our region.)

Pauper Pug (or Fletcher's Pug) *Eupithecia egenaria* Herr.-Schaff. Leigh Woods, Bristol ST562731 (vc 6) 25 May 2005 S. Ogden, very fresh specimen, identification confirmed by R.J. Barnett. (A Nationally Notable species found in the Wye Valley and a few places in East Anglia and the Midlands. Only the second time it has been confirmed at Leigh Woods but there is likely to be a solid resident population.)

Annulet *Charissa obscurata* (D. & S.) Durdham Downs, Bristol ST564746 (vc 34) 9 July 2005 Bristol & District Moth Group, one at a light trap. (Very local in the region.)

Hummingbird Hawk-moth *Macroglossum stellatarum* (L.) St Andrews, Bristol ST5974 (vc 34) 19 April 2005 feeding at Aubretia. Knowle, Bristol ST67 (vc 6) 27 May 2005 H. Johnstone. Claverton, Bath ST76 (vc 6) 25 August 2005 A. Mears. (A spectacular migrant which can appear in numbers in some years and has recently been shown to occasionally over winter in this country.)

Red-necked Footman *Atolmis rubricollis* (L.) Trooper's Hill, Bristol ST628733 (vc 34) 18 June 2005 Bristol & District Moth Group. Durdham Downs, Bristol ST564746 (vc 34) 9 July 2005 Bristol & District Moth Group. (A local species which has been doing well in recent years.)

White-line Dart *Euxoa tritici* (L.) Pilning, South Gloucestershire ST556849 (vc 34) 23 July 2005, J.P. Martin, at light. (A coastal speciality and seldom recorded in our area unless very close to the Estuary.)

Dog's Tooth *Lacanobia suasa* (D. & S.) Pilning, South Gloucestershire ST556849 (vc 34) 28 June 2005, J.P. Martin, at light. (Another species not recorded far from the coast.)

White-point *Mythimna albipuncta* (D. & S.) Timsbury, Bath & NE Somerset ST659587 (vc 6) 11 September 2005 M. Bailey, one found in garden moth trap. (An occasional migrant.)

Delicate *Mythimna vitellina* (Hb.) Timsbury, Bath & NE Somerset ST659587 (vc 6) 25 May 2005 M. Bailey, one found in garden moth trap. Whitchurch, ST66 (vc 6) 26 May 2005 R. Andrews, one found in garden moth trap. Burnham, Somerset ST ? (vc 6) 12 September 2005 A. Slade. (An occasional migrant.)

Old Lady *Mormo maura* (L.) Pilning, South Gloucestershire ST556849 (vc 34) 9 August 2005, J.P. Martin, at light. Wick Golden Valley Local Nature Reserve, South Gloucestershire ST703731 (vc 34) 19 August 2005 Bristol & District Moth Group, one at light. (A local species noted for entering aestivation in mid-summer and therefore sometimes found in tunnels and similar places at roost.)

Scarce Bordered Straw *Helicoverpa armigera* (Hb.) Berrow, Somerset ST35 (vc 6) 12 September 2005 J. Packer. (A fairly regular migrant.)

Coleoptera (beetles)

Dicheirotrichus gustavi Crotch West Huntspill, Somerset ST2945 (vc 6) 27 April 2005 R.S. Cropper, two females from beneath a stone at the top of the saltmarsh. (A local species of saltmarsh along the Severn estuary coast.)

Summer Chafer *Amphimallon solstitialis* (L.) Durdham Downs, Bristol ST564742 (vc 34) 9 July 2005 R.J. Barnett, several in flight at dusk. (Local and much less common than the Cockchafer.)

Garden Chafer *Phyllopertha horticola* (L.) Gordano Valley National Nature Reserve, North Somerset ST435729 (vc 6) 15 May 2005, R.J. Barnett, three swept from vegetation along the cinder track within few metres of each other. (Found on light or sandy soils but locally in our region.)

Prosternon tessellatum (L.) Trooper's Hill, Bristol ST6273 (vc 34) 2 July 2005 R.J. Barnett. One swept. (Few records from Somerset and Gloucestershire.)

Tillus elongatus (L.) Durdham Downs, Bristol ST565746 (vc 34) 9 July 2005 R.J. Barnett, one at light. (A rare species whose larvae prey on longhorn beetle larvae. Not recorded in Gloucestershire or Somerset for many years. A Nationally Notable species.)

Opatrum sabulosum (L.) Brean Down, Somerset ST2958 (vc 6) 16 April 2005 R.S. Cropper, one found in sandy turf. (A Nationally Notable species which is very local in Somerset but has been found at this site previously on occasion.)

Sulphur Beetle *Cteniopus sulphureus* (L.) The Gully, Durdham Downs, Bristol ST564746 (vc 34) 5 July 2005 R.J. Barnett, several on flower heads. (A coastal species of a distinctive yellow colouration.)

Arhopalus rusticus (L.) Durdham Downs, Bristol ST565746 (vc 34) 9 July 2005 R.J. Barnett, one at a light trap. (An introduced species where conifers grow, thinly scattered in the Bristol region.)

Cryptocephalus aureolus Suff. Trooper's Hill, Bristol ST629732 (vc 34) 2 July 2005 R.J. Barnett. Several swept. (A Nationally Notable species of dry flowering meadows.)

Chrysolina oricalcia (Mull.) Near the Gully, Durdham Downs, Bristol ST 564 747 (vc 34) 5 July 2005 R.J. Barnett, one swept in the evening from umbel close to the Circular Road and on the edge of the wooded area that leads to the top of the Gully. (A Nationally Notable species is very rare in Somerset and Gloucestershire and has not been recorded from this site before.)

Hymenoptera (bees, wasps and ants)

Hornet *Vespa crabro* L. Rangeworthy, South Gloucestershire ST68 (vc 34) May onwards, W. Moss, nest in garden bird box, followed successful Blue Tit brood in same box. (Apparently expanding from the known site of Wetmoor (Lower Woods), a very local species still in the region.)

Bombus humilis (Ill.) Long Sutton, Somerset ST483260 (vc 6) 6 August 2005 R.S. Cropper, good numbers seen in disused quarry visiting *Cirsium eriophorum*, *Lotus glaber* and *Lotus corniculatus*. (A second known site in Somerset for this declining species. Great care must be taken to avoid confusion with *B. pascuorum* and *B. muscorum*.)

Bombus sylvarum (L.) Following the discovery in 2004, found again on the north bank of the Huntspill River, West Huntspill, Somerset ST294457 (vc 6) in 2005 on 27 August R.S. Cropper, several at *Lotus corniculatus*. Also Long Drove, Walton Heath, Somerset ST454388 (vc 6) 13 August 2005 R.S. Cropper, two at thistles. (A rare and declining species of concern.)
Ectemnius sexcinctus (Fabr.) Post Office, Burnham-on-Sea, Somerset ST 30 49 (vc 6) 21 July 2005 R.S. Cropper, one found dead. (Not a common species and mainly found in southern England.)

Diptera (true flies)

Volucella inanis (L.) Cornwall Road, Bishopston, Bristol ST585757 (vc 34) 18 August 2005 R.J. Barnett, one roosting in bedroom immediately above roof with wasp's nest. (Until a few years ago this species was largely restricted to south east England but has since undergone an expansion in range and is now firmly established in the Bristol region.)

Volucella zonaria (Poda) Cornwall Road, Bishopston, Bristol ST585757 (vc 34) 27 August 2005 R.J. Barnett, one seen entering wasp nest presumably to oviposit. (A well known resident of the city of Bristol which may becoming commoner.)

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Bristol Mammal Report 2005

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Introduction

The intention of this mammal report is to be a wide-ranging review of the records and studies of mammals in and around the Bristol area and to report on significant issues and events affecting British mammals in 2005. The number of one-kilometre squares in which those species were positively recorded is given in brackets after the scientific name, followed by the number of one-kilometre squares for 2004, 2003, 2002, 2001 and 2000. Where no grid reference was provided, the record is not included in this total. The former county of Avon covers an area of approximately 1300 square kilometres, and so the number of 1 km squares for which records have been received gives an indication of the abundance of each species. Where given, all grid references are for the 100 km grid square ST. The differences between the years is likely to be due to changes in numbers and locations of recorders rather than changes in mammal abundance or distribution. Provided the submitter of a record gives permission, all records are submitted annually to the Bristol Regional Environment Records Centre (BRERC).

Insectivora (Hedgehogs, Shrews and Moles)

Hedgehog *Erinaceus europaeus* (39 1-km squares for 2005, 26 for 2004, 26 for 2003, 45 for 2002, 38 for 2001)

53 records from 39 1-km squares. There were 48 road casualty records in 2005, in every month except January, February and December with the majority being in May (13 records). There were six road casualty Hedgehogs from a single 1-km square (ST4670) – Queens Road, North Street, and Silver Street in Nailsea.

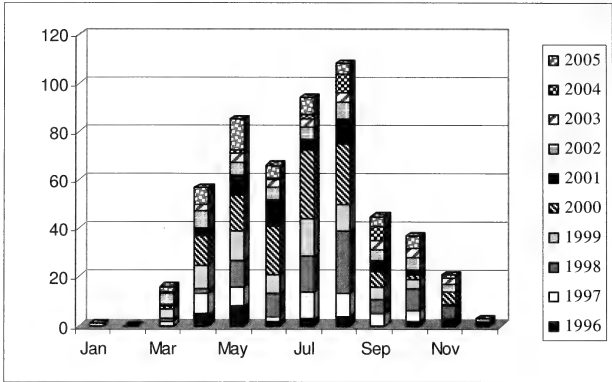


Figure 1. Number of Hedgehog Road Casualty Records per Month 1996-2005.

Ten years of data and 535 records of road casualty Hedgehogs show two main peaks, a smaller peak in May when most Hedgehogs have emerged from hibernation and a larger peak in July/August when the young of the year disperse (Fig. 1). Hedgehog road casualties have now been recorded in every month of the year except February.

Recorded by RB, PC, BF, S&JG, JM, J&SP, JR, CS, DT, MT, DW, LW.

The Hedgehog was the South West gardeners' favourite creature according to a survey carried out by Wild About Gardens, a joint project organised by the Wildlife Trusts and the Royal Horticultural Society (Avon Wildlife Trust *Wild Times* December 2005).

Mole *Talpa europea* (90,63,56,63,69,151)

97 records from 90 1-km squares. The vast majority of records were of mole hills, generally the only evidence that moles are in a particular area.

Recorded by RB, PC, JR, TBS, DT, RW.

Common Shrew *Sorex araneus* (6,2,5,4,3,1)

Six records from six 1-km squares. Records ranged from one killed by a cat in Stapleton, one found in a dustbin in Pilning, a sighting in a garden, a road casualty to two caught alive in *Longworth* traps at Clapton Moor Nature Reserve.

Records from PC, JP, JR, TS, DT.

Pygmy Shrew (0,0,6,4,0,0) No records for the year.

Water Shrew *Neomys fodiens* (0,2,2,2,0,0) No records for the year.

Chiroptera (Bats)

Greater Horseshoe Bat *Rhinolophus ferrumequinum* (5,0,1,1,0,1)

Eight records from five 1-km squares. Hibernation counts of 48 (January), 49 (February) and 67 (December) from ochre mines near Banwell, 58 from caves near Banwell in January and one from Black Rock Quarry also in January. Six (including a ringed female) in a priest hole in a Gordano Valley church in April, with emergence counts of six and nine from the same location on two evenings in May.

Records from LD, LR.

Lesser Horseshoe Bat *Rhinolophus hipposideros* (7,0,4,9,0,3)

14 records from seven 1-km squares.

Hibernation counts in January of three and four at Ashton Court, two at Black Rock Quarry, 27 at caves near Banwell, 23 in ochre mines near Banwell and eight at Brockley Combe; 38 in ochre mines near Banwell in February and 10 in Brockley Combe in March; 37 in ochre mines near Banwell in December.

Emergence counts of 58 and 104 from Clarken Combe Lodge in May, of 117 and 112 from Upper Langford in June and 45 at Leigh Court in July.

Records from LR, JW.

Whiskered Bat/Brandt's Bat *Myotis mystacinus/brandtii* (0,1,1,0,0)

No records for the year.

Natterer's Bat *Myotis nattereri* (0,1,3,1,3)

Single record of a maternity roost in Wraxall in July.

Record from LR.

Bechsteins Bat *Myotis bechsteinii* (0,1,1,0,0) No records for the year.

Daubenton's Bat *Myotis daubentoni* (2,0,2,1,0) No records for the year.

Serotine *Eptesicus serotinus* (1,0,2,2,0,0)

One individual foraging at Clapton-in-Gordano in May.

Record from LR.

Noctule *Nyctalus noctula* (4,4,4,3,1) No records for the year.

Leisler's Bat *Nyctalus leisleri* (0,0,0,1,0) No records for the year.

Common Pipistrelle *Pipistrellus pipistrellus* and **Soprano Pipistrelle** *Pipistrellus pygmaeus* (9,6,5,12,4+,3)

Nine records from nine 1-km squares. A number of Pipistrelle droppings were found on the floor of the fishermen's hut near Herriot's Bridge, Chew Valley Lake in May. Bat boxes at Tickenham Nature Reserve (Avon Wildlife Trust) were checked in October. Two of the four 'standard' wooden boxes contained one & two Pipistrelles respectively. Three of the 13 *Schwegler* boxes had bat droppings in them. Approximately 40 Pipistrelles were seen in a roof roost in Backwell in July. An amazing 435 were counted out of a maternity roost at Chew Stoke also in July. All the other records were of small numbers of bats flying over gardens between May and September.

Records from D&GB, KG, PL, JP, J&SP, JR, LR, DT.

Nathusius' Pipistrelle *Pipistrellus nathusii* (0,0,0,0, 1,0)

No records for the year.

Brown Long-Eared Bat *Plecotus auritus* (0,1,1,0,0)

No records for the year.

BATS IN THE NEWS

Bats indirectly made the headlines in the Weekend Post (Bristol) of 9th July. *'Dark Ages – a plan to install lights to make a lane (next to Narrowways Millennium Green Nature Reserve) safer for children walking to school has been attached by environmentalists – who say it could harm bats and moths'*.

'We were here first' (Western Daily Press 2nd May) – the presence of a colony of Bechstein's Bats in woodland adjacent to the site of a proposed development of 500 new houses in Trowbridge is on hold pending further research on the potential impact of the development.

Potential purchasers of Springhead Farm, Upper Langford near Churchill were advised that one of the barns belonging to the property already has some sitting tenants in the form of a colony of Lesser Horseshoe Bats (*'At home down on the farm'* Bristol Evening Post property supplement 8th July).

Lagomorpha (Rabbits and Hares)

Brown (European) Hare *Lepus europaeus* (10,6,24,10,11,34)

11 records from 10 1-km squares. A pair were seen mating in a field near Stowey in March (with a third hare in an adjacent field). Three were seen together in a field at West Littleton in June.

Records from RB, PC, EN, J&SP, LR, DT, DW.

Rabbit *Oryctolagus cuniculus* (76,68,52,36,19,105)

76 records from 64 1-km squares.

Records from RB, PC, EN, J&SP, JR, ST, DT, MT, RW

Rodentia (Rats, Mice, Voles and Squirrels)

Brown Rat *Rattus norvegicus* (7,9,9,13,6+,17)

Seven records from seven 1-km squares. Rats caused concern in the children's playground next to Tesco in Nailsea (*'Rat plague forces the closure of playground'* Bristol Evening Post 19th August). Residents of Derham Park in Yatton complained to North Somerset Council about increasing sightings of Rats in their gardens (*We're being taken over by rat plague* – headline in the Clevedon Mercury 17th November). Other records

from West End Nailsea, Clevedon, Stapleton, Bishop Sutton, Pilning and in Bristol.

Records from JR, TS, DT, DW, RW.

For the first time in 30 years a Puffin chick was seen emerging from a burrow and for the first time in 49 years Manx Shearwaters successfully fledged on the island of Lundy. This follows a three year £60,000 campaign to eradicate rats (both Brown Rats and Black Rats *Rattus rattus*) using poison baits (*BBC Wildlife* 23 (9) September 2005).

Grey Squirrel *Sciurus carolinensis* (83,62,59,37,50,77)

113 records from 83 1-km squares.

Richard Bland has been counting Grey Squirrels on a weekly basis in his 1-km square local patch (ST5673 centred on Clifton) for the past five years. His results are summarised in figure 2. These show a very sharp increase from about weeks 36 to 40 (mid September to mid October) with numbers then declining to 'normal' levels by week 48 (late November). This peak is likely to coincide with the autumn dispersal of that year's young together with some of the adults (Corbet and Harris 1991).

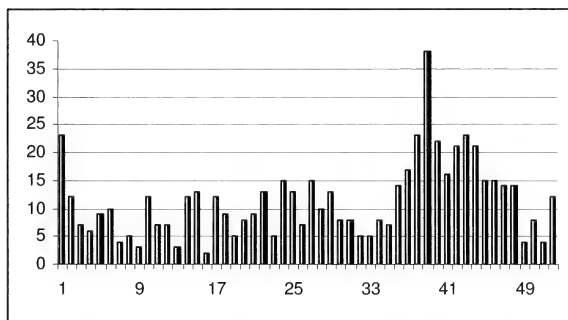


Figure 2. Cumulative weekly grey squirrel counts for ST 5673 for the years 2001-2005

Records from RB, JB, PC, JM, EN, JP, J&SP, JR, DT, MaT, RW.

'Squirrels on rampage' (Clevedon Mercury 6th October). Grey Squirrels got into the Old Council Chamber at North Somerset Council and knocked paintings off the walls and caused minor damage to cables in the ornate wooden council chamber resulting in some committee meetings being delayed.

Water Vole *Arvicola terrestris* (2,1,2,2,2,0)

Records from two 1-km squares. One was seen swimming across a rhyne at Avonmouth, with burrows seen in the same locality. At least one individual was seen at Bleadon.

Records from RB, LR.

Bank Vole *Clethrionomys glareolus* (3,1,5,6,1,4)

Records from only three 1-km squares, two killed by a cat at Stapleton and individuals live-trapped at Clapton Moor Nature Reserve in June and November.

Records from TS, DT.

Short-tailed Field Vole *Microtus agrestis* (3,1,5,7,2,2)

Three records from three 1-km squares. One seen feeding under a bird feeder in Nailsea, the other two records were of cat kills (a cat in Stapleton killed four field voles in February!).

Records from J&SP, JR, TS.

Common Dormouse *Muscardinus avellanarius* (0,0,1,1,0,?)

No records for the year.

Lincoln Garland and Michael Woods reported on Highways Agency Dormouse surveys along the M4, M5 and A303 corridors (Garland and Woods 2005). Sites were surveyed by erecting dormouse tubes in scrub and plantations, and where hazel was present, checking fallen shells for the distinctive gnaw marks of Dormice. Evidence of dormice was found at eight sites (seven of the sites were not previously known about) along the M4, M5 and A303, with a mean size of 4.8ha (range 0.8-20ha), a population estimate range of 3-12 individuals at the poorest site to 80-200 animals at the best site. A mean of 45% (range 2-100%) of the habitat was on the road verge itself. They concluded that:-

Road developments have been responsible for the severance of hedgerows and woodland. Fragmenting Dormouse populations and inhibiting their dispersal. However, plantation and scrub along motorways can also provide important permanent habitat for dormice and as a means of dispersal between populations that are on the same side of the road.

Dormice are thought to be under-recorded in many areas and in particular along road verges. Motorway and trunk road plantations usually consist of a wide variety of different native shrubs and trees providing a sequence of foods for dormice during the changing seasons. Bramble is also very abundant along road verges and is a key source of food and cover for Dormice.

Contiguous roadside plantation and scrub as small as 1 ha can constitute the principle component in the habitat of some dormouse populations, although such sites probably support sink populations dependent on continued immigration for their long-term survival.

Although Dormice are reluctant to cross small gaps in hedgerows and woodland within their established home range, they do appear capable of crossing minor roads and grassland with only patchy scrub during dispersal along road verges.

Minor roadside tree and shrub loss resulting from soft estate management and minor road works can potentially result in disturbance and fatalities of dormice and fragmentation of their habitat.

Wood Mouse (Long-tailed Field Mouse) *Apodemus sylvaticus* (7,3,9,5,7,6)

Records from seven 1-km squares. An amazing 18 individuals were live-trapped in the roof of a house in West End, Nailsea and released c. 3 km away. As far as is known none returned! Four individuals were live-trapped (in *Longworth* live-capture traps) in hedgerows at Clapton Moor Nature Reserve in June and 46 individuals trapped in the same hedges in November.

Records from:- EN, J&SP, JR, TS, DT, MT).

Harvest Mouse *Micromys minutus* (1,0,0,0,1,0)

A single record from a *Longworth* trap at Bleadon Level in December. This is the first Harvest Mouse record since 2001.

Record from LR.

House Mouse *Mus domesticus* (3,1,3,1,4,3)

Three records from three 1-km squares (Nailsea, Stapleton and Pilning).

Records from JR, TS, DT.

Yellow-necked Mouse *Apodemus flavicollis* (0,0,0,1,0,0)

No records for the year.

Small mammal studies

A small mammal trapping exercise was undertaken at the Avon Wildlife Trust's Clapton Moor Nature Reserve in November as a follow-up to a similar study undertaken in 2002 (Trump 2003).

120 *Longworth* live-capture traps were set in the same six field margins/hedgerows as in 2002. The traps were set to catch for two nights with all individuals caught being uniquely marked so that they could be identified if recaptured. 48 individuals of three species were trapped (Wood Mouse, Bank Vole and Common Shrew). This compares with 52 individuals of five different species (the same three as 2005 with the addition of Field Vole and Pygmy Shrew). As in 2002, the vast majority of captures were of Wood Mice (96% in 2005, 79% in 2002).

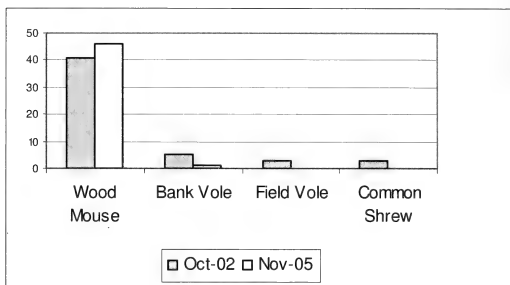


Figure 3. Small mammals trapped in hedgerows/field margins at Clapton Moor Nature Reserve autumn 2002 and 2005

Cetacea (Whales, Dolphins and Porpoises) and Pinnipedia (seals)

Harbour Porpoise *Phocoena phocoena* (0,1,0,0,0,0)

No records for the year.

Grey Seal *Halichoerus grypus* (5+,0,0,1?,0,0)

At least seven records from at least five 1-km squares. One at Portbury Wharf in March, one at Littleton Pill in July, one at Redcliff Bay in August, individuals seen off New Passage on four occasions between August and October and of course Whitby the Seal who was seen by hundreds of people on the Avon and in Bristol Docks between August and September.

Records from RB, MD, GH, Severnside –email group, TBS.

Whitby the Seal

In August and September, readers of the Bristol Evening Post followed the antics of Whitby the Seal as he/she swam up and down the River Avon in Bristol. The first report was on 11 August when a 'black seal' was spotted 'climbing across rocks on the river bank and scaling a weir' on the river at Netham. The following day, a series of photos were published of Whitby (*Where is Whitby Going?*), named after Whitby Road in St Anne's where the seal was seen climbing up over 'Wetham Dam', *sic*, ST646726. The seal was thought to have been seen up as far as Hanham. Another photo of Whitby appeared on 16 August (*Playful Whitby's 'as happy as Larry'*), this time as he/she followed a narrow boat along the Feeder Canal before disappearing near Totterdown ST601718. The harbour master told the owner of the narrow boat that a seal had also been reported from the 'harbour'. At 08.30 am on the same day a seal had been seen up as far as Willsbridge Mill, 6 km upstream ST660700.

A dead seal was reported to have been found washed up on the beach at Portishead on about 17 August. 'Whitby still alive' – a report in the Evening Post on 23 August said that Whitby had been seen swimming up the River Severn near the Second Severn Bridge. The next report was on 6 September 'Whitby the seal may have been spotted again' when a seal was seen swimming down the river at Pill ST525762. At the same time there were reports of a seal getting into Sharpness Docks on the River Severn at high tide. The seal became trapped in the dock and was caught by port staff before being released back into the river. The harbour master reported that it was rare to get seals so far up-stream with sightings only every couple of years.

Grey Seal *Halochoerus grypus* sightings are occasionally reported to BNS, the latest being on 7 July 2005 when one was seen off shore at Whale Wharft at Littleton Pill (ST 5891). A seal pup was also apparently found 'abandoned' on Steep Holm this summer. It was 'rescued' and taken to a wildlife rescue centre in Somerset. Prior to this in November 1997 a Grey Seal was seen close off shore at Severn Beach (ST5384). One was seen off the landing beach at Steep Holm (ST2360) in August 1998. In 1999 one was seen at Northwick Warth (ST5487) in August and one at New Passage (ST5486) in September. In 2002, one or two seals were seen off Severnside.

In the 1970s(?) a Grey Seal was rescued from the floating harbour in Bristol and spent many years living in Bristol Zoo.

The Atlas of Mammals in Britain (Arnold 1993) has records of Grey Seals from two 10 km squares in the Bristol area, one in the Weston-super-Mare area (ST36) and one from the Bristol Avon (ST57). Interestingly there are a number of records of Common Seal *Phoca vitulina* from further up the Severn Estuary from 10 km squares ST59, SO60, SO70 and SO71.

The well known Millerd's Map of Bristol, 1688, clearly shows a Grey Seal swimming among Swans in the Bristol Docks area.

Carnivora (Carnivores)

American Mink *Mustela vison* (2,1,0,2,0,3)

Two records from two 1-km squares, both in the Chew Valley Lake area.

Records from CVL Birding, DW.

Stoat *Mustela erminea* (4,0,1,3,4,10)

Four records from four 1-km squares (Portbury, Chew Stoke, Abbots Leigh and Walton Moor).

Records from LR, TBS, DT, DW.

Weasel *Mustela nivalis* (7,4,6,7,3,10)

Seven records from seven 1-km squares. Most records were of single animals running across roads and tracks.

Records from PC, LR, Severnside e-mail Group, DT, DW.

European Polecat *Mustela putorius* (1,0,0,2,2,?)

A Polecat was found run over on the B3114 in Chew Stoke in April. It was confirmed as a true Polecat by Johnny Birks of the Vincent Wildlife Trust. The first confirmed Polecat record since 2002.

Record from RE/DW.

Otter *Lutra lutra* (36+,28+,19+,25,2+,24)

Three records from 3 1-km squares. Lots of Otter tracks seen at Damery Bridge in January, one seen at Chew Valley Lake in November and footprints seen in the sand below the 'old' Severn Bridge at Aust in December.

Records from AB, CVL Birding, JK.

Otters in North Somerset - summarised from the North Somerset Otter Group's newsletters produced by James Field of the Avon Wildlife Trust - issues 18 (spring 2005) and 20 (winter 2005).

The survey in November (2004) went well with several successful records being sent in (12 sites surveyed). Recent spraint was found at Puxton along the Old Bridge River. Three recent spraints at Nailsea Ford and also recent activity along the Old Yeo rhyne.

Most of the other records were old spraint. Two along Tickenham Boundary rhyne, two along the Land Yeo/Middle Yeo at Tickenham and also activity from the River Kenn area.

The Backwell wardens reported the only fresh spraint along the land Yeo. There were also two records of mink activity lots observed along Rickford Brook and one along the Old Yeo rhyne.

Returns in February 2005 were lower than usual (due to problems in distributing survey forms) but some recent activity was recorded along the River Kenn. Other signs of activity from the Congresbury Yeo. No spraint found but footprints seen at Puxton along the Old Bridge River. 12 sites were surveyed in August with eight positive for Otter signs.

Danger to Somerset's Otters - from the North Somerset Newsletter 21 Spring 2006.

"Somerset's fragile otter population is under threat from illness spread by a foreign parasite. In the last twelve months, a tiny flatworm (*Pseudamphistomum truncatum*) has been found in post mortems on six dead Otters found in Somerset. That equates to around 10% of the estimated population, leading conservationists at Somerset Wildlife Trust to fear this could be the biggest threat to the species for decades. The parasite is believed to have been spread by ornamental fish imported from Russia and

Eastern Europe. Scientists think the fish might have escaped from ponds and spread the worm among Otters and Mink in the Somerset Levels. To date, the parasite appears to have been contained within the county but experts are worried it could spread to other areas and species. The worms live in the gall bladder and can cause liver damage and jaundice. In rare cases, the disease has been known to affect people.

Initial research into the discovery of the worm in dead Otters was published in Veterinary Record in July 2005. Evidence came from autopsies on the bodies of dead otters sent to the Wildlife Veterinary Investigation Centre, in Cornwall, from all over southern Britain.

“We are very alarmed by this and worried for the Otters on the Somerset Levels, said SWT Otter Group chairman James Williams. “The parasite does not appear to be killing the Otters, in that there are other causes of death. It may be weakening them but we don’t think it’s a fatal disease. What we need is more research to discover whether this is a major problem or not. (From Somerset Wildlife Trust’s website

We have had no positive evidence of Otters being affected by the disease on the North Somerset Levels and Moors – please, if you or anyone you hear of, finds a dead or injured Otter, please let Avon Wildlife Trust know – 0117 9177270.

Otters on the Bristol Avon in 2005 - information summarised from Simon Reece’s Bristol Avon Otter Survey newsletter of February 2006.

Bristol Frome

Three Brooks Lake (6281) – spraints.

By Brook

Fountain Wood weir (8475) – spraints and digging; Common Hill weir (8374) – spraints and digging; Box Mill (8268) – spraints; Middle Hill Gauge (8168) – spraints; Shockerwick Bridge (8068) – spraints; Bathford Bridge (7867).

Corston Brook

Upper Lake (6964) – spraints; A4 Road Bridge (6965) – spraints; Railway bridge (7065) – spraints and digging.

Mells Stream

Edford Wood (6648) – spraints; Mells Bridge (7248) – spraints; Mells Pond (7348) – spraints.

River Avon

Lockkeeper, Keynsham (6569) – spraints.

River Boyd

Old Mill Weir (6871) – spraints.

River Chew

Coley Reservoir (5855) – spraints; Shrew Bridge (5756) – spraints; Hollow Brook Lake Bridge (5860) – spraints and padding; Denny Lane and Flume (5761) – spraints and padding; Stanton Drew Bridge (5963) – spraints and padding; Bye Mills (6163) – spraints and padding; Publow Bridge (6264) – spraints; Old Bridge and Weir (6464) – spraints; Woollard Bridge (6364) – spraints.

River Frome

Spring gardens (7749) – spraints, padding and digging.

Siston Brook

Londonderry Wharf (6669) – padding.

Otters were seen at various locations during the year; including at Claverton Island on the River Avon upstream of Bath and on the River Avon downstream of Bath

Badger *Meles meles* (48,37,31,50,42,77)

53 records from 48 1-km squares. 47 road casualty records, from every month except November and December (12 in April).

Records from the following RB, AB, JB, PC, EN, JP, JR, LR, DT, MT, DW, LW.

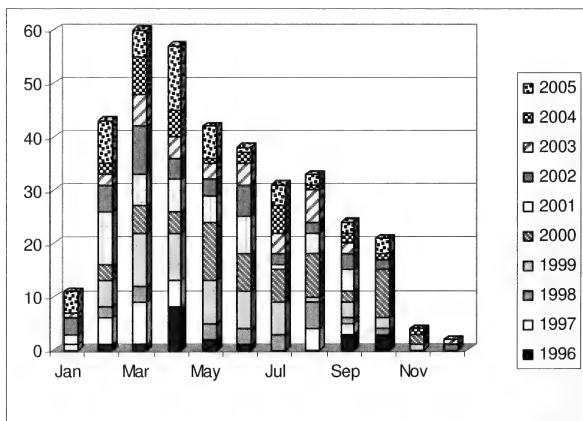


Figure 4. Number of Badger Road Casualty Records 1996-2005

Ten years of Badger road casualty figures with 366 records to date show a large peak around March/April (peak breeding season) with perhaps an indication of a smaller peak in August (dispersal of young) (Fig 4). There are few records between November and January. This is the time of year when Badgers are at their least active with the pregnant females underground in their setts prior to giving birth to cubs between January and March.

Since records of road casualty badgers were recorded on a regular basis (from 1996), a number of 'hot-spots' are apparent.

1-km	Number deaths	Location/Notes
ST4169	6	M5 near Clevedon (the overbridge at ST414699)
ST4170	4	M5 junction 20 (Clevedon)
ST4271	9	M5 near Clevedon Court
ST4369	3	Minor road across Kenn Moor
ST4673	3	M5 near Clapton Court
ST4971	3	B3130 Wraxall
ST4972	4	B3128 Wraxall
ST4975	3	A369/M5 at Portbury
ST5072	3	B3128 Wraxall
ST5269	8	A370 Cambridge Batch (Long Ashton Bypass)
ST5369	8	A370 Barrow Wood (Long Ashton Bypass)
ST5469	3	A370 Long Ashton (bypass)
ST5471	5	B3128 at Ashton Court
ST5472	4	B3129 Ashton Court/Beggar Bush Lane
ST5484	6	A403/M49 Severn Beach
ST5563	3	B3130 near Winford
ST5570	3	A370 Long Ashton (bypass)
ST5571	4	A370/B3128 Long Ashton (bypass)/Bower Ashton
ST5587	3	A403 north of Northwick
ST5781	3	B4055 south of Easter Compton
ST6469	5	A4 Keynsham Bypass
ST7172	3	A420 Wick
ST7476	4	A46 Dyrham Park
ST7757	4	B3110 Hinton Charterhouse
ST7775	3	Minor road near West Littleton
A further 49 1-km squares had 2 road casualty Badgers and 133 1-km squares had 1 road		

Table 1. Numbers of road casualty badgers per 1-km square (1996-2005)

The results give an indication of the most hazardous places for Badgers (and for road users) but are likely to be biased towards the routes driven by the regular badger road-casualty recorders. This is particularly true of the roads around Nailsea, the M5 and the A370 where your county mammal recorder lives. Nevertheless, 23 badger road casualties along a 5-km stretch of the A370 between Cambridge Batch and Bower Ashton in 10 years is something that the Highways Authority may need to consider taking action over. The erection of Badger-proof fencing along the road verges or the construction of Badger tunnels (and wildlife under or over passes) could be considered.

Which were the most dangerous roads for badgers in 2005?

<i>Road Name/Number</i>	<i>Location (in 'Avon')</i>	<i>Number of road casualties in 2005 (2004 figures in brackets)</i>
M4	Tormarton to Second Severn Crossing	(1)
M5	Falfield to Loxton	1 (1)
A4	Avonmouth to Batheaston	1
A37	Temple Meads to Farrington Gurney	1 (1)
A38	Falfield to Churchill	1 (1)
A39	Corston to Hallatrow	1
A362	Farrington Gurney to Radstock	(1)
A368	Banwell to Marksbury	2 (1)
A369	Bower Ashton to Portishead	1
A370	Ashton Gate to East Brent	4 (5)
A46	Starveall to Bathampton	(1)
Old A46	Lambridge (Bath)	1
A403	Avonmouth to Aust	5 (1)
A420	Bristol to Marshfield	1
B3110	Bath to Hinton Charterhouse	1 (1)
B3124	Clevedon to Portishead	1
B3128	Bower Ashton to Stone-edge-batch	3
B3130	Pensford to Clevedon	2 (3)
B4055	Shirehampton to Pilning	4 (1)
Unspecified roads	Chew Valley area	9
Minor roads	Various locations	9 (9)

Table 2. Numbers of road casualty badgers on roads in the former county of Avon in 2005 (and 2004 in brackets).

The most hazardous roads appear to be the A403 (Avonmouth to Aust) with five road casualty badgers reported, the A370 (Ashton Gate to East Brent) and the B4055 (Shirehampton to Pilning) both with four.

Jeff Rawlinson once again reported on the nocturnal activities of Badgers in a large rural garden at Pilning (5585). Figure 5 summarises the numbers of Badgers seen in his garden throughout 2004 and figure 6 summarises the same information for 2005. Only half the number of badgers were seen in 2005 as compared with 2004. Detailed Badger counts ceased in early August 2005 – hence the apparently abrupt departure of Badgers from the garden. Food (peanuts) continued to be taken from mid August until the end of the year although in declining quantities.

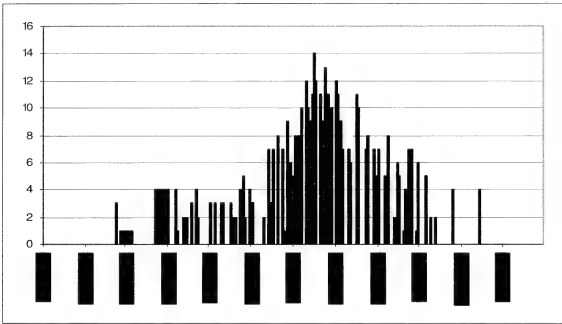


Figure 5. Numbers of Badgers seen in a Pilning garden in 2004.

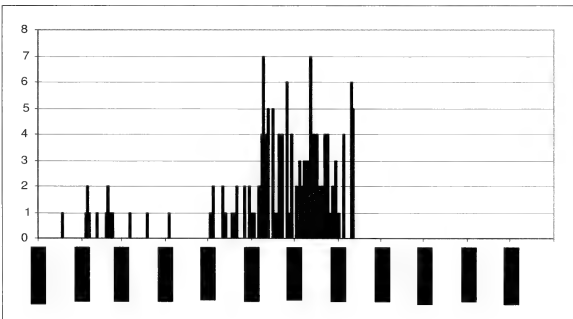


Figure 6. Numbers of Badgers seen in a Pilning garden in 2005.

Hounscome and Delahay (2005) investigated the impact of Badger predation on ground nesting birds. They reviewed 110 published studies of Badger diet or badger predation of birds throughout the range of their range from Ireland east to Japan and from Sweden south to Spain. Bird remains were recorded in 2038 cases out of 36699 samples of badger faeces and stomachs. The overall percentage frequency of bird remains was 5.5% for all the studies combined and 7.9% for UK studies. The remains of 45 species of 11 different orders were recorded. Whilst the percentage frequency of occurrence of birds in badger diet increased significantly with latitude, there were no significant seasonal differences. The authors were unable to assess whether badger predation has had an impact on bird population at a national scale.

Whilst observing a group of Badgers in an area of rough ground near Plymouth, David Dixon started to notice patterns in their behaviour, particularly in relation to phases of the moon (*BBC Wildlife* 23 (9) September 2005). The dominant male and female badgers in the group would scent-mark more often at times of a new moon than at other times. He also noticed that the female's attitude to the male members of the group varied depending on the phase of the moon. This ranged from tolerance or indifference when the moon was new to hostility when it was full. The majority of the mating events he observed were during the lunar 'dark phase' (last quarter to first quarter), suggesting that the Badger reproductive cycle is strongly influenced by the lunar cycle. Badgers also tended to be more active on 'dark phase' nights. However, their principle prey the earthworm, is more influenced by damp weather conditions than by the phase of the moon.

Fox *Vulpes vulpes* (47,38,48,39,35,71)

67 records from 47 1-km squares.

Foxes found within the 'City and County of Bristol' boundaries in the following 1-km squares:- 5668, 5673, 5675, 5677, 5773, 5778, 5780, 5873, 5876, 5974, 5975, 6071, 6074, 6075, 6076.

Records from RB, JB, PC, PF, HN, EN, JP, HP, J&SP, JR, DT, DW, RW.

Artiodactyla (Deer)

Red Deer *Cervus elaphus* (0,0,0,1,0,1)

No records for the year outside deer parks and deer farms.

Roe Deer *Capreolus capreolus* (33,26,33,27,20+,51)

35 records from 33 1-km squares. Groups of three or more seen at the following locations:- 3 at Portbury Dock in March, 5 (2 bucks, 3 does) at Widcombe in February, 4 (2 bucks, 2 does) at Bishop Sutton in March, 3 (doe and 2 fawns) at East Wood, Portishead in July, 5 at Walton Moor in June. Records from RB, PB, AB, JB, PC, ML, EN, HP, J&SP, LR, DT, DW.

'Firefighters battle to save deer' (Bristol Evening Post 5th May). Avon Fire and Rescue Service and the RSPCA spent three and a half hours rescuing a Roe Deer buck from the River Frome between Wellington Road and the Easton roundabout in Bristol. Unfortunately it had to be put down as it was injured.

Fallow Deer *Dama dama* (0,1,1,0,0,0)

No records for the year outside deer parks.

Chinese Muntjac Deer *Muntiacus reevesi* (2,3,1,?,1,0)

Two records for the year, one at Damery Bridge in January and a road casualty at Shortwood in May.

Records from AB, AJ.

Mammal casualties on avon roads in 2005

Richard Bland counted dead mammals, mainly Rabbits, on local roads in Avon in 2005. There were some sharp differences in rates in different months, September being the worst - one casualty every six miles, compared with one every 98 miles in March (Table 3).

Month	Miles	Road casualties	Miles/casualty
Mar	98	1	98
Apr	108	4	27
Jul	198	13	15
Sep	126	21	6
Oct	85	8	11

Table 3. Road casualties per mile for different months in Avon, 2005

'A' roads in the region had an overall rate during the year of one casualty per 8 miles, whereas local motorways had one per nine miles.

Road type	Miles	Road casualties	Miles/casualty
A Roads	257	33	8
Motorways	222	26	9

Table 4. Avon Road casualties per mile on 'A' roads and motorways.

The national average for the July-October period surveyed by the Mammal Society on roads that were not urban or motorway was one death every eight miles. The majority of road casualties were Rabbits. Table 5 shows the rates for each species on local roads (non urban, non motorway) in Avon.

Species	Casualties	Miles/casualty
Rabbit	16	16
Squirrel	7	37
Hedgehog	6	43
Badger	2	129
Fox	1	257
Hare	1	257

Table 5. Casualties by species in Avon, July-October 2005

Richard Bland spent three days in the Yorkshire Dales in August, and the casualty rate there was very high. Rabbits were very common and there was disease (myxomatosis?) prevalent. Between 17th and 20th August he travelled 173 miles on Dales roads and counted an incredible 364 dead mammals, 354 of them Rabbits, a rate of one casualty every 0.5 miles. The journey to Scotland and back, 640 motorway miles, in August, as part of the same holiday, produced 64 casualties (10 miles per casualty).

National mammal surveys

The population estimates for British mammals made in 1995 (*A review of British mammals, JNCC, Peterborough*) have been revised following on from the many technological advances made over the past 50 years or so. Amongst the mustelids the Badger population has been revised downwards from 275,000 to 175,000 (the high figure was based on too many adults per sett) and Mink numbers are also much lower having dropped from 110,000 in 1995 to 36,950. This decline is thought to be due to the continued recovery of the Otter whose numbers have increased from 7,350 to 12,350. The Polecat population has increased from 15,000 to 63,200 (the 1995 population was based on conservative distribution data). Deer populations have increased for most of the species present in the UK; Chinese Water Deer numbers have increased from 650 to 2,100 (the UK holds an estimated 25% of the world population of this species), Muntjac have increased from 40,000 to 128,500, Fallow Deer from 100,000 to 128,000 and Sika Deer from 13,000 to 26,600. Numbers of Roe and Red Deer have been revised downwards to 300,000 and 316,000 respectively.

Domestic cats *Felis catus* are responsible for the deaths of a number of small mammal and bird species (a number of records each year are for 'what the cat brought in'). A study by Philip Baker and colleagues at the University of Bristol attempted to quantify the impact of domestic cats on prey species in a area in north west Bristol. Questionnaires were sent to all 3494 householders in a 4.2 km² asking them to record numbers of individuals of each species the cats brought home. 1243 questionnaires were returned and it was estimated that 19% of households in the area owned cats. This equated to a 'predator density' of 229 cats/km². Five mammal (Common Shrew, Grey Squirrel, Wood Mouse, Bank Vole, Common Rat), 10 bird and one amphibian species were recorded. The mean predation rate was 21 prey/cat/annum and the most commonly recorded species was the Wood Mouse. Predation on birds was greatest in spring and summer, probably reflecting the killing of juvenile individuals. The impact of cat predation on Robins *Erithacus rubecula*, House Sparrows *Passer domesticus* and Dunnocks *Prunella modularis* was thought to be higher than the annual productivity for these species and would warrant further investigation.

Legislation

There are plans to give the Water Vole full protection under the Wildlife and Countryside Act 1981. At present the water vole's habitat is protected but the animals themselves aren't (*BBC Wildlife News* 23 (3) March 2005).

Exotics/beasts/former native species

Big Cats

Reports of large beast/cats/panthers/leopards/pumas etc roaming the countryside attacking livestock continue to circulate in the press but as yet there have been no confirmed sightings.

'Farmers are left shocked as mystery beast strikes – savage attack on calf points to existence of large predator on loose' (Western Daily Press 2nd May). A farmer from Hewish near Weston-Super-Mare found the remains of one of his calves in a field together with a large footprint *'on a different scale to that of his large dog, a bull mastiff-American pit bull cross'*. A 'black cat' was also sighted at Lower Weare, near Axbridge.

Wild boar *Sus scrofa*

A small population of feral Wild Boar continue to roam the woods around Staunton in the Forest of Dean (*'They're so tame, if they stay here someone will shoot them'* The London Times 29th January). Another small population lives in woodland immediately to the south of Ross-on-Wye (Phil Herritty pers com).

European Beaver *Castor fiber*

On 28th October, despite a few legal issues, five hundred years after they became extinct in Britain, Beavers are once again to be found in Gloucestershire. Six beavers from Bavaria (or Bulgaria according to the Times) have been released into a fenced 100 acre site at the Lower Mill Estate, Somerford Keynes in the Cotswold Water Park ('Battle of the beavers' – Daily Mail; 'Battle of Beaver Creek' – Western Daily Press; 'Beavers making a comeback after a 500-year absence' – the Times online).

Siberian Chipmunk *Tamias sibiricus*

Siberian Chipmunks were on the loose in Hampshire after escaping from a privately owned country park. Anything up to 70 individuals were thought to have escaped following an attack by a Mink. It was thought that the Mink had entered the chipmunk's cage through a hole that had been deliberately cut (*BBC Wildlife* 23 (13) Dec 2005).

Acknowledgements

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Clevedon Toad Patrol

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Location.

The patrol area covers Norton's Wood Lane [aka Clapton Lane] from its junction with Harley Lane [aka Walton Drove] westward towards Clevedon for approx one mile. It also includes about one third of a mile of Harley Lane northwards from the junction. This provides cover for the main migration route but it has been noticed that toads do move in limited numbers over a wider area along both Norton's Wood and Harley Lane and also along the B3124 Clevedon to Portishead Road. Presumably at one time toads migrated to the rhynes from all sides of the Gordano Valley.

Background.

This crossing has been patrolled for many years. I have some records going back to 1991. This year I have taken over the role of co-ordinator from Dorothy Wright who filled the role for a number of years. Dorothy took over following many years work by Mike Chamberlain.

The migration route.

The toads move down from Norton's Wood on the south side of the lane to the rhynes in the Gordano Valley on the north side of the lane. A favourite spawning ground seems to be the Portbury Drain that runs west to east through English Nature's Gordano Reserve [SSSI]. The drain in effect follows the route of Norton's Wood Lane 300 yards lower down in the valley. This 300-yard journey is over grazing land, horse paddocks and some gardens. It is not known how far up into the woods the toads live. The wood extends along the length of the lane to a depth varying from 400 to 700 yards. The main barriers across the route seem to be stonewalls along the north of the lane that are up to 4 feet high.

Good numbers of toads have been recorded all along the patrol area on Norton's Wood Lane but there has been a noticeably greater density in the central third of a mile. Numbers have been lower on Harley Lane and it is often not clear to and from where they are moving.

Measures used to help save the toads.

We organize crossing patrols, we make people who live on the lane aware of the toads habits, and we place 'Toad crossing' warning triangle road signs at four points. These signs seem to have good collectors' value. We have lost three of the four this year. This seems pretty much par for the course. We put Notices in the Black Horse pub at the west end of the lane asking customers if they would help save the toads by using the alternative route to and from the pub during the migration period. We put an article in the local press asking local people to avoid or take extreme care on the lanes after dark during the migration

Traffic on the lane

The lane is busiest during 'rush hour' as residents return from work, people working in the area go home and a small number of commuters use the lane as a cut through to avoid heavy traffic around the M5 and in parts of Portishead and Clevedon. Even then it is only spasmodic with perhaps a car every few minutes on average. Outside this period traffic is light with less than double figures an hour maximum. After seven it can become very light. Many of the local residents are aware of the toads and drive carefully to avoid them or even stop to help them across. Most of the traffic is considerate and supportive of our activities. It seems inevitable that some traffic is inconsiderate and a very small number can even be aggressive.

The patrollers

This year a rota has been organised with 20 volunteers. Many of the volunteers are North Somerset Wildlife Wardens or members of other wildlife groups. There is also a number of local residents who contribute considerable amounts of their time whenever possible. The total volunteer effort is estimated to be in excess of 500 hours

The patrol process

We tried to have patrollers out on the lane by dusk, which is when the toads begin to move on suitable nights. In the early part of the migration in January this was around 4.30pm. Obviously as the season progressed dusk became later. The length of the patrol depended on the numbers of patrollers available and also on the amount of toad activity. On very busy nights some patrollers stopped out for 3 or 4 hours and sometimes handovers were organised in advance or by mobile phone contact. In order to learn more about movement timings and patterns and to try to develop a predictive model we patrolled the lane on all 'suitable' nights wherever possible. Patrols did not take place on cold nights. Generally a temperature of 5°C or below was seen as too cold. Initially short visits were made to confirm this assumption. Otherwise patrollers visited the lane on most

nights. The patrol process involved patrollers walking the lane with torches, picking up toads and moving them across the road to safety. An alternative method used by some patrollers or in some circumstances was to drive slowly down the lane and move the toads from the car. Buckets came in useful to help rescue greater numbers more quickly at times of mass movement or when traffic was busy

Health and Safety issues

An obvious hazard of patrolling a narrow country lane in the dark and often in poor weather conditions is the risk of being hit by a vehicle. There is also the related risk of being a hazard to traffic. Other risks include falling or tripping in the dark and possible risk of assault. Some measures taken to manage these risks were: -wearing fluorescent jackets including the issue of jackets to those not owning their own, the use of good torches to light the road and also provide warning to motorists. One rechargeable torch was purchased from funds from Nailsea Town Council and used on a rota basis, carrying mobile phones, the issue of patrol notes including H & S instructions, instructions that patrollers must not operate alone but work at least in pairs, person under 18 must be in the direct control of a responsible adult, the erection of toad warning road signs along the lane

Summary timetable, 2005

The first toad movement towards the valley was on Jan.6th, the last on Mar 29th. The first spawn record was on Feb 21st, and the first tadpole on April 18th. The first returning toad was on March 14th, and the last on June 28th.

Numbers migrating to the rhynes

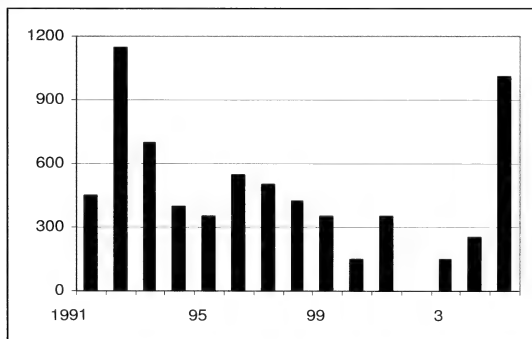


Chart 1 Toad totals counted annually 1991-2005

In 2005 we counted 1014 toads, the highest since 1992 . However counts are influenced by the number of nights and total hours patrolled, the pattern of toad movement and the effectiveness of the reporting and recording systems .Precise records of males and females are not available. There were certainly more males. Records we have suggest something like a 5:1 ratio. As the migration progressed there was an increasing incidence of 'aplexus' pairs but not in any great numbers.

Males often 'squeaked' when gently picked up. More so on warmer nights when they were more active. On a number of occasion males clasped very tightly on to a gloved finger when picked up and were sometimes difficult to remove.

Newts

We also recorded 157 newts. All the ones that were positively identified were palmate

Death rates

On the migration to the rhynes this year we recorded 126 dead toads against a total of 1014, which gives a death toll of 12.4%. However this % should be regarded with some caution. Toads that have safely crossed the road but have not been seen by patrollers do not of course appear in the records. Whereas those that were killed during the same period will probably be recorded, as they will still be on the road when the patrollers next cover that area. In effect this means that the % of deaths to total numbers crossing, whether recorded or not, is probably considerably lower than 12.4%

Records for 2003 and 2004 indicate death tolls of 23% and 20% but on much smaller totals. Earlier years records suggest that the death toll proportion reduces as the total numbers recorded increase.

It is not possible to be precise on the reasons for this reduction in death toll. I would surmise that it is a combination of two effects. The first being a real increase in survival from increased levels of patrolling. The second being more accurate counting and record returns of total numbers again influenced to some extent by patrol levels

The pattern of migration

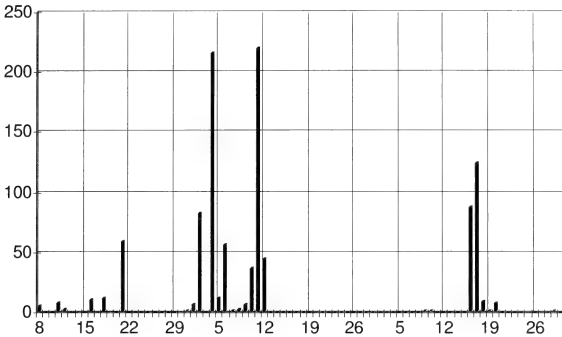


Chart 2 Daily Toad counts Jan 8 to March 30 2005

Downwards migration started 6/1 and finished 29/3. This means that the last of the stragglers were still heading to the valley 3 months after the first movement.

There was a small steady movement up to 20/1 when we found a then record number of 60 on the one night. A cold spell with temperatures below 6°C prevented any further movement until 29/1. Temperatures then rose again for two weeks during which the main volumes migrated. On 1/2, 4/2, 5/2 and 10/2 we recorded 82, 216, 56 and 220 respectively. Then followed a prolonged cold spell with temperatures quickly falling below zero during the evening for four weeks. All migration activity ceased during this time. Just when we thought the migration might be finished a spell of milder humid weather produced a final flurry with 88 records on 15/3 and 124 on 16/3. Apart from 1 stray toad 29/3 the records of downward migration ended with 8 on 19/3.

Factors affecting volume of movement.

It is also fairly clear that toads, being basically cold-blooded animals cannot physiologically be active at low temperatures. Below 6°C they are inactive. Above 6C a number of factors may have an impact on likely movement across the road and the volume involved.

Humidity is usually expressed as a % relative to humidity saturation at a given temperature. As air temperature rises so does its capacity to hold moisture. So air at 10°C holds more moisture at a given humidity % than air at 6°C with the same humidity reading. The combination of temperature and relative humidity can be crucial. Also it is important to differentiate between humidity and damp/wet weather. Wet nights will have high humidity. On the other hand one of our high recording nights was dry and bright and said to be unsuitable for toads. Surprisingly humidity records for that night showed 86% against other similar nights below 70%.

Wind direction and speed. There could be a wind chill or desiccation influence that impacts movement.

The natural trigger that causes toads to move. There may be a communal factor at work, as on some warm damp nights there is only one single toad and on others over 200.

The distance the toads have to move to reach the road and the **speed of movement**. It seems that the greatest volume of movement is around or within a couple of hours of dusk which may suggest that they either live close to the road or complete their journey over more than one night.

The conditions on previous nights. There seems to be a suggestion in the patterns that activity builds up over a number of consecutive suitable nights

Predicting volumes

Temperature and humidity seem to be the two most relevant factors to use in analysing volume data. Hard information is available for these from a local Portishead website that Mike Thomas has built, and it seems clear the main indicator is a combination of temperature and humidity. The best correlation with the numbers recorded is obtained by multiplying the temperature by a factor of 0.75 for 50% humidity, 1.0 for 75% and 1.25 for 100% humidity.

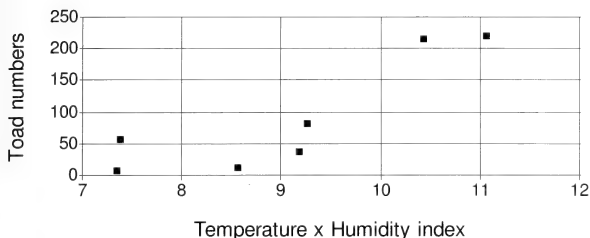


Chart 3 Toad numbers Feb 2nd-12th in relation to Temperature x humidity index

Spawning

In order to investigate the spawning grounds I obtained a permit from English Nature to enter their restricted access Gordano Valley Reserve. The main spawning area seems to be the Portbury Drain, a very slow moving drainage rhyne, that runs through the reserve parallel to Norton's Wood Lane in an easterly direction. I found the first spawn on 21/2. This was despite being in the middle of a prolonged very cold spell with no sign of any migrating toads for the previous 10 days. By 28/2 there was considerable quantity of spawn along most of the drain. Again the nights in the period between 21/2 and 28/2 were very cold with no toad movement on the road. In fact at the time of my 28/2 daytime visit most of the drain was covered in ice.

The main concentration of spawn was in the section running below 'Greenacre' and the adjacent horse paddock. This is close to the stretch of the lane where the greater numbers of toads were found. I had some reservations about the quality of water in parts of the drain. There appeared to be an oily scum covering much of the surface in parts. However English Nature arranged for the Environment Agency to check water quality and the result was very positive.

Parts of the drain used for spawning were quite shallow – less than 450mm. Most of the spawn was laid in horizontal strings wrapped around plants close to the surface rather than hanging vertically down through deep water. Despite information suggesting that toads and frogs prefer different habitats for spawning, frogspawn and toad spawn appeared together in most of the spawning areas. Perhaps that is because there restricted habitat in this area. I wondered if they had perhaps chosen to spawn in the same places for the same survival reasons that groups of frogs lay communal spawn.

The return migration

The first returning toad was found Mar 14th. Between then and 29th we found small numbers of returning toads amongst the stragglers still heading for the rhyme. After the 30th we found only returning toads. The recorded numbers returning were small and spasmodic over a prolonged period from Mar 14th to June 28th. The maximum recorded in any one night was 21 but most records were in single figures. The total recorded was only 138, 800 fewer than on the outward journey. There are a variety of explanations for this. Many of the nights were dry. Dusk occurs later in May and June and the return may continue overnight in the warmer conditions. The number of patrols is reduced in May.

However I believe enough of a watching brief has been kept to know that large numbers have not returned during the first couple of hours after dusk on suitable nights. Most visits have found no more than a handful during the period after dusk. Within an hour or two of dusk there appears to be little activity but of course we have not had cover throughout the night. The lack of any squashed carcasses during the period of low records would also add to the confidence that we have not missed any mass movements. I would surmise that the return has been in dribs and drabs over a prolonged period. Certainly the return has extended for more than three months since the first spawning. Whilst it is generally suggested that toads leave the water once they have spawned they certainly seem to take their time returning to the woods. During this return process the traffic has been much lighter later in the evening and death rates appear low. Contrary to popular expectation we found a small number of 'aplexus' pairs on the return journey. In July a very small number of adults were found on the road. These seemed to be coming out from the wood side of the road. It may be that these were coming to the road to feed on the very plentiful supply of slugs and snails on the road at night.

Toadpoles and young toads

Despite regular visits to the drain there was no sign of any emerging toadpoles until April 18th. That was almost two months after the first spawn. This is somewhat longer than the ten days suggested by the BBC Natural History website. It may have been affected by the lengthy spell of cold weather, but frogspawn had hatched and the tadpoles dispersed long before the toadspawn hatched .

On April 18th the eggs had just started to take some shape with spasmodic movement but the developing poles were still attached to the spawn strings. They were attacked by both water boatman and a diving beetle. By April 22nd the poles were swimming freely close to the surface and on May 9th the surface of the drain was black with thousands of poles. By June 7th the toadpoles had grown considerably but there was no sign of any leg growth.

Despite a number of visits to the rhynes, surrounding areas and periodic checking of the lane there has been no sightings of young toads. The dense overhanging vegetation along the rhynes in summer; the difficulty of access to the land on the lane side of Portbury Ditch; the lateness of nightfall in summer; or the spasmodic nature of my visits could explain this. The nature of the migration of young to the woods remains a mystery.

Media Interest

2005 was dubbed 'the year of the volunteer', and the patrol featured in:- The BBC 'Ican' website, a Guardian article on ten unusual ways to volunteer, a Radio 5 live telephone link radio interview and Radio Hereford and Worcester live telephone link interview.

An exhibition of fossil marine reptiles at Frome Museum, Somerset.

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During the summer of 2005, the writer displayed some of his fossil marine reptile collection at Frome Museum, Somerset. These fossils had all been found in the Upper Jurassic, Lower Kimmeridge Clay of Westbury, Wiltshire at the Lafarge clay quarry. The exhibition represented over 14 years of collecting fossils from the site. A number of rare and well-preserved reptiles have been found by him including the remains of pliosaurus, plesiosaurs, ichthyosaurs, crocodiles and a turtle. Some of this material has been donated to Bristol City Museum and Art Gallery and now forms part of their research collection. The most important donated material includes a metriorynchid crocodile skull, one of only a very few to be found from the English Kimmeridgian (Upper Jurassic) and the 1994 pliosaur (*Pliosaurus brachyspondylus*). This represents one of the most complete pliosaur specimens of its kind to be found in England and was excavated by a team of geologists from Bristol Museum and Art Gallery and the University of Bristol. The specimen was donated by Blue Circle Cement Plc (now Lafarge Plc) to Bristol City Museum where it is undergoing its final preparation and conservation.

Until the exhibition at Frome Museum, much of this material had not been seen by the public, although some of it had been the subject of research by staff and students at Bristol University.

The rocks that contain the bones of marine reptiles at Westbury, Wiltshire form part of an extensive layer of marine clay deposited during the Upper Jurassic Period over 154 million years ago. It occurs over much of Britain (and northern France), but is seldom seen except on coastal cliffs and during quarrying activities inland. It is called the Kimmeridge Clay after the Kimmeridge area of Dorset, where it is well exposed. During this period, much of southern England was covered by a shallow, subtropical, muddy sea inhabited by a multitude of living creatures including many different kinds of fish and reptiles as well as abundant invertebrate animals especially the coiled molluscs called ammonites.

The writer is a keen amateur geologist and fossil hunter who has been collecting fossils since he was a boy. He was awarded the Geological Collector of the Year award in 1991 and the R H Worth Prize for 1996 by the Geological Society of London for outstanding achievements by an amateur geologist.

As well as being a very avid collector of fossils from the South West of England, the writer has been involved in expeditions to collect dinosaur remains from Alberta, in Western Canada and marine reptiles from the Nevada desert region of the Western United States. Both expeditions were led by palaeontologists collecting fossils for Cinicinati Museum in Ohio, America.

The writer continues to collect marine reptile fossils from Westbury, Wiltshire and at the time of writing has just discovered another rare and important metrioryhynchid crocodile skeleton. The exhibition at Frome Museum was generously sponsored by the Geologists' Association Curry Fund, the Bristol Naturalists' Society and Wiltshire Geology Group.

The writer would like to express his thanks to Lafarge Plc for their continuing co-operation and support of collecting activities at their quarries.

The writer currently holds the post of President of the Geology Section of the Bristol Naturalists' Society and has recently held the position of President of the Society.

Profiles of local naturalists 1.

Martin Evans

I was born 16th July 1952 in Weston-super-Mare, but grew up in the nearby village of Banwell. Living only a few hundred yards from the nearest woodland and fields, there was always plenty of wildlife in our garden, so I developed an interest in natural history from an early age.

My earliest memories of insects were of jam jars full of Seven-spot Ladybirds collected from the *Lonicera* hedgerow that was planted around the garden at the front of the house and capturing Large and Small "Cabbage" White butterflies in the vegetable garden.

My parents were both from the Mendips and had a good knowledge of the commoner plants, birds and animals that we saw on our Sunday afternoon walks. They encouraged me to have an interest in what I saw around me and gave me a basic natural history knowledge.

I was given several of the "Observer" natural history books, as well as a number of other bird, flower and insect guides. From these I can remember identifying the Great Green Bush-crickets that called from the runner beans in the garden and finding a colony of Chalkhill Blues near Banwell Quarry (sadly they are long gone).

When I was about eleven I swapped a Grass-snake I had found for some guppies and platies. This started a life long interest in tropical fish. My father bought a tank around this time and also became a keen aquarist.

I left Churchill Secondary Modern School when I was sixteen (after just taking a few CSE's) and started a Mechanical Engineering Apprenticeship at Westland Helicopters in Weston-super-Mare. I left home not long after this and was married by the time I was nineteen.

I then started working part-time in a tropical fish importers and at the end of my Engineering Apprenticeship worked in the aquarist trade full time. During the next twenty years I also worked for another tropical fish importer and a third retail shop, as well as becoming self employed for a while breeding tropical fish.

During the mid-1970's I went back to Westland Helicopters for a couple of years working as an aircraft inspector. It was here that I met the late Dixie Dean. Dixie and I became good friends and for the next ten years visited a different natural area every Sunday morning. Dixie was keen on photography and I had bought a camera to photograph tropical fish. This common interest got us into moth trapping and photographing them. Although our Sunday trips still carried on, we then also moth trapped every other night of the summer.

In the mid-1980's I decided to spend a year getting some education, so I studied GCSE English Language and A-level Biology.

I then spent a year coppicing, fencing, buiding walls, paths and steps for the Avon Wildlife Trust. At the end of the year I applied for their horticulture course that they were running. They said I should apply for a Horticultural Degree place at Bath University. This was on a Wednesday. On the following Monday I was starting my degree in Horticulture specialising in Land Management.

I managed to mould the course to my interests, so that I was the one that did the seminars on water gardens and nature reserves, and so that my thesis was on alien plant escapes in Britain and my taxonomic study was on European Speedwells *Veronica* spp. (wild and cultivated). I obtained a 2.1 Honours.

I spent a lot of the first summer after university collecting plant records with Tony Smith as part of the Avon Flora Project (which was later published as an Atlas). This detailed recording work was new to me, but prepared me for future survey work.

In the early 1990's Ray Barnett (at that time Assistant Curator of Natural History at Bristol Museum) set up the Bristol and District Moth Group and Dixie and I became members. In 1994 I started volunteering in the museum with Andy Pym, entering moth records into a card database. When Andy left the museum Roger Edmondson carried on the work with me and I ended up editing the newsletter for the next six years.

Gradually the card database was computerised and I built a database specifically for the Bristol and District Moth Group records. By this time I was employed part-time at the Bristol Regional Environmental Records Centre (BRERC) and was later asked to convert the moth database into a database for all British species (not just moths). This database became the main BRERC database. Over the next nine years I worked on end to end contracts at BRERC; working the summer in the field on surveys and during the winter on database work and computer mapping of records. I also worked as a private contractor often with Janet Boyd for bodies such as South Gloucestershire Council, Avon Wildlife Trust, the National Trust, Butterfly Conservation and others.

In the early 1990's Roger Edmondson joined me on the field surveys at BRERC where we worked until the summer of 2004.

In November 2002 I launched my website WildGuideUK.com. The idea was to try and make use of the vast number of photographs I had taken and at the same time help others to identify insects. The site allows you to compare similar species on screen pointing out the sometimes minor

differences. I mainly avoided the groups such as dragonflies and butterflies which are well covered in books and elsewhere on the internet and concentrated on less well known insects such as bee-flies, micro-moths, shieldbugs and grasshoppers

On leaving the record centre in 2004 Roger and I decided to use some of the 12,000 insect pictures that I had taken to illustrate some field guides. We travelled around the south of England that year photographing mainly shieldbugs and grasshoppers. We published "A Photographic Guide to the Shieldbugs and Squashbugs of the British Isles" in January 2005.

That summer we continued taking photographs of grasshoppers and crickets (by now we had over 3000 digital Orthoptera pictures) not just in the south of England but also visiting the Isle of Man and Jersey to get the rarer species. The book should be completed during the summer of 2006.

In the meantime I have just completed building a new tropical fish breeding room and will be specialising in the breeding of South American Loricarids (suckermouth catfish). There may be a future book on that subject as well!

The arrival and spread of the Long-winged Cone-head *Conocephalus discolor* (Thunberg) in Somerset and the Bristol district, 1995-2005.

Robert Cropper, 14 Rosewood Close, Burnham-on-Sea, Somerset TA8 1HG

The Long-winged Cone-head *Conocephalus discolor* (Thunberg) is a small bush-cricket of the family Tettigoniidae. It is an attractive, graceful insect of a delicate green colour, with a brown dorsal stripe on head and pronotum and brown wings. Its stridulation is a faint, high-pitched hissing which is produced almost continuously in warm weather during late summer, and although only audible at close quarters, it is easily heard on a bat detector tuned to 22kHz. In this it differs from its close relative the Short-winged Cone-head *C. dorsalis* (Latreille), which sings at a much higher frequency, around 43kHz.

Before 1970, this species was an extreme rarity known from a few localities on the south coast of England, including a well documented site at Chapman's Pool, west of Swanage in Dorset. Here, in 1969, B.C. Pickard and Miss S. House found unusually long-winged specimens and noted that the colony had undergone an enormous increase in size (Ragge, 1973). Following these observations, it became evident that the insect was

spreading inland and becoming increasingly common throughout Dorset and the New Forest. By the early 1990's this spread had accelerated and several localities were known in Wiltshire. It was likely to be only a matter of time before *C. discolor* was added to the Somerset list.

On 13th August 1995 the first stridulating male was located on a roadside verge at Witham Friary (ST764418) and on 17th August a second was found at Knole, near Long Sutton (ST488252), also on a lane-side verge in rough grass. On 27th August the first breeding colonies were confirmed along country lanes at Henstridge (ST702202) and Templecombe (ST716225 – 728228) the latter site being quite extensive. A brown-form female was found at Henstridge. On 2nd September three stridulating males were located in a rough field at Evercreech, this being the most northerly record at that time.

On 31st August 1996 a single male was stridulating at Lollover Hill, Compton Dundon (ST477325) indicating continuing spread. By now the species was well established in the Yeovil area, and a record from Cricket St. Thomas (ST364084) on 29th September was the start of an assault upon the Chard-Ilminster-Crewkerne triangle.

On 30th August 1998 stridulating males were found in Frome (ST769465) and Standerwick (ST816508), indicating an advance from the east and, by the 1999 season, several breeding colonies were known on East Mendip. The species could now be regarded as common in south and south-east Somerset and was still on the increase.

It was in 1999 that the first records were made from the Bristol region. On 21st September J.P. Martin discovered a small colony at Bathampton Meadows Nature Reserve (ST782671) and on 25th September a large colony was found scattered over a wide area at Hengrove Park (ST592683).

Many localities are now known in the Bristol and Bath area – by 2003 the species was spreading westwards along the River Avon with records from Saltford, Swineford and Corston, also along the A368 where it occurred in many spots around Marksbury, Hunstrete, Compton Dando and Woollard. On 11th August a large colony was located in a rough field at Draycott (ST478512) the first record for the main mass of Mendip, but so far this remains an isolated site.

By September 2004 Portishead had been reached with colonies in at least three separate spots and in 2005 new records were made at Failand

(ST513700 and 504707) 24th September, Stone-edge Batch (ST462718) 24th September, Bishop Sutton (ST583604) 25th September, Chew Valley lake (ST554594) 25th September and in several sites in ST56 – Chew Stoke - Chew Magna, Chew Valley Lake to Limeburn Hill 2nd October.

Further south, the westward spread continues with colonisation of the Bridgewater and Taunton areas and a record from Wollavington Bridge (ST345436) on 2nd October 2005 indicates that the coastal belt has almost been reached.

On 19th August 2001 a breeding population was discovered around an overgrown pond at leechpool, north of Yate (ST709856) and a single male was heard at Westerleigh Common (ST6982) – these are the first records for West Gloucestershire (vice-county 34).

The main habitat is rough ungrazed grassland whether this be downland, uncut meadows, field edges or roadside verges. It does not seem to favour the low-lying areas of the Somerset Levels, although it readily colonises the surrounding hills. Whether this is due to competition is not yet known, but would seem likely.

There is nothing to suggest that this spread will not continue. The remarkable range extension of this fascinating and resourceful little bush-cricket surely has to be one of the most incredible phenomenon in British entomology in the last thirty years.

(Unless otherwise stated, all records are my own.)

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Climate Change in Bristol

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The issue of climate change, once the preserve of specialists, has become a very political topic. The evidence for climate change can only come from meteorological records, and I publish here a continuous series of mean maximum temperatures from 1881 to 2005 in order to provide detailed and accurate information to inform the debate. Other evidence, particularly any derived from alterations in the populations or distribution of species, may reflect temperature, but is also the consequence of a very wide variety of other factors.

In the broadest sense we live at what is likely to be the end of an interglacial, as it is some 12,000 years since the last ice age ended, and previous inter-glacials have tended to last around 10,000 years, a very brief period compared with the length of ice-ages. There is no detailed understanding of the mechanisms that end ice-ages, or indeed of those that start them, though clearly complex feed-back processes must be involved. Glaciers in the Alps and Norway are the local remnants of the last ice age, and have been slowly retreating throughout modern times. Greenland is still covered by the sort of ice-sheet, up to 2km thick, that once covered the whole of Britain. The thawing of that ice resulted in a rise of sea level, the creation of the North Sea, and the English Channel. The weight of the ice was such that it pressed Scotland down, and it has been rebounding from that ever since, and the south east of England has been sinking. The subsequent climate of Britain can be reconstructed from peat deposits, tree ring data and other sources, and it has clearly swung between colder and warmer periods in the past 10,000 years. The invention of accurate thermometers in the 17thc enabled more precise measurements to be made, and there is a detailed temperature series of sorts from 1697.

In Bristol modern maximum and minimum records have been kept since 1881, and the first were published in that year in this journal. There were made from then until 1916 at Clifton College, and from 1920 to 2002 at Long Ashton Research Station. Since then I have used the figures published daily by the Times. I have used the mean maximum temperature rather than the mean temperature partly because that is what is quoted in the Times, partly because, although night-time temperatures clearly have an influence on the environment, especially if they fall below freezing, it is the impact of day-time temperatures that has the greater significance for plant development. The hottest year (1921) since 1881 had a mean maximum temperature of 15.6C and the coldest (1892) 12.1C. The standard deviation

was 0.7C, or 5% of the average of 13.8C. Chart 1 shows the fluctuating figures, listed in Table 1 at the end.

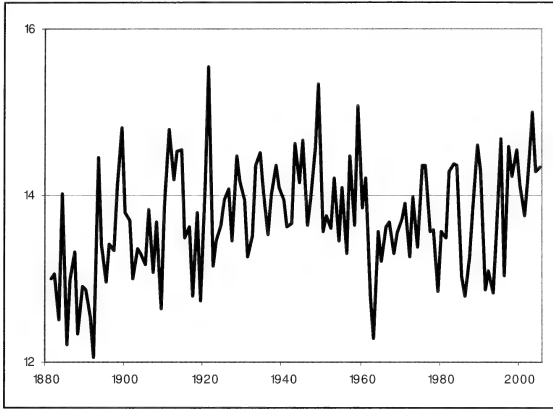


Chart 1 Annual mean maximum Bristol temperatures, 1881-2005

A long term trend is the best way of making sense of such violent fluctuations. Ideally this would be at least 50 years long, as climate change is a gradual process, but Chart 2 shows a 20 year moving average applied to the annual figures. It makes it clear at once that temperatures were rising on trend from 1880 to 1950, but that then a cooling trend set in, which has recently begun to be reversed. It is unfortunate that the series did not start earlier than 1881 as it is clear that the late 19c century had a series of spectacularly cold winters which were commented on in general in an article in this journal by GF Burder in 1890, and it is likely that the earlier part of that century was warmer. If that is so it is entirely possible that the annual trend temperature has swung from around 13C up to 14C and back again over the past two hundred years or more. It is also fairly clear that there is no close correlation between these figures and human industrial activity or consumption of coal or oil.

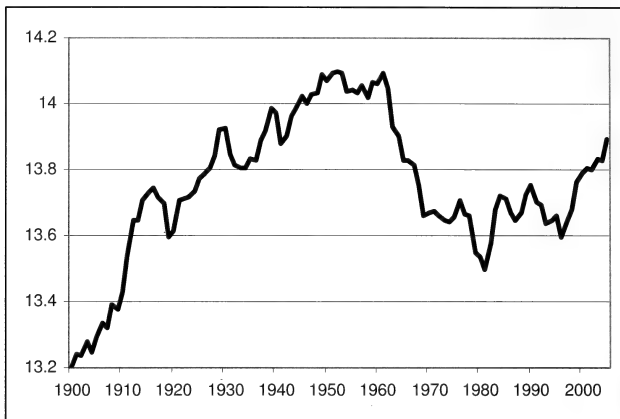


Chart 2 Twenty year rolling average annual maximum temperature.

Seasonal Change

The annual pattern has not been the same as the seasonal one. The three charts below show the twenty year trend figures for the four seasons. Winter is defined as December to February; Spring, March to May; Summer, June to August; and Autumn, September to November. The winter of 2005 is thus December 2004 to February 2005.

Winter The mean since 1881 is 7.7C. The series peaked in 1930 and fell to 1970. Since then they have warmed by 0.5C back to just above the long-term mean.

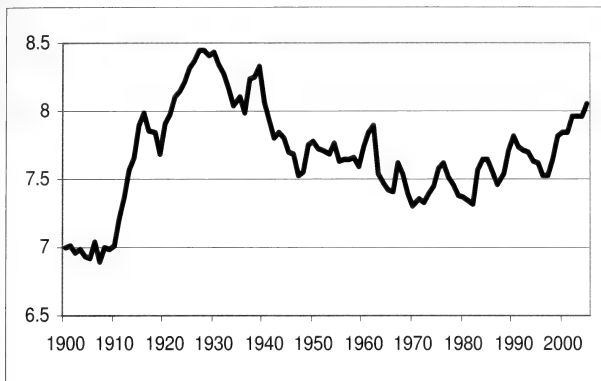


Chart 3 Winter, twenty year running mean 1900-2005

Spring and Autumn. The values of these two seasons overlap, so they are on the same chart. Spring, mean since 1881 13.0C, grew steadily warmer from 1900 to 1963, and then became steadily colder to 1990, since when it has climbed back to the average value. Autumn, mean since 1881 14.1C, grew warmer to 1950, held level at 14.5C to 1968 and then became a little cooler. In 2005 it was just above the long term mean.

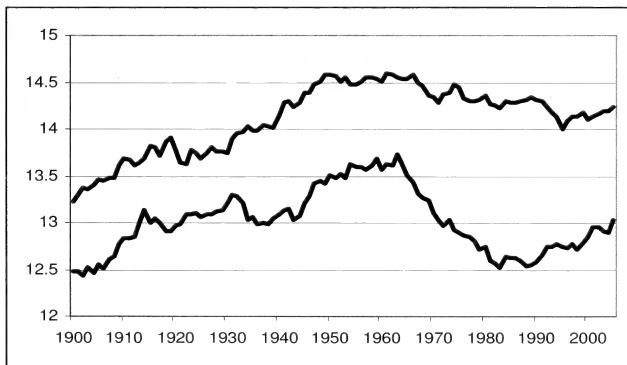


Chart4. Spring, lower line; autumn, upper line; twenty year running means, 1900-2005

Summer Mean since 1881 20.1C. The twenty year mean peaked in 1953, and then cooled sharply to 1974. There has been no trend since and in 2005 the figure was 20.1C, the same as the long term mean.

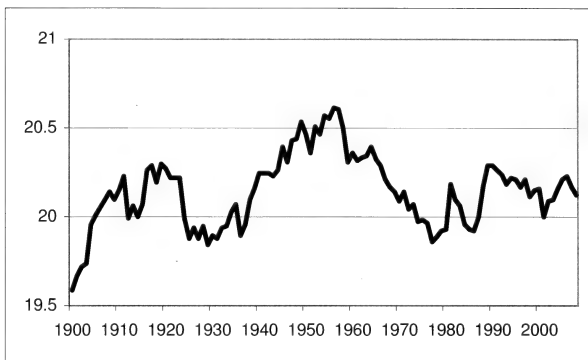


Chart5 Summer. Twenty-year running mean 1900-2005

The table below lists the annual average figures, derived from the sources I have quoted. The series between 1910 and 1920 , which were not available from Clifton college, and which I have failed to find elsewhere are derived from the national Central England mean temperatures, adjusted for the normal difference between those temperatures and Bristol mean maximum. These figures are thus less precise and less reliable than the others.

1880	1881	1882	1883	1884	1885	1886	1887	1888	1889
	13	13.1	12.5	14	12.2	13	13.3	12.3	12.9
1890	1891	1892	1893	1894	1895	1896	1897	1898	1899
12.9	12.6	12.1	14.4	13.4	13.0	13.4	13.3	14.1	14.8
1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
13.8	13.7	13	13.4	13.3	13.2	13.8	13.1	13.7	12.6
1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
13.8	14.8	14.2	14.5	14.5	13.5	13.6	12.8	13.8	12.7
1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
14.2	15.6	13.1	13.5	13.6	13.9	14.1	13.5	14.5	14.2
1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
13.9	13.3	13.5	14.4	14.5	14.0	13.5	14.0	14.4	14.1
1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
13.9	13.6	13.7	14.6	14.2	14.7	13.6	14	14.6	15.3
1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
13.6	13.8	13.6	14.2	13.5	14.1	13.3	14.5	13.7	15.1
1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
13.8	14.2	12.8	12.3	13.6	13.2	13.6	13.7	13.3	13.5
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
13.7	13.9	13.3	14	13.4	14.4	14.4	13.6	13.6	12.9
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
13.6	13.5	14.3	14.4	14.4	13	12.8	13.3	13.8	14.6
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
14.3	12.9	13.1	12.8	13.5	14.7	13	14.6	14.1	14.6
2000	2001	2002	2003	2004	2005				
14.1	13.8	14.2	15	14.3	14.3				

Table 1 Annual mean maximum temperatures, 1881-2005

Obituary

David Winston Cope

1945 – 2005

David joined the Bristol Naturalists' Society in 1982 and was President of the Geology Section of the Society until his death on the 18th August 2005. He was an accomplished geologist, geomorphologist and soil scientist.

Born on the 26 November 1945 at Leek, Staffordshire, he attended Leek High School, achieving 8 O levels and 3 A levels, including geography and geology. The Headmaster of Leek High School presented David with a book prize for his achievements at school in geology – so his interest in the subject had started when he was a young man. He graduated from Manchester University in 1967 and went on to join the Soil Survey of England and Wales and was based at the Burghill Road office in Bristol until 1975 and then at Long Ashton, Bristol until 1991. During this time numerous Soil Survey maps, publications and reports bear his name as author or co-author.

As a soil surveyor he was enthusiastic and diligent and on completion of one of his publications, the Wilton Map and Record, Prof. Walter Russell wrote to David's regional officer, Derek Findley, with congratulations on the quality and insight of the survey. In the 1970's David made a large contribution to the mapping of peat thickness in the Somerset Moors. His understanding of the peat soils was second to none. 1979 saw the start of the 1:1/4 million National Soil Map, in which he mapped much of Somerset, Gloucestershire and Wiltshire, as well as part of Cornwall.

In 1991, David left the Soil Survey, working as a self-employed subcontractor for the Survey and other organisations until his death. David was also secretary of the South West England Soils Discussion Group, of which he was a founder member.

David never married and remained a quiet private person. Without a family and its associated commitments he was able to devote his life to his interests in soils and geology. At one time he was asked to

undertake forensic work with soil samples to help solve a murder in Wiltshire. This was dramatised on Channel Four in 1993 and had the actor playing him look at a particular type of soil and pronounce to the watching millions “King Norton series”.

David had not enjoyed good health for some time before his death, but despite this he still made a huge effort to continue his support of the Society. He was a regular helper at geological site clearance projects arranged by the geology section and would always put more than his fair share of effort into the digging and was always good company. He will be sadly missed by the Society and particularly the members of the Geology Section.

David collapsed and died while undertaking field work in Wareham, Dorset and was not discovered for 2 days. He died doing the thing he enjoyed doing most.

Simon Carpenter, friend of David and fellow member of the Bristol Naturalists' Society.

A. C. K. Fear

1914-2005

Arthur Charles Kitchener Fear was born on 8 December 1914. He died on 17 November 2005, in his 68th year as a BNS member, a record seldom if ever surpassed. As a small boy he showed intellectual promise, buying and avidly studying second-hand books. He won a scholarship to Cotham Secondary School, and went on to take a science degree at Bristol University. Career openings were scarce in the depressed mid-1930s and he hesitated between entering the ministry - he was a devout Anglo-Catholic - and a career in horticulture. In 1936 he came 34th of the 238 (45%) who passed the RHS' General Examination in Horticulture, but found employment with a firm of Accountants, though gardening remained a life-long interest.

Called up to the Army in 1940, he went via Porton Down and Glasgow to Tunisia and Italy. Demobilized, he worked in the Zoology Department of Bristol University from 1946-48, taking various courses in Zoology and Marine Biology. He then obtained a post at Bristol Cathedral School, where for many years he variously

taught Botany, Zoology, Geography, Geology and Archaeology, finally moving to Worcester Technical College to teach Earth Sciences until he retired in 1980 aged 65.

Fear joined the Society in 1937. After the War he met fellow-member Mary Clench, a mathematics graduate. They married in 1947 and a daughter Margaret Jane (Maggie) was born in 1953. He and Mary served a term on Council from 1949, and in 1950 and 1951 Mary served as Joint Assistant Hon. Secretary, along with Miss M. H. Rogers (our President, 1958-9). Fear served on the Field Committee and led expeditions both General and Geological, including at least one all-day excursion jointly with Mary. He exhibited at Geological Section and Society exhibition meetings; in January 1949 the Section Secretary, Igor Loupekine, wrote, "I am, of course, once again counting on you to produce something spectacular" One display, "Items of Geological Interest in the Bay of Naples", reflected the delight in Italian geography and geology kindled by his wartime service.

He made many extended walking tours in France and especially Italy, with his friend Philip Boulder. Sadly, in 1976 he was called home by the news that his beloved Mary had died, following a hip fracture caused by slipping on wet leaves at Chew Valley Lake. His final Italian backpacking tour, at the age of 80, lasted over five weeks.

His thirst for information lasted all his life, and he would join courses even in subjects he knew well. In 1951 he enrolled in evening classes for the London External BSc in Botany and Zoology, at the then Merchant Venturers' Technical College (the writer and his fiancée were in the same class), and when the Botany lecturer fell by the wayside he took her place. He amassed a large library of books on natural history, geology and topography, especially relating to Italy and the SW of England. Almost to the end of his days he collected cuttings and articles on natural history topics, which he filed meticulously, leaving 309 box files.

As his health declined Maggie abandoned her London career to look after him, aided by a faithful carer. Increasing infirmity demanded 24-hour care, and finally in June 2005 he entered a Nursing Home, where he died. Friends described him as a devoted and generous father, a cheerfully firm teacher, a courteous and gentle man of deep intellect, with a subdued mischievous streak, and a pleasure to know.

S. M. Taylor, Hon. Archivist

A.J. Willis

1922-2006

Arthur Willis was born in Sherborne, Dorset and brought up on a farm. He was educated in Bruton, Somerset, and became a lecturer in Botany at Bristol University from 1947 to 1969. He became a member of the Society, and in 1958 wrote the first of several botanical articles on the vegetation of the Gordano valley. In 1959 he became Editor of the proceedings. In 1963 he contributed an article on the Mosses of Leigh Woods, and in 1965 he took over the writing of Bristol Botany after the sudden death of Noel Sandwith. He continued the tradition of updating the information in JW White's flora of 1912, which had been maintained since White's death in 1930, by Mrs Cecil Sandwith and her son.

In 1969 he moved to become Professor of Botany at Sheffield, a post he retained for 18 years, but returned annually to Gloucestershire partly to carry out a survey of roadside vegetation near Bibury which he maintained for 48 years. This survey was originally designed to monitor the impact of different weed-killing and mowing regimes on the flora, but the detailed phenological data from the control patches is now in demand as evidence of the impact of climate change, as it is the longest series anywhere run by the same individual at the same site using the same methodology. He also continued to write Bristol Botany for the Society until 2003, and his formidable memory for botanical detail ensured that the reports read as if he were an active resident of the area. The continuity of tradition in Bristol Botany over ninety years must be unequalled. He contributed important articles to the Proceedings in 1970 on Dr Arthur Broughton, in 1989 on the vegetation of the Avon Gorge, and in 1990 of the development of Berrow Dunes.

He was a very important national figure, revising Sir Arthur Tansley's 1923 Practical plant ecology, and he was editor of the Journal of Ecology's Biological Flora, which issue by issue carries a detailed study of a particular species. He was fascinated by the ecology of dunes, and in 1997 produced a classic study of them with John Packham. He worked with botanists in Egypt to produce three volumes on the plant life of that region. His enthusiasm was boundless, and his encouragement of others will be greatly missed by plant enthusiasts around the world.

C Lovatt, R Bland

President and Council for 2005

The following officers and members of Council were elected at the AGM on January 24th 2004. They are the Trustees of the Society.

Officers

President;	Mr. R Barnett.		
Vice Presidents	Mrs A Hollowell. Mrs A Wookey		
Hon Secretary:	Mr B Frost	Hon. Treasurer;	Mr. S Fay.
Hon. Librarian;	Mrs. AF Hollowell	Hon. Editor;	Mr R Bland
Hon. Membership Secretary;	Mrs AM Wookey.	Hon. Archivist;	Mr SM Taylor
Hon. Distribution Secretary;	Mr B Frost.	Webmaster;	Mr. D Strawford
Hon. Bulletin Secretary;	Mr. DB Davies.	BRERC Rep	Mr T Corner
Publicity.	Ms M Leivers & Miss M Morris		

Section Officers.

Geology;	Mr. S Carpenter,	Ms S Flint
Botany;	Mr A Smith,	Mrs. P Millman
Invertebrates;	Mr R Barnett,	Mr AG Smith.
Mammals;	Mr DPC Trump	
Ornithology;	Mr. RL Bland, Dr. M Hill.	

Ordinary Members.

Mr.R Muston. Mr. N JWray. Mr. HG Morris. Mr M Johnson

REPORT OF COUNCIL FOR 2005

The aims of the Bristol Naturalists' Society for 2005 were "*The promotion of education and research into natural history, including geology, with special reference to the Bristol District; and the promotion and conservation of the British fauna and flora, and protection of geological and geomorphological sites*".

The Society's activities consisted of sectional and general, indoor and field, meetings. The Society's specialist sections covered Botany, Geology, Invertebrates and Ornithology, and there was an informal Mammal group. General Field Meetings had been running at a loss, and in future, Sections will be asked to host meetings with a wide natural history interest. The preparation and distribution of the Society's publications, and the maintenance and development of its Library, consumed the greater part of Society's income, and those activities were managed by committees that worked to plans and budgets agreed by Council (the Trustees).

During the course of the year a new President was elected, as well as two new Vice-Presidents, and a new Secretary, Treasurer, Editor, and Publicity Officer.

The Society received welcome publicity early in September, three times in the Bristol Evening Post, as well as on local television news, local teletext, and the internet. This was due to the fact that a Blue Plaque was unveiled to celebrate the life and work of Adolph Leipner, who was a co-founder of the Society in 1862. He was also its first Secretary for 31 years, as well as having a period as President. The plaque unveiled on the 8th of September on the wall of a former home at 47 Hampton Park, Redland, Bristol, also commemorated the fact that he was the founder of the first University of Bristol botanic garden more than 120 years ago. The President and Secretary, and other members, represented the Society at the unveiling. The plaque states:- 'Adolph Leipner 1827 – 1894. Professor of botany. Co-founder of the Bristol Naturalists' Society. In 1882 he created Bristol University's first Botanic Garden at Woodland Road. Lived here from 1870 to 1894'.

Education

26 talks and 42 field meetings were organised by the Society during 2005. These offered an interesting and informative programme of activities concentrating particularly, but not exclusively, on the Bristol District. There were:-

- 6 General talks
- 5 Geology talks and 5 Geology field meetings
- 7 Ornithology talks and 15 Ornithology field meetings
- 2 Invertebrate talks and 5 Invertebrate field meetings
- 6 Botany talks and 16 Botany field meetings
- 1 joint General/Botany field meeting

The Society publicised its meetings to members and to visitors with the help of its website, a monthly bulletin, occasional press releases and poster publicity displayed in public places, particularly libraries. As always, particular emphasis was placed on the encouragement of new members.

Publications

Volume 64 of *Nature in Avon*, was delivered to the printers in September, and sent out to members in October. The members of the Publications sub-committee express their thanks to Richard Bland for taking on the role of Editor this year and for producing Volume 64, in addition to all his other work for the Society.

The Avon Bird Report arrived in mid December and was distributed to members in January 2006. The second late year is deeply regretted by AOG, and it is fully intended to get back to an October date in 2006. The Editor, Harvey Rose, and his team are particularly to be congratulated on the wide range of articles.

In addition to the main two publications, the Committee is greatly indebted to those who produce and manage the other means of promoting the activities of the Society and to those who arrange and carry out distribution of hard copy.

David Davies has continued to produce the ever larger monthly bulletin. At a cost of 30p per member per month it is remarkable value and continues to act as an invaluable means of informing the membership.

David Strawford continues to manage the Society's website. The question of whether it was appropriate to include photos was discussed during the year. Although desirable, the difficulties of obtaining copyright, maintaining the site, limitations imposed by the website host (Bristol City Council) and the increased length of time to download the site for those without broadband resulted in the idea not being progressed as yet. It was decided that unless, and until, we found someone with the time and expertise to create an independent website for the Society, we would leave it unchanged. The problem of ensuring that it was appropriately updated continued.

Brian Frost had managed to keep the postage costs of the society within strict limits despite the ever increasing weight of the Bird Report. R. J. Barnett

The gift of two computer floppy discs to the Society by Philippa Foster of 5D Illustration was much appreciated. The illustrations on these could be used freely in our Bulletins and on our Website, so long as due acknowledgement was made to her.

Library

The Library Committee worked to the Library Plan for 2005, agreed by Council. In the course of the year an Index to all articles in the Proceedings since 1865 was created, and added to the computer, which, in addition to the index to all journals, also now holds details of 1150 books. The year's work was completed well within the budget agreed by Council. In promoting the Library, reports of new accessions were featured regularly in the Bulletin, and an Ornithology Section "Open Day" was held in October. Committee members continued to staff the Library from 12.30pm to 1.30pm on Wednesdays, and from 10.15am to 12.00pm on Saturdays

Journals were obtained by subscription or exchange, or were donated. *Atropos*, a new entomological journal, was taken on trial. Books purchased included the latest New Naturalists' series on *Northumberland, Fungi, The Sea Shore*, and Peter Marren's *The New*

Naturalists. Three bird books, *A Time to Fly, Birds, Scythes and Combines*, and *The Skylark, and Land Snails of the British Isles, Wild Boar in Britain*, and *Britain's Orchids* were purchased. Ten Defra reports on topical subjects were given to the Library, and one member gave a large collection of unwanted older books, many of which were sold to members in aid of the Conservation fund. Special name plates were added to donated items accepted into the collection.

Access to the Library was made available to others, particularly to the University of Bristol and to staff of Bristol's City Museum. The Society thanks the Head of Museum Services, Bristol City Council, for continued use of the Library room, and for the assistance given to members during the year by Museum staff, and welcomes the continued use made of the Library by Museum staff.

The Library Committee met on 4 occasions. The Society thanks the Honorary Librarian, Mrs. A.F. Hollowell, and Committee members Mrs. A.M. Wookey, (Chair), Mr. R.L. Bland, Mr. R.G. Symes Mr. B. Tizard, Mr. D.P.C. Trump, Mr J Webster, and Mr. D.A. Wilson. for their time and assistance during 2005.

Library statistics for 2005 (2004 in brackets)

Visits:- 33 members (37 in 2004) made 253 (332) visits to the Library. 1 (6) of these visits were made by new members. 7 visits were by members of the Museum staff. 253 (256) items were borrowed.

Journals:- 17 journals were received by subscription, 27 by exchange.

Books:- 10 books were purchased.

Donations:- 4 books, 54 issues of journals, and 11 pamphlets/ off-prints and reports, were accepted.

Donors:- We were indebted to Mr. R.J. Barnett, Dr. R. Bradshaw, Dr. M. Hill, Mrs. A.F. Hollowell, Mr. P.J.M. Nethercott, Mr. R.G. Symes, Mr. D.P.C. Trump, Mr. D.A. Wilson, Bath Natural History Society, Bristol Environmental Records Centre, the International Geosphere

Research and Conservation

Records of observations made by members as part of both local and national recording schemes were submitted to Bristol Regional Environmental Records Centre (BRERC), and formed the basis of the biota sections of the Society's *Proceedings (Nature in Avon)*. Surveys included botanical, mammal, invertebrate and ornithological recording schemes. Members of the Society assisted with data entry at BRERC.

The Society maintained close local links with The City Museum & Art Gallery, which housed its Library, with Bristol University (especially the Earth Sciences Dept.), with both the Avon and Somerset Wildlife Trusts, VOSCUR (The Voice of Bristol's Community and Voluntary Sector), Avon Gorge & Downs Wildlife Project and with Bristol City Council. Regionally the Society continued its link with the South West Naturalists' Union, were represented on the Downs Management Plan, and continued to be represented at meetings of the Leigh Woods Advisory Committee. The Society is now a partner in the Avon Biodiversity Action Plan, and both the North Somerset and South Gloucestershire Baps. Here the Society's main role is assisting in the monitoring process, and acting as adviser at meetings. Nationally it has been involved with the British Trust for Ornithology, Botanical Society of the British Isles, the Woodland Trust, and Royal Entomological Society. The Society also continued to be represented at meetings of the Leigh Woods Advisory Committee.

Botanical Section

At the AGM on 24 Jan the Officers and Committee were re-elected: President: Mr A.G.Smith, Hon.Secretary/Treasurer: Mrs P. Millman.) Committee Members: Ms L. Houston, Mrs C.Kitchen, Mr M.Kitchen, Mr C.Hurfurt, Mrs M.Webster., Ms M.Wood, Mr T.Titchen.

Section Meetings

Five meetings were held with talks and fourteen field meetings mainly led by members of the committee.

Jan 24	AGM	
Apr 3	Leigh Court	Tony Titchen
May 7	Lower Woods	Mike Martin
May 29	Arnos Vale	Mary Woods
May 31	Snuff Mills	Tony Smith
June 6	Oaklands	Tony Titchen
June 11	Wick Rocks	Chris Hurfurt
June 14	Tow Path	Libby Houston
June 20	Portishead Police HQ	Tony Smith
July 3	Max Bog	Tony Smith
July 6	Almondsbury	Mark and Clare Kitchen
July 19	Tyntesfield	Pam Millman
July 31	Felton Common	Margaret Webster
Aug 21	Severn beach	Mark and Clare Kitchen
Sept 4	Clapton Moor	Tony Smith, Pam Millman
Oct 24	New Zealand Paradise	Pat Hill-Cottingham
Nov 28	Oxford Ragwort	Simon Hiscock
Dec 28	A tree gazer in Madiera	Tony Titchen

Following a varied program of lectures in the winter we have had an interesting season on Field Botany. We have been taken to a wide range of habitats starting with woodlands in the spring including a well-supported meeting on Mosses. Finding scarce agricultural weeds was a challenge taken up by Mark and Clare Kitchen on one meeting. The Felton Common meeting led by Margaret Webster was an important recording meeting to monitor its wildlife value as it lies adjacent to Bristol Airport. Future developments could pose a threat. Pam Millman led our first meeting to the National Trust site at Tyntesfield where we are recording plants in the estate for the first time since access was not possible for the Flora of Bristol. We were accompanied by the Estate Warden. Wetland species including several orchids were encountered on Max Bog and later on Clapton Moor we worked on identifying tricky Pondweeds (Potamogetons) and Stoneworts. We always encourage less experienced members at meetings and help them to improve their identification skills.

On 23 July the Section organised a Field Meeting by coach to Westonbirt Arboretum, led by Tony Titchen. This was the Sections contribution to a General Society Field Program. The meeting was very well supported. We continue to send records to BRERC. Members are involved with both the Somerset and Gloucestershire Rare Plants groups.

We should like to acknowledge the work of Dr Clive Lovatt in editing Bristol Botany. Members will find his section in Nature in Avon well worth reading.

Pam Millman

Geological Section

In addition to a programme of indoor lectures, held at the Earth Sciences Department of Bristol University, the Geological Section continues to be involved in several 'hands on' geology initiatives. The biggest being the annual 'Rock and Fossil' event which took place on the Bristol & Bath Railway Path in August. This event provided an opportunity to engage with the public, to tell them about the regions fascinating geological heritage, and to promote the activities of the Society. This event was undertaken in collaboration with the Bath Geological Society and the West of England Geologists' Association. It was estimated that over 500 members of the public stopped to find out more, and several local newspapers ran the story in their publications.

Simon Carpenter, acting President of the Section, after the untimely death of David Cope in August, had an exhibition of his fossils at Frome Museum during the summer. This was supported with funds from the Society, and other organisations.

David Cope joined the Society in 1982, and was President of the Section for much of this time. He was an accomplished and dynamic geologist, geomorphologist and Soil Scientist. During

the early part of his working career, David worked for the Soil Survey, based in Bristol. He was responsible for writing several Soil Survey Memoirs and contributing as co-author on many more.

A full obituary on David can be found elsewhere in the Proceedings.

Invertebrate Section

The Section is a very active hub for a great range of organisms, not just confined to showy butterflies and brilliant dragonflies. Regular meetings with Bristol Moth Group, Somerset Invertebrates Group, and many other British recording groups from slugs to sandhoppers, bugs, beetles and plant hoppers ensure that the rich fauna of the Region is listed nationally. This year has included finding rare bugs on Crooks Peak, the Poldens, Thornbury and Troopers Hill. In the Avon Gorge, the Gully and the Downs, rare moths and nationally notable beetles have had first regional records or exciting re-finding of rarities. Following an interesting lecture in the winter season the Section visited the Invertebrates House at Bristol Zoological Gardens to study the Captive Breeding Programmes for the Mole Cricket and the New Forest Cicada. News of notable finds were summarised monthly in the Bulletin of the Society.

Ornithology Section

At the 2005 AGM, held on January 21st 2005, Richard Bland was elected as President, on the understanding that he would remain in post for 2 years only; Mary Hill was re-elected as Secretary and Treasurer.

Mike Taylor retired from the committee and was thanked for his contributions. Present committee members happy to be re-elected were - Joyce Callard, Angela Levinson, Ann and Richard Crawford, Ed Drewitt and Paul Farmer. Several other people had been asked to join the committee, but none felt able to serve.

A feed back sheet, circulated at the AGM, proved very helpful in indicating the types of meetings that people preferred and giving suggestions for future lectures. Following a suggestion at the AGM, and a long voting process (to allow everyone to have their say), it was decided that lectures should begin at 7.30pm in future (rather than at 7pm).

In 2005 there were 6 lecture meetings, 1 fieldwork meeting and 15 field meetings. They are listed below. The meetings were reasonably well attended - the numbers at field meetings are always very weather dependant and, perhaps more significant, the numbers at lecture meetings (average 30.5) were down on those of recent years (averages 40.2 in 2004; 38.5 in 2003; 47.3 in 2002). We are very grateful to all our speakers and field meeting leaders.

Field work Members were involved in the following surveys

The national Breeding Bird Survey, which monitors all common species annually and covered 195 local squares this year, the Waterways Survey, the Heronry Survey, WeBBS counts of Waterfowl and Waders, BTO Woodland Breeding Bird Survey, Avon Quinquennial Rookery survey, BTO overwintering warbler survey, The BTO Tawny Owl Survey, The Atlas Trial Winter Fieldwork Survey, the Nest Record Card Scheme, and the National Ringing Scheme.

They also participated in BTO Garden Birdwatch, Bristol Birdwatch, and the society's own 30 year old Winter Garden Survey.

They continued to monitor wintering Blackcap and Chiffchaff populations, and winter populations through the Winter Bird Counts.

Involvement with Local Authority.

The results of BBS work is sent to the four Unitary authorities Environmental departments, and in Bristol is used as part of the annual Quality of Life audit.

Bristol Birdwatch is part of the work of the Local Agenda 21 Biodiversity committee, which has revealed the substantial role played by gardens in sustaining the City's biodiversity.

Lectures, 2005; 6 lectures and 1 Field work meeting, and 15 fieldwork meetings

Jan 21	Diet of Bristol Peregrines	E Drewitt
Feb 16	Trinidad and Tobago	H Williams
Mar 16	Falkland Islands	C Kinsey
Sep 16	Fieldwork	R Bland
Oct 12	The Hawk and Owl Trust	I McGuire
Nov 16	Slimbridge	G Maple
Dec 7	Chew valley ringing Group	M Bailey

Mammal Group

The Group had a relatively quiet 2005. Records of mammal sightings from the Bristol area together with other items of mammal interest continue to be gathered and are reported on in the Mammal Report published in the Proceedings. Links continue to be maintained with BRERC (to whom all verified mammal records are submitted electronically), the Avon Bat Group, the Avon Wildlife Trust and the Mammal Society. A second mammal training day was held in November at the Wildlife Trust's Clapton Moor Reserve (organised as part of the North Somerset Levels and Moor Project run by the Wildlife Trust).

Promotion and Publicity

Posters announcing forthcoming meetings were produced on a regular basis and those and membership leaflets were displayed, particularly in libraries. Press releases were also issued to promote the events run by the Society. The Society's display was updated and in order to promote the Society's activities and to attract new members, stands were taken at various events including the University of the West of England Freshers' Fair, the Bristol Festival of Nature, and the University of Bristol Alternative Careers Fair. Publications produced by the Society were offered for sale, and although the revenue from these was small, the main benefit of attending was to promote the aims of the Society, as was the giving out of Membership Leaflets.

Organisation, Membership, and Management of the Society's Funds.

The Bristol Naturalists' Society is an unincorporated association, registered charity no. 235494. The Society's activities are governed by the Rules, adopted in 1971, and amended in 1993 and 1999. All involved with the running of the charity in 2005 were volunteers, there were no paid officials. The time provided by volunteers was considerable, and was crucial in the success of the Society. It was necessary to employ the services of an auditor. The officers and members of Council were elected by members of the Society at an Annual General Meeting, held on Saturday, 22nd January, 2005. The names of those proposed by the previous Council had been circulated to all members in the December 2004 issue of the Society's Bulletin and no further names were proposed by members. Those elected, together with the officers of Sections, served as the Trustees of the Society for 2005. Members were also elected to the Publications, Library, and Hector Hockey Fund Committees. Council and Library Committee meetings continued to be held at Clifton College.

The Society's official address was Bristol Naturalists' Society, c/o The City Museum and Art Gallery, Queen's Road, Clifton, Bristol, BS8 1RL. The Society's main bankers were Lloyds TSB, 58 Queen's Road, Clifton, Bristol BS8 1RQ and CAF Bank Ltd., PO Box 289, West Malling, Kent. ME19 4TA. The Trustees' powers regarding investment etc. are prescribed in the Society's Rules. Monies representing the Memorial, Conservation and Library Funds and an Ornithological Section Special Fund, were held in a CAF Bank account. The funds were available to support projects as decided by Council. These included the Dave Clark Memorial Fund, the Chew Valley Ringing Station, the preparation of a book on Orthoptera, and the

sponsoring of a film about the move of the University of Bristol Botanic Garden to a new site.

The Hector Hockey and Milton Funds were held in Income Bonds and a National Savings Account. Grants from the Hockey Fund were governed by the Rules of that Fund. Council had agreed previously that the monies designated as the Milton Fund would be used to support "Hockey" applications also, and both funds were involved in 2005. Sections had individual bank and building society accounts holding sufficient funds to cover running costs.

Accounts for 2004 were approved by the Trustees, and subsequently sent to the Charity Commission, who were also given details of all of the Trustees, as they had requested. All Trustees of the Society were given a copy of the latest issue of the Charity Commission booklet 'Responsibilities of Charity Trustees – A Summary'.

A presentation of an engraved Bristol Blue glass vase was made in March to Professor A. Willis in recognition of his authorship of Bristol Botany in the Society's *Proceedings* for 40 years. During the year the Society's Calendar was brought up to date and expanded in detail, giving a clearer picture of events, and requirements for its management by the Trustees.

Members also presented a slide projector was given for use at meetings.

Regretfully the deaths were reported of Mr M Brooks, Mr D Cope (whose obituary will appear in the 2005 Proceedings), Miss E Fleure, Mrs P Foster, Ms E Jones, Mr A Kelly, Mrs D Peddle, Mr P Thomson, Mr R Vaughan, and Mrs B Wright.

At the end of 2005 Society membership was 552, a decrease of 55 on the previous year.

Thanks

The Society is indebted to the large number of its members who gave their time freely to support the activities of the Society and in some cases generously donated funds to the BNS. This help was much appreciated by the Society and was vital in helping the BNS meet its many objectives. Special mention must be made of members of the Society who continue to save the Society substantial postal charges by delivering Society publications by hand. The Society acknowledges with gratitude the facilities and support given by the Earth Sciences Department, University of Bristol, and Mr Mark Moore, Headmaster of Clifton College; for the use of their premises for meetings, and Ms. Kate Brindley, Director of Museums, Galleries and Archives, Bristol City Council, for continued support of the Society Library located within the City Museum & Art Gallery.

Plans for the Future

The Council of the Society for 2006 will be appointed on the 21st January 2006, and those Trustees will be responsible for that year's strategic planning. It is hoped that some of the ideas that came from the 'Ideas' meeting held in July 2004, and in the Report of that meeting 'Are we getting it right?', can be acted upon. It is also hoped to publish revised Society Rules, as well as its Procedures, bringing them up to date.

Accounts for 2005

BRISTOL NATURALISTS' SOCIETY

	<u>2005</u>	<u>2004</u>
INCOME (Incoming resources)		
Membership Subscriptions	7,682.00	9,297.00
Opening (Subscription) Debtors	-638.00	
Gift Aid	1,140.28	
Bequests & Donations	469.15	1,623.00
Trading	97.50	992.00
Sections Income	0.00	1,655.00
Interest Received	1,191.74	1,179.00
Miscellaneous	0.00	44.00
Total	9,942.67	14,790.00
EXPENDITURE		
(A) Direct Charitable		
Meetings	835.18	538
Books & Periodicals (Library)	558.44	553
Proceedings Production	1,668.96	
Avon Bird Report	1,387.41	3,417
Bulletin Production	1,240.84	902
White Sheet Production	66.50	66
Distribution Costs	1,197.46	814
Subscriptions	0.00	45
Publicity	214.27	951
Grants	3,050.00	52
Special Funds Expenditure		4,246
Sections Expenditure		2,323
Fundraising Costs		702
Total	10,219.06	14,609
(B). Administration		
Print & Stationery	172.27	160
Postage & telephone	100.94	145
Software	0.00	161
Subscription refund	0.00	61
Insurance	223.24	219
Audit	0.00	517

Miscellaneous	144.68	0
Sections general	0.00	28
Total		641.13
		1,291

Operating Surplus (Deficit) **-917.52** **-1,110**

**BALANCE SHEET AS AT 31 DECEMBER
2005**

	Notes	2005	2004
ASSETS			
Current Assets			
Prepayments	1	322.45	
Debtors			2499
Investment Accounts	2	11,055.93	11427
Bank (Lloyds)		4,584.59	
Bank (CAF)	3	23,834.47	
Bank & Cash (Sections)	4	224.81	27161
		40,022.25	41087
LIABILITIES			
Creditors			
Subscriptions Received in Advance		201.50	769
Accrual (postage)		420.00	
		621.50	769
Total Assets less Total Liabilities		39,400.75	40,318
CAPITAL			
General Fund	5	10,472.69	10089
Designated Funds			24852
Milton		5,855.28	
Memorial		14,060.35	
Conservation		426.64	
Library		2,299.74	
Ornithological		1,085.40	
Restricted Funds			
Hector Hockey		5,200.65	5377
		39,400.75	40318

Notes

1 Prepayments

Meeting Rooms	128.00
Insurance	89.45
Periodicals	105.00

2 National Savings

	Hector Hockey FundMilton Fund (Restricted)	
Opening Balance	5,377.00	6,029.00
Adjustment	10.26	10.26
Interest Received	148.39	231.02
T/f to Lloyds (Grants)	-335.00	-415.00
Closing Balance	5,200.65	5,855.28

3 CAF

	General Fund	Memorial Fund	Conservation Fund	Library Fund	Ornithological Special Fund
Opening Balance	0.00	13,727.44	1,842.13	2,212.93	1,039.96
Transfer from Lloyds	5,000.00	0.00	0.00	0.00	0.00
Interest Received	106.34	532.91	40.51	86.81	45.44
Transfer to Lloyds (Grants)	0.00	-200.00	-600.00	0.00	0.00
Transfers (Grants)	1,000.00	0.00	-1,000.00	0.00	0.00
Transfers (Donations)	-144.00	0.00	144.00	0.00	0.00
Closing Balance	5,962.34	14,060.35	426.64	2,299.74	1,085.40

4 Sections

	Ornithology	Field	Geology	Botany
Opening Balance	122.93	376.65	67.14	115.83
Transfer from General Fund	100.00	0.00	0.00	100.00
Interest Received	0.00	0.32	0.00	0.00
Transfer to General Fund	0.00	-376.97	0.00	0.00
Net Expenditure	-167.90	0.00	-32.59	-80.60
Closing Balance	55.03	0.00	34.55	135.23

5 General Fund

Opening Balance

Debtors	2,498.71	
Creditors	-768.50	
Unreconciled item	20.52	
Sections	682.55	
Bank (Lloyds)	7,656.43	10,089.71

Closing Balance

Bank (Lloyds)	4,584.59	
Bank (CAF)	5,962.34	
Sections	224.81	
Prepayments	322.45	
Creditors	-621.50	10,472.69

Movement

382.98

Activity 2005

To National Savings Funds	-20.52	
Paid from Lloyds A/c	-10,139.45	
Sections expenditure	-281.09	
Paid into Lloyds A/c	12,267.29	
Transfer from Sections	-376.65	
Interest received	106.66	
To Designated Funds	-144.00	
From Designated Funds	1,000.00	
Debtors movement	-2,176.26	
Creditors movement	147.00	

382.98

INSTRUCTIONS FOR AUTHORS

The editor welcomes original papers or short notes on the natural history of the greater Bristol region for consideration for publication in the Proceedings. All papers for consideration should reach the editor by the end of November for publication in the following year. All Society Reports and Biota should reach the editor by the end of February in the year of publication.

Whenever possible, text should be submitted electronically in Word. The data for graphs should be sent in Excel, and any other illustrations should be submitted electronically.

The Editor welcomes digital photos of any natural history subject taken in the region, whether relevant to an article or not. They should be of the largest pixel size possible.

References should be listed at the end of the text, in alphabetical order of the first author's name, and should take the following form. (with book and journal title in italics and first line hanging).

Book: Author (Date). *Title*. Place of publication: Publisher. - e.g.

Rackham, O. (1986). *The history of the countryside*. London: J.M. Dent.

Clapham, A.R., Tutin, T.G. and Warburg, E.F. (1952) *Flora of the British Isles*. Cambridge at the University Press.

Paper: Author (Date). Title. *Journal Name*, volume (part), page nos. - e.g.

Ross, S.M. and Heathwaite, A. L. (1986). West Sedgemoor: its peat stratigraphy and peat chemistry. *Proceedings of the Bristol Naturalists' Society*, **44**, 19-25.

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