Nature in Cambridgeshire

No 53 2011

Plate 1. Tower Mustard (*Arabis turrita*) photographed in May 2011, three weeks after the picture on the front cover. (Photograph by Philip Oswald) (See article on page 51)

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Cover illustration: Tower Cress (*Arabis turrita*). Photograph by P.H. Oswald.

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EDITORIAL

As everyone is surely only too well aware, costs are rising all the time, and the Editorial Board have reluctantly agreed to raise the price of Nature in Cambridgeshire from £5 to £6, with any postage costs to be added. We hope that subscribers will agree that the journal is still excellent value for money. We would benefit from having more subscribers, so please do all you can to publicise the journal amongst your friends and family!

This year Nature in Cambridgeshire covers flowering plants (the flora of the Devil's Ditch, Water Peppers, Tower Mustard), birds (Swifts in Fulbourn, Marsh Harriers near Cambridge), declining Common Toads in and near Ramsey, Chalkhill Blue butterflies, fungi in Eversden Wood and lichens in Chippenham Fen.

Regular articles include the sixth part of Hilary Belcher and Erica Swale's Algal Flora of Cambridgeshire, a report of the 2010 survey of Coton Country Park by members of Cambridge Natural Society, the regular sections on vascular plants, bryophytes and invertebrates, book reviews and an obituary. John Kapor has again contributed weather notes from the Botanic Garden. There is also an article reporting on the Hemiptera recorded during a BioBlitz event at Coe Fen. Since the BioBlitz scheme will take annually, we hope that such reports will become regular.

I mentioned in my editorial in No 47 that I was keen to include some shorter articles in the journal. I am still keen to do so, and if anyone has made observations that would take up around half a page, please let me have them. Any subject of natural history interest in Cambridgeshire will be acceptable.

Finally the Board must say hello and goodbye to David Barden, who contributed the article on St John's Worts to No 52. We invited him to join the Board in March 2010 and were pleased that he accepted, though he warned us that he might not be staying in Cambridge for very long. That proved correct, as he left Cambridge for Cardiff in March this year. He made very valuable contributions to our discussions while he was here.

An Annotated Check List of the Flora of the Devil's Ditch, Cambridgeshire

AC Leslie

Introduction

The Devil's Ditch is a linear earthwork, considered to be of early Saxon origin, stretching for just over seven miles from the edge of the fens at Reach in the north-west, to the boulder clay just west of Woodditton at the south-eastern end. For much of its length it runs over the chalk and consists of a deep ditch (or fosse) along the south-west side of a tall bank (or vallum), although in various places the ditch has been partially or entirely filled in. In places too the vallum has been lowered or removed to allow variously the passage of people, horses, vehicles, trains or planes. The Ditch passes through mainly arable fields today at its north-west and south-eastern ends, whilst the central section runs over Newmarket Heath, where it rubs shoulders with both the famous turf of Newmarket race course as well as a golf course, the latter now with two elevated tees on the top of the vallum. The soil in a short stretch in the golf course section is much sandier. Whatever its original purpose - it is most usually described as being a defensive structure – the Ditch has been famous for more than 350 years as a site of exceptional botanical interest, chiefly for the chalk grassland flora that has developed on its banks. There is not space here to discuss the detailed history of the Ditch, its ownership and management, and the profound effect this has had and continues to have on the development and distribution of its flora.

It would be a mistake, however, to think of the Ditch as one long stretch of uniform grassland. The south-eastern end, south-east of Dane Bottom, has probably been wooded for a very long time, as is evidenced by its local boulder clay woodland flora, including species such as Oxlip (*Primula elatior*), Wood Speedwell (*Veronica montana*), Nettle-leaved Bellflower (*Campanula trachelium*), Wood Anemone (*Anemone nemorosa*) and Yellow Archangel (*Lamiastrum galeobdolon*). Other stretches, notably from north-west of Dane Bottom to the Newmarket railway have been planted with trees, probably in the nineteenth century and now have a rather depauperate secondary woodland flora. In the latter part of the twentieth century at least, large areas all along the Ditch had become covered in scrub and scrub invasion remains a constant and serious threat to the main areas of remaining species rich chalk grassland: although it must be said that the composition of this scrub can also be of considerable botanical interest! Experimental work has been undertaken on the Ditch for many years by Prof. Peter Grubb and his students from Cambridge University, investigating the soil changes that take place under scrub and the consequences this has for the re-establishment of chalk grassland when scrub is removed. One of the practical conclusions from this work was the recommendation to sow Upright Brome (*Bromopsis erecta*) on newly scrub-cleared areas, as this was found to make the excess nitrate and phosphate accumulated under the scrub much less available to other plants, thereby

reducing vigorous weed growth and promoting the return of chalk grassland species. Following the clearance of very large areas of scrub on many areas of the Ditch in 2001-2006, work funded by a Lottery grant, this Brome, sometimes accompanied by Sheep's Fescue (*Festuca ovina*), was sown over many of these areas. Establishment met with varied success, largely due to adverse weather conditions, but one or both species have established and persisted in many areas. The subsequent natural movement of chalk grassland species into these areas is a much slower process. A combination of sheep grazing and mechanical cutting, both in these new and in the existing grassland areas, is currently playing an essential role in keeping scrub invasion at bay, with a little too much help in some areas from rabbits.

The best areas of botanically rich grassland mostly occur on the vallum slopes and are particularly well-developed on Galley Hill and that part of the Ditch just to the south-east (opposite Ditch Farm), as well as all along the race course section and much of the stretch between the Newmarket railway and the pines planted on the vallum by the golf course. A small area just north-west of the old railway, near Reach is also of note. Between them these areas hold populations of a number of nationally or locally rare plants, including Lizard Orchid (*Himantoglossum hircinum*), Pasque Flower (*Pulsatilla vulgaris*), Bloody Crane's-bill (*Geranium sanguineum*), Spotted Cat's-ear (*Hypochaeris maculata*), Field Fleawort (*Tephroseris integrifolia*), Purple Milkvetch (*Astragalus danicus*), Rare Spring Sedge (*Carex ericetorum*), Lesser Meadow-rue (*Thalictrum minus*) and Bastard Toadflax (*Thesium humifusum*), although some of these are in very small numbers. Of native plant losses over the period in which records have been accumulated, the most significant are a number of orchids, which have declined generally in the county and more widely (most notably Burnt Tip Orchid, *Orchis ustulata*, which was last seen in 1955) and two Breckland specialities, the grass *Phleum phleoides* and the Breckland Thyme (*Thymus serpyllum*), neither of which has been seen since the nineteenth century.

The Ditch has also acquired a surprising list of planted or alien species. These include many of the woody plants introduced on the stretch between the Newmarket railway and Dane Bottom, but also here and there all along the Ditch, together with bird-sown shrubs, especially species of *Cotoneaster, Sorbus* and *Quercus.* There is also a range of garden plants, some of which have probably arrived with dumped garden waste, but quite a few of which have probably been deliberately planted (especially the bulbs). These occur on every section of the Ditch. Most do not last long, but a few have persisted for long periods. One might be suspicious too of some concentrations of new records of potentially native plants which might have been sown e.g. Musk Mallow (*Malva moschata*), Marjoram (*Origanum vulgare*),Viper's Bugloss (*Echium vulgare*) and Yellow Rattle (*Rhinanthus minor*) all on the stretch of cleared scrub along the vallum opposite Ditch Farm, south-east of Galley Hill. It seems that some people are too impatient to let these things happen naturally.

Sources of records

This list is based on a card index of records for the Devil's Ditch originally compiled by Gigi Crompton and now maintained by Alan Leslie. A Check List of the Devil's Ditch flora was first circulated by Mrs Crompton in 1974, with lists of additions in 1982 and 1985. This current list draws on a wide range of both published and unpublished sources and aims to include mention of all taxa of vascular plants that have been recorded from the Ditch. The earliest records are from John Ray's Flora of 1660. Of the unpublished sources some of the most important include:

(a) the manuscript notes on localities for Cambridgeshire plants compiled by Charles Babington in the preparation for his Flora of 1860. Many individual localities were not published in the Flora and in those cases cited here the date is given as pre 1860, with Babington as recorder
(b) the records made by Eric George in 1940 and entered on the Cambridge Natural History Society card index of Cambridgeshire records held in the Herbarium of the School of Plant Sciences
(c) the manuscript records made by John Clarke between 1950 and 1970
(d) the records made since 1972 by the usually annual 'Committee Walks' undertaken by the Devil's Ditch Management Committee (latterly Friends of the Devil's Ditch), in particular the 1973 walk led by Peter Sell
(e) the records made by Alan Leslie during intensive studies in 1980-1982 (often with Major General Jeremy Spencer-Smith; see Leslie, 1983) and in particular in the period 2007-2010, when a considerable effort was made to record systematically over all parts of the Ditch at all times of the year

The list has also benefited from the extensive literature and herbarium research undertaken for the *Catalogue of Cambridgeshire Flora Records Since 1538* (Crompton, 2001, 2003, 2004 and on www.cambridgeshireflora.com), to which those wanting further details of sources and more individual records should refer.

Interpretation of the Check List

In the list below the date at the beginning of each entry is for the earliest record that can be associated with that species on the Devil's Ditch. This is followed by the accepted name (the nomenclature for which, with very few exceptions, follows Stace, 1997) and the author of that first record. Synonyms relate to the names used for those species in the draft Check List compiled by Gigi Crompton for the Devil's Ditch Management Committee in 1974. There may then be various comments, details of selected individual records or notes on variants that have been seen on the Ditch. At the end of an account there may be one or more numbers given in brackets. These indicate that the species has been seen by the author on the Ditch during the period 2007-2010 in one or more of seven sections of the Ditch, as follows:

1. Reach to old the railway: starting from the line of scrub at the south-east end of the village green and extending to the banks of the old railway that are formed by the vallum and ditch (but not the track itself).
2. The old railway to the Burwell Road: from the bank on the other side of the track to the fence on the north-west side of the Burwell Road, including the stretch with no vallum.
3. The Burwell Road to the A14 (including Galley Hill): from the fence on the south-east side of the Burwell Road to the top of the bank of the A14, including the stretch of filled in ditch.
4. The Running Gap to the Newmarket Road (A1304, formerly the A11): often referred to as the race course section. Recording excludes the flat area between the A14 and the start of the vallum by the Running Gap, excludes the flat area of the Stable Gap, but includes the Bomber, Well and Cambridge Gaps. It stops at the un-named Gap behind the July Cottages.
5. The Newmarket Road (A1304) to the B1061 Dullingham Road: often referred to as the golf course section. Recording starts at the edge of the scrub on the south-east side of the A1304, includes the golf tees on the vallum, but excludes the track of the Newmarket railway and the flat section without a vallum or ditch just north-west of the Dullingham road.
6. The Dullingham Road (B1061) to the Stetchworth Road: from the fence on the south-east side of the Dullingham Road to the fence on the north-west side of the Stetchworth Road, omitting the wooded area on flat ground to the north-east of the vallum.
7. The Stetchworth Road to the Camois Hall end (including Dane Bottom): from the fence on the south-east side of the Stetchworth Road to the end of the ditch and vallum opposite Camois Hall, again omitting the wooded areas on the flat to the north-east of the vallum and south-west of the ditch.

Records have as far as possible been restricted to those actually found on the Ditch, from the lip of the fosse (or ditch) across to the base of the vallum on its north-east side. Records from ‘near’ or ‘by’ the Devil’s Ditch have generally been omitted, but of course it is impossible to be sure that past recorders did not simply associate their finds with the Ditch as being the most conspicuous feature nearby to which to make reference. When there has been only one record on the Ditch this is indicated by ‘only record’; if there has been only one site, but the plant has been seen there in more than year this is indicated as ‘only site’. When ‘ditch’ is used, with a lower case initial letter, this refers to the excavated hollow or fosse, when used with a capital D (as in ‘Ditch) it refers to the whole structure, i.e. the fosse and vallum combined. Many records refer to ‘the pines’ and in this context these are the trees assumed to have been planted on the vallum in the golf course section: there are other pines along the race course as well as in the wooded south-eastern sections.

Some records made pre 2007, including some first records, will have been made in sections other than those for which the species has been recorded in 2007-2010. Details of all these are not given here, but are retained on the card index.

References (in bold type) to the location of herbarium specimens collected on the Ditch (usually just for first records) use the standard abbreviations from Kent (1957), with the addition of **BATHG** for the Geology Museum, Bath (where much of Leonard Jenyns' material is held).

If an entire record is enclosed in brackets this indicates that there is no accepted record from the Ditch.

Whilst every effort has been made to include all species recorded from the Ditch it is likely that further research, especially in herbaria, will unearth new entries for this list, new sites for listed plants or later records. Moreover, despite the fairly intense recording effort in recent years, new species are continually being found (or re-found) or appear to be extending their range on the Ditch. Others may be losing ground, always harder to record but evidence for this is also of great value. In some instances plants have genuinely been missed in the past (especially if not readily visible from the vallum path), in other cases plants may be more sporadic or casual in their appearance and are then readily missed by recorders. Sometimes too we see what we expect, as witnessed by the large patch of Sea Couch (*Elytrigia atherica*) which spreads right across the path just south-east of Galley Hill and which had been walked over by countless recorders, probably for over 35 years! The author would be delighted to receive any additional records from the Ditch, whether new or old, as field records or as a result of trawling herbaria or other potential sources.

Acknowledgments

I am deeply indebted to Mrs Gigi Crompton for her initial encouragement to study the flora of the Devil's Ditch, for entrusting me with the continuing care and updating of her card index of its flora, for preparing the initial electronic draft of this Check List and for commenting constructively on my annotations, additions and changes. So much of the original work to provide the historical data presented here was undertaken by her. I am also grateful to Prof. Peter Grubb for information on the work he and his students have conducted on the Ditch.

CHECKLIST 2010

Pre1860 *Acer campestre* -- CC Babington. Frequent only at the south-east end, but starting to appear in scrub elsewhere. [1,2,5,7]

1981 *Acer platanoides* -- AC Leslie. Planted in the Bomber Gap. Also planted at Reach and now self-sown there and in several places along the race course section. [1,4]

1950 *Acer pseudoplatanus* -- JW Clarke [1,2,3,4,5,6,7]. Plants with purple-backed leaves, f. *purpureum* [4], have been recorded recently.

1828 *Aceras anthropophorum* -- JS Henslow (**CGE**): the only record.

1940 *Achillea millefolium* -- EA George. [1,2,3,4,5,6]

1660 *Acinos arvensis* -- J Ray. Last record A Malins Smith, 1905.

1972 *Aconitum compactum* -- GMS Easy. A garden outcast: the only record.

1983 *Adonis annua* -- MJ Boddy *et al.*: the only record.

1940 *Aegopodium podagraria* -- EA George. [3,6]

1977 *Aesculus hippocastanum* -- FH Perring. One, probably planted, between the

Stetchworth Road and Dane Bottom. Now bird-sown there and in scrub between the A1304 and the Cambridge Gap. [3,7]

1971 *Aethusa cynapium* -- BD Jones. [5]

1940 *Agrimonia eupatoria* -- EA George. Mostly on the north-east slope of the vallum or in the ditch; locally abundant. [1,2,3,4,5,6,7]

1825 *Agrostis capillaris* (*A. tenuis*) -- L Jenyns (**BATHG**).

1825 *Agrostis capillaris* x *stolonifera* = *A.* x *murbeckii* -- JS Henslow (**CGE**, det.PJO Trist, 1985): the only record.

1983 *Agrostis gigantea* -- AC Leslie: the only record.

1949 *Agrostis stolonifera* – A Brown & R West (**CGE**). [2,3,5,7]

1972 *Aira caryophyllea* -- Committee Walk. Between golf tee and Newmarket railway: the only record.

Pre1860 *Ajuga reptans* -- CC Babington. Only south-east of Dane Bottom, both in the ditch and by the vallum path. [7]

1969 *Alcea rosea* -- GMS Easy. [2,5]

1951 *Alliaria petiolata* -- CD Pigott & SM Walters. Often frequent in areas where scrub has been cleared. [1,3,4,5,6,7]

2006 *Alopecurus myosuroides* -- AC Leslie. Only two records, probably both casuals. [7]

1660 *Anacamptis pyramidalis* -- J Ray. Still on Galley Hill and just to the south-east, opposite Ditch Farm, in both cases on the north-east face of the vallum, also along the race course section, where it occurs on both faces. A very pale pink-flowered plant was found on Galley Hill in 2010. [3,4]

2004 *Anagallis arvensis* -- AC Leslie. [3,7]

1880 *Anemone nemorosa* -- CC Babington. Not recorded again until a Committee Walk in 1982. Only to the south-east of Dane Bottom, a few patches on either side of the vallum path and two at the base of the ditch. [7]

1940 *Anisantha sterilis* (*Bromus sterilis*) -- EA George. Abundant in recent years especially in areas cleared of scrub. [1,2,3,4,5,6,7]

1904 *Anthriscus caucalis* (*A. neglecta*) – collector unknown (CGE) & W. West (pre 1916). Not recorded again until 2009: heavily sheep-grazed slope of vallum north-west of A14. AC Leslie. [3]

Pre1860 *Anthriscus sylvestris* -- CC Babington. [1,2,3,4,5,6,7]

1660 *Anthyllis vulneraria* -- J Ray. [1,2,3,4]

2008 *Antirrhinum majus* -- AC Leslie: the only record. [1]

1983 *Apera interrupta* -- AC Leslie: the only record.

2004 *Aphanes arvensis* -- AC Leslie. [3,5]

1830 *Aquilegia vulgaris* -- CC Babington (**CGE**). A range of colours and flower forms recorded recently amongst plants probably planted by vallum path just south-east of A1304. [1,5]

1914 *Arabis hirsuta* -- CE Moss. Refound 1953, SM Walters (**CGE**). Still present along the north-east face of the vallum in the Bomber Gap. [4]

1860 *Arctium lappa* -- CC Babington. Refound 1983, AC Leslie and now scattered along the ditch between the golf tees and the railway. [5]

1973 *Arctium minus* -- Committee Walk. The commonest Burdock on the Ditch, often abundant after scrub clearance, especially in the ditch. [1,2,3,4,5,6,7]

1951 *Arctium pubens* -- CD Pigott & SM Walters. Recent records are both of solitary plants intermediate in form between the other two species. [2,3]

1860 *Arenaria serpyllifolia* -- CC Babington. The subsp. *leptoclados* has been recorded in the past, but recent records have not distinguished between this and subsp. *serpyllifolia*.[2,3,5]

1950 *Armoracia rusticana* -- JW Clarke. Refound on ditch bank just south-east of the Burwell Road, 2008, AC Leslie. [3]

1940 *Arrhenatherum elatius* -- EA George. [1,2,3,4,5,6,7]

1973 *Artemisia vulgaris* -- Committee Walk. [1,2,3,4,5]
1951 *Arum maculatum* -- CD Pigott & SM Walters. Plants with yellow spadices were reported near the Dullingham Road, 1974, BD Jones. Commonest in the wooded south-eastern end, but scattered under scrub elsewhere. [1,3,5,6,7]
1950 *Asparagus officinalis* -- JW Clarke. One plant on the south-west face of the vallum on the golf course section has been known since 1981, when it was already a large clump with 18 stems. [3,4,5]
1825 *Asperula cynanchica* -- L Jenyns (**BATHG**). [2,3,4,5]
1660 *Astragalus danicus* -- J Ray. Only seen recently on the race course section and between the Newmarket railway and the pines on the golf course section. May still be just below the *Berberis vulgaris* near Reach. Some plants along the vallum path margins may have been lost as the path has widened with increased use. [4,5]
1981 *Atriplex patula* -- AC Leslie. [3]
1950 *Atropa belladonna* -- JW Clarke. Refound just north-west of the old railway, 2006, AC Leslie. There is also now a large colony on the scrub-cleared south-west slope by the pines on the golf course section (26 plants in 2009). [1,2,5]
2004 *Avena fatua* -- AC Leslie. [3]
2008 *Avena sativa* -- AC Leslie: the only record. [7]
1951 *Ballota nigra* -- SM Walters & CD Pigott. [1,2,3,4,5,6]
1974 *Barbarea vulgaris* -- BD Jones. [1,3]
1951 *Bellis perennis* -- CD Pigott & SM Walters. Usually in small quantity on the vallum path. [1,3,4,5,7]
1973 *Berberis vulgaris* -- SM Walters. Now a large suckering patch by the vallum path just north-west of the old railway. Perhaps the only example of this species in the county which may realistically assessed as bird-sown, not planted. [1]
1940 *Betula pendula* (*B. verrucosa*) -- EA George. Planted in a few places and now also self-sown; self-sown plants first noticed on the race course section in 1972 are now a significant problem in that area. [1,4,5,6]
1981 *Betula pubescens* x *pendula* = *B* x *aurata* -- AC Leslie & JM Spencer-Smith. Self-sown plants in several places along the race course section. [4]
1967 *Betula pubescens* -- FH Perring. Probably planted in a few places but self-sown plants scattered along race course section and by the golf course. [4,5]
1987 *Borago officinalis* -- Committee Walk: the only record.
1953 *Blackstonia perfoliata* -- FH Perring. In the Bomber Gap. It has now spread all along the race course section. [4]
1827 *Brachypodium pinnatum* -- L Jenyns (**CGE**). Now locally dominant in many sections, often as large clonal patches. [2,3,4,5]
Pre1860 *Brachypodium sylvaticum* -- CC Babington. [1,2,3,4,5,6,7]
[1889 *Brassica elongata* -- The only record (AS Shrubbs, **CGE**) has been re-determined as *Rorippa sylvestris*].
2008 *Brassica napus* -- I Webb & M Baker: the only record. [3]
1940 *Briza media* -- EA George. [1,2,3,4,5]
1913 *Bromopsis erecta* (*Bromus erectus*) -- WM Mills. The dominant grass over large areas, including some ex scrub areas re-seeded with this species, the seed for which came from Therfield Heath. [1,2,3,4,5]
Pre1860 *Bromopsis ramosa* (*Bromus ramosus*) -- CC Babington. [5,6,7]
1984 *Bromus hordeaceus* (*B. mollis*) -- AC Leslie. [2,3,7]
1940 *Bryonia dioica* -- EA George. [1,2,3,4,5,6,7]
2008 *Buddleia davidii* -- AC Leslie. So far only three plants have been recorded. [1,2,7]
1960 *Buglossoides purpureocaerulea* -- see *Lithospermum*.
2006 *Bunias orientalis* -- AC Leslie. On the lip of the ditch by the gap behind the July

Cottages, where G Crompton & JC Faulkner had attempted to transfer material in 1977. This species had not previously been on the Ditch, although a long naturalized colony remains on the sides of the old road nearby at this locality. [4]

1940 *Buxus sempervirens* -- EA George. Many self-sown plants around planted bushes south-east of Dane Bottom and along a long stretch between the Dullingham and Stetchworth roads. Many of the planted bushes in the latter section were cut down in 2008: two showed rings on the stumps indicating they were over a century old. [6,7]

[1982 *Calamagrostis canescens* -- AC Leslie. A patch in middle of Booth plot, just south-east of Galley Hill has been re-determined as an unusual variant of *C. epigejos* with the leaves hairy above; it is still there].

1930 *Calamagrostis epigejos* -- TG Tutin. Long known and now much increased between the Burwell Road and Reach and recently found on the golf course section. [1,2,3,5]

1660 *Calluna vulgaris* -- J Ray. No definite later record. It seems unlikely to us now, but heather might have been present in the past, notably on the golf course section where, in places, the soil is sandier.

1973 *Calystegia sepium* -- Committee Walk. Plants with deeply divided corollas (f. *schizoflora*), have been recorded recently. [3,5,6,7]

1660 *Campanula glomerata* -- J Ray. [2,3,4]

1987 *Campanula rapunculoides* -- JCA Rathmell: the only record.

1660 *Campanula rotundifolia* -- J Ray. [1,2,3,4,5]

1852 *Campanula trachelium* -- CC Babington (**CGE**). Formerly restricted to the section south-east of the Stetchworth road, where it is still frequent, but now increasing between the Stetchworth and Dullingham roads and also recorded by the pines beside the golf course. [5,6,7]

1951 *Capsella bursa-pastoris* -- CD Pigott & SM Walters. [1,3,5]

2008 *Cardamine hirsuta* -- AC Leslie. [3]

1940 *Carduus crispus* -- EA George. [4,5,6,7]

2008 *Carduus crispus* x *nutans* = *C.* x *stangii* -- AC Leslie. [5]

1940 *Carduus nutans* -- EA George. Abundant for a while after scrub clearance, especially to the north-west of the A14, where white-flowered plants have been reported on a number of occasions. Now more reduced in numbers. [1,2,3,5]

1824 *Carex caryophyllea* -- L Jenyns. [3,4,5]

1913 *Carex ericetorum* -- ND Simpson. At one time reliably recorded over a long stretch of the vallum path between the Newmarket railway and the pines, but since 2004, and despite a good deal of searching effort, only one plant has been found. This has flowered regularly on the north-east side of the path just north-west of the railway. [5]

Pre 1860 *Carex flacca* -- CC Babington. [1,2,3,4,5,7]

2008 *Carex pendula* -- AC Leslie. Apparently a recent arrival, in the ditch south-east of Dane Bottom and by the steps up to the vallum from the south-east end. [7]

[1820s *Carex pilulifera* -- JS Henslow (and later by CC Babington, HN Dixon and WH Mills). There are no voucher specimens from the Ditch and all the records are treated as requiring confirmation. Jenyns's 1824 specimen (**BATHG**) from the Heath has proved to be *C. caryophyllea*].

1980 *Carex sylvatica* -- AC Leslie & JM Spencer-Smith. Now frequent along the vallum path south-east of Dane Bottom and has recently appeared by the path just south-east of the A1304. [5,7]

Pre1860 *Carlina vulgaris* -- JS Henslow. [1,2,3,4,5,7]

1957 *Carpinus betulus* -- FH Perring & RG West. Two big, probably planted trees between Stetchworth Road and Dane Bottom, one young plant in developing scrub by race course section. [4,7]

1827 *Catapodium rigidum* -- L Jenyns (**BATHG**). [1,2,3]

1732 *Caucalis platycarpos* -- J Martyn. 'along the banks of the Devil's Ditch, between

Reech and the Newmarket Road, plentifully'. Persisted on or near the Ditch into the nineteenth century, but not seen since c.1835 near Reach.

2009 *Centaurea cyanus* -- AC Leslie. Sown below golf tee: the only record. [5]

1940 *Centaurea nigra* sens. lat. -- EA George. [1,2,3,4,5,6,7]

1940 *Centaurea nemoralis* -- EA George.

1940 *Centaurea scabiosa* -- EA George. [1,2,3,4,5]

Pre1850 *Centaurium erythraea* -- L Jenyns. Sporadic, in very small quantity, just to the north-west of the Burwell Road (1956, one plant, 2004, two plants, 2006, one plant). Jenyns's record was not precisely located.

1983 *Centranthus ruber* -- G Crompton: the only record.

1660 *Cerastium arvense* -- J Ray, 'plentifully'. Last seen on the south-west bank of the vallum just north-west of the Newmarket railway, by B.D. Jones, in 1978.

Pre1860 *Cerastium fontanum* subsp. *vulgare* -- CC Babington. [1,2,3,5]

1975 *Cerastium glomeratum* -- JW Clarke & PJ Grubb. [3,5]

1981 *Cerastium semidecandrum* -- AC Leslie & JM Spencer-Smith. On one of the golf tees, the only record.

n.d. *Chaenorhinum minus* -- JF Duthie, probably 1860s. Last recorded on a Committee Walk in 1973.

1950 *Chaerophyllum temulum* -- JW Clarke. [1,5,6,7]

1950 *Chamerion angustifolium* -- JW Clarke. [1,2,3,4,5,7]

1973 *Chelidonium majus* -- Committee Walk: the only record.

1985 *Chenopodium album* -- EM Hyde. [3,5,6]

1930 *Chenopodium hybridum* -- G Perry: the only record.

2009 *Chrysanthemum segetum* -- AC Leslie. Sown below golf tee: the only record. [5]

1973 *Circaea lutetiana* -- Committee Walk. Only on the floor of the ditch south-east of Dane Bottom. [7]

1829 *Cirsium acaule* -- S Hailstone. In the 1970s common on the south-west face of Galley Hill, but following a period of intense grazing now rare. Plants with stems sometimes recorded. [1,2,3,4,5]

1951 *Cirsium arvense* -- CD Pigott & SM Walters. [1,2,3,4,5,6,7]

1951 *Cirsium vulgare* -- CD Pigott & SM Walters. [1,2,3,4,5,6,7]

1996 *Claytonia perfoliata* (*Montia perfoliata*) -- DA Wells *et al*.. In scrub south-east of Galley Hill: the only record. An earlier record in 1975 was not actually on the Ditch

1835 *Clematis vitalba* -- In Hb. JA Power (**RTE**). A potential problem plant on the Ditch; it has increased recently at the south-east end and in section 2, north-west of the Burwell Road. [2,3,5,6,7]

1982 *Clinopodium ascendens* (*Calamintha sylvatica* subsp. *ascendens*) – AC Leslie & JM Spencer-Smith. [1,2]

1835 *Clinopodium vulgare* -- In Hb. JA Power (**RTE**). [1,3,5,6,7]

1828 *Coeloglossum viride* -- JS Henslow (**CGE**). Last record, Evans (1939) who said 'still occurs'.

1845 *Conium maculatum* -- S Hailstone (**YRK**). [1,3,4,5]

1940 *Convolvulus arvensis* -- EA George. [2,3,4,5,7]

2004 *Conyza canadensis* -- Committee Walk. [5,6]

2008 *Cornus australis* -- AC Leslie. Several young bird-sown plants scattered along the race course section, some intergrading in hair characters with *C. sanguinea.* [4]

Pre1860 *Cornus sanguinea* -- CC Babington. [1,2,3,4,5,7]

1979 *Coronopus squamatus* -- ME Smith: the only record.

1860 *Corylus avellana* -- CC Babington. Mostly in the wooded sections south-east of the Stetchworth road, but one bird-sown into scrub by the golf course; the latter may not be a native variant. [5,7]

2008 *Cotoneaster hjelmqvistii* -- I Perry: the only record. Bird-sown. [2]

2007 *Cotoneaster horizontalis* -- AC Leslie. Several bird-sown plants now scattered on

both faces of the vallum to either side of the Cambridge Gap. [4]
2008 *Cotoneaster salicifolius* -- AC Leslie. Bird-sown. [4]
2002 *Cotoneaster simonsii* -- AC Leslie. Bird-sown. [4,5]
2007 *Cotoneaster sternianus* -- AC Leslie. Bird-sown. [4]
1960 *Crataegus laevigata* x *monogyna* = *C.* x *media* -- SM Walters (**CGE**, det. PD Sell, 1975): the only record.
1940 *Crataegus monogyna* -- EA George. Plants with dark pink flowers recorded between the Burwell Road and the old railway (1987, G Crompton). [1,2,3,4,5,6,7]
2008 *Crepis biennis* -- I Webb & M Baker. [3,6]
1981 *Crepis capillaris* -- AC Leslie. [1,2,3,5,6]
[1835 *Crepis foetida* -- Listed by HC Watson (1835) on the basis of a specimen from WJ Hooker; this is likely to have been an error, probably for *C. vesicaria*, but needs to be checked].
1973 *Crepis vesicaria* subsp. *taraxacifolia* -- Committee Walk. [1,2,3,7]
1904 *Cynoglossum officinale* -- A Hosking. [1,3,4,5]
2004 *Cynosurus cristatus* -- Committee Walk. [1,2,3,4,5]
1828 *Cytisus scoparius* -- JS Henslow (**CGE**). The only other record, in 1972, may have been on the golf course.
1950 *Dactylis glomerata* -- JW Clarke. [1,2,3,4,5,6,7]
Pre1860 *Dactylorhiza fuchsii* subsp. *fuchsii* -- CC Babington. Only on the race course section, formerly more common here, now very rare. [4]
1660 *Dactylorhiza incarnata* -- J Ray. Only recorded again in 1949 and 1952 (**CGE**), when white-flowered plants were seen just south-east of the Bomber Gap.
1999 *Daphne mezereum* -- D Radley & S Hearle. Presumably bird-sown in scrub on north-east face of vallum between A1304 and Cambridge Gap: the only record.
1940 *Daucus carota* -- EA George. [1,2,3,4]
1972 *Deschampsia cespitosa* -- Committee Walk [2,4,7]; subsp. *parviflora* has been recorded from the vallum path south-east of Dane Bottom (1985, EM Hyde).
1919 *Descurainia sophia* – AJ Crosfield (**CGE**). [5]
1905 *Diplotaxis muralis* -- A Malins Smith. [3]
1961 *Diplotaxis tenuifolia* -- PD Sell. Has persisted near the Running Gap since at least 1973. [4]
1981 *Dipsacus fullonum* -- AC Leslie. [5,6]
1839 *Dipsacus pilosus* -- Miss Jane Hailstone: the only record.
1980 *Doronicum pardalianches* -- AC Leslie & JM Spencer-Smith. [7]
2010 *Dryopteris affinis* -- AC Leslie. One plant on north-east face of ditch just south-east of Dane Bottom: the only record. [7]
2008 *Dryopteris dilatata* -- AC Leslie. Scattered along the ditch south-east of the Stetchworth road, usually on old tree stumps and fallen trunks. [7]
c1851 *Dryopteris filix-mas* -- SW Wanton. Refound by AC Leslie in 1981 and now scattered along the ditch south-east of the Stetchworth Road (some with large crowns) and in one place on the vallum to the north-west of the road. [6,7]
2006 *Echinops bannaticus* -- WFS meeting. Planted or dumped. [3]
2009 *Echium plantagineum* -- AC Leslie. Sown below golf tee: the only record. [5]
Pre1860 *Echium vulgare* -- CC Babington. [3]
1981 *Elymus caninus* (*Agropyron caninum*) -- AC Leslie. [6,7]
2009 *Elytrigia atherica* -- AC Leslie, conf. T Cope (**CGE**). A large patch straddling the vallum path just south-east of Galley Hill. Probably the '*Agropyron repens* var. *glauca*' recorded in this area by TCE Wells in 1974. [3]
1826 *Elytrigia repens* (*Agropyron repens*) -- L Jenyns (**BATHG**). [1,2,3,4,5]
1979 *Epilobium ciliatum* (*E. adenocaulon*) -- ME Smith. [6]
1981 *Epilobium hirsutum* -- AC Leslie. [1,2,3,4,5,7]
1979 *Epilobium montanum* -- ME Smith. [6]

2007 *Epilobium parviflorum* -- AC Leslie. [1,4,5,6,7]
1980 *Epilobium tetragonum* (*E. adnatum*) -- AC Leslie & JM Spencer-Smith. [1,2,5,6]
1981 *Erigeron acer* -- PJ Grubb. [1,2,3]
1899 *Erodium cicutarium* -- collector unknown (**CGE**). [5]
1822 *Erophila verna* -- L Jenyns (**BATHG**): the only record.
1885 *Erucastrum gallicum* -- W Marshall. Last recorded on the Ditch in 1961 (and nearby, beside the A1304, in 1980). Many, perhaps most, records have actually been from waste ground beside the Ditch near the A1304.
1969 *Euonymus europaeus* -- SA Manning. [5,7]
2010 *Euonymus fortunei* var. *radicans* -- AC Leslie. Planted by the path just north-west of the Stetchworth Road: the only record. [6]
1827 *Euphorbia amygdaloides* -- L Jenyns. Listed by Babington (1860), but no later records. Only at the south-east end.
1836 *Euphorbia exigua* -- In Hb. JA Power (**RTE**): the only record.
1972 *Euphorbia lathyris* -- JW Clarke.
1973 *Euphorbia peplus* -- Committee Walk.
1980 *Euphrasia nemorosa* -- PF Yeo. Very few confirmed records.
1898 *Euphrasia pseudokerneri* -- FR Tennant (**CGE**). This is now the commonest species along the Ditch and may have been the Eyebright recorded by Ray (1660) and Babington (1860). [3,4,5]
1949 *Fagus sylvatica* -- EAR Ennion. Probably planted in several places south-east of the Newmarket railway, but now frequently bird-sown especially in the race course and golf course sections. [4,5,6,7]. Seedlings of the purple-leaved Atropurpurea Group have been noted just to the north-west of the Cambridge Gap. [4]
2004 *Fallopia convolvulus* -- AC Leslie. [4,5,6]
1973 *Festuca arundinacea* -- Committee Walk. [1,2,4,5]
1951 *Festuca gigantea* -- CD Pigott & SM Walters. [5,6,7]
1825 *Festuca ovina* -- L Jenyns. Occurs naturally in short turf, but has also been sown in scrub-cleared areas, with *Bromopsis erecta.* [1,2,3,4,5]
1940 *Festuca pratensis* -- EA George. [7]
1940 *Festuca rubra* -- EA George. [1,2,3,4,5,6,7]
1905 *Filago pyramidata* -- WCC(sic) & PGM Rhodes (CBSC). Later records (in 1926 and 1963) appear to have been near but not on the Ditch.
Pre1860 *Filago vulgaris* -- CC Babington: the only record.
1660 *Filipendula vulgaris* -- J Ray. [2,3,4,5]
1950 *Foeniculum vulgare* -- JW Clarke. Now a good population at Clarke's locality just south-east of the Burwell Road, the only site. [3]
1957 *Fragaria vesca* -- FH Perring & RG West. [5,7]
1973 *Frangula alnus* -- Committee Walk. [2,3,4,5]
1969 *Fraxinus excelsior* -- SA Manning. [1,3,4,5,6,7]
1951 *Fumaria officinalis* -- CD Pigott & SM Walters. All recent records have been of subsp. *wirtgenii.* [1,5,6]
1973 *Fumaria parviflora* -- Committee Walk. Only other record: disturbed ground below both golf tees, 2009, AC Leslie. [5]
2008 *Galanthus nivalis* -- AC Leslie: the only site. [6]
1895 *Galeopsis angustifolia* -- A Hosking: the only record.
1972 *Galeopsis tetrahit* -- BD Jones. [5]
1940 *Galium aparine* -- EA George. [1,2,3,4,5,6,7]
1840 *Galium mollugo* -- WLP Garnons (**SWN**). Both subsp. *mollugo* and subsp. *erectum* have been recorded. [1,2,3,4,5,6,7]
2004 *Galium mollugo* x *verum* = *G.* x *pomeranicum* -- JL Sharman. Several plants now known in two places between the Burwell Road and Galley Hill. [3]
2007 *Galium odoratum* -- AC Leslie, PJ Grubb & I Perry. [6]

1951 *Galium verum* -- CD Pigott & SM Walters. [1,2,3,4,5]
1835 *Genista tinctoria* -- In Hb. JA Power (**RTE**): the only record.
1660 *Gentianella amarella* subsp. *amarella* -- J Ray. [3,4,5]
1984 *Geranium columbinum* -- AC Leslie. [3]
2004 *Geranium dissectum* -- AC Leslie. [1,3]
1973 *Geranium* x *magnificum* -- Committee Walk. Probably planted at base of north-east slope of vallum, north-west of Burwell Road, still there in 1981 but not reported since. The only site.
2008 *Geranium molle* -- AC Leslie: the only record. [5]
1954 *Geranium pratense* -- PH Oswald.
2004 *Geranium pusillum* -- AC Leslie. [3,6]
1973 *Geranium pyrenaicum* -- BD Jones. [5]
1972 *Geranium robertianum* -- Committee Walk. [1,2,3,6,7]
1660 *Geranium sanguineum* -- J Ray. Still locally abundant both to the north-west and south-east of the Newmarket railway (and actively seeding into an adjacent arable field); also in good quantity on the south-west lip of the ditch at Dane Bottom, but struggling in increased shade here along the vallum path and lost from the face of the vallum. [5,7]
1828 *Geum rivale* -- JS Henslow (**CGE**). Recorded again by TG Tutin in c.1932, but no confirmed later records.
1828 *Geum rivale* x *urbanum* = *G.* x *intermedium* -- JS Henslow (**CGE**). Last recorded by AS Shrubbs in 1894.
1950 *Geum urbanum* -- JW Clarke. [1,2,3,4,5,6,7]
1951 *Glechoma hederacea* -- CD Pigott & SM Walters. [1,2,3,5,6,7]
1660 *Gymnadenia conopsea* subsp. *conopsea* -- J Ray. Only seen recently on the north-east face of the vallum south-east of Galley Hill. [3]
1961 *Gymnadenia conopsea* subsp. *conopsea* x *Dactylorhiza fuchsii* subsp. *fuchsii* = x *Dactylodenia st-quintinii* -- PD Sell (**CGE**). At the north-west end of the race course section: the only record.
1950 *Hedera helix* -- JW Clarke. Most plants are subsp. *helix*, but subsp. *hibernica* has been recorded from near Reach and is still where FH Perring first recorded it in 1977 just south-east of the A1304. [1,2,3,4,5,6,7]
1660 *Helianthemum nummularium* (*H. chamaecistus*) -- J Ray. Plants with almost white or with very pale yellow flowers have been noted. [1,2,3,4,5]
1827 *Helictotrichon pratense* -- L Jenyns (**BATHG**). [1,2,3,4,5]
1848 *Helictotrichon pubescens* -- CC Babington (**CGE**). [1,2,3,5]
2007 *Hemerocallis* sp. -- AC Leslie. Planted: the only record. [5]
1940 *Heracleum sphondylium* -- EA George. [1,2,3,4,5,6,7]
1950 *Hesperis matronalis* -- JW Clarke: the only record.
1951 *Hieracium aviicola* (*H. strumosum*) -- SM Walters, CD Pigott & C West (**CGE**).
1950 *Hieracium pilosella* -- see *Pilosella officinarum*.
Pre1914? *Himantoglossum hircinum* -- Mr Burn. Appears to have been known along the July Course stretch of the Ditch since before the First World War, but did not become more widely known until after the Second World War. It occurs on both slopes of the vallum and on the ditch banks and the number of flowering spikes can vary considerably in quantity from year to year, well over 200 in good years; sometimes also found on the adjoining parts of the Course; a much smaller colony has been known on the vallum south-east of the old railway near Reach since 1947, but has not been seen in the last couple of years. [4]
1660 *Hippocrepis comosa* -- J Ray. Occasional plants recorded recently with pale brownish yellow flowers, with conspicuous brownish purple veins on standard and wings. [1,2,3,4,5]
1940 *Holcus lanatus* -- EA George. [2,5,6,7]

1982 *Hordeum distichon* -- AC Leslie.
1940 *Hordeum murinum* -- EA George. [1,3]
1827 *Hyacinthoides non-scripta* (*Endymion non-scriptus*) -- L Jenyns. White-flowered plants have occasionally been recorded. [6,7]
1977 *Hyacinthoides non-scripta* x *hispanica* = *H.* x *massartiana* -- JW Clarke. Planted in two places, perhaps dumped in another. [6]
1983 *Hyoscyamus niger* -- AC Leslie: the only record.
1932 *Hypericum calycinum* -- HC Gourlay: the only record.
1860 *Hypericum hirsutum* -- CC Babington. [7]
1972 *Hypericum perforatum* -- Committee Walk. Some plants have a proportion of their sepals broader, less tapered and distinctly toothed towards the apex and may represent introgression from *H. maculatum*: such variants are common in the county. [3,4,5]
1724 *Hypochaeris maculata* -- J Ray. Formerly occurred in a number of places along the Ditch north-west of the A1304, but apparently now lost from all but one site on the north-east face of the vallum between the A14 and Galley Hill, where four plants were present in 2009. Two plants also remain out of a number planted on the south-west face of the vallum on Galley Hill in 1971. [3]
1950 *Hypochaeris radicata* -- JW Clarke: the only record.
2002 *Ilex aquifolium* -- Committee Walk. [4,7]
1852 *Inula conyzae* -- CC Babington. [1,3,5]
1984 *Iris foetidissima* -- AC Leslie. [1]
1973 *Juglans regia* -- Committee Walk. [1,3,4,6]
1940 *Knautia arvensis* -- EA George. Plants with white or very pale pink flowers have been reported several times around Galley Hill. [1,2,3,5]
1827 *Koeleria cristata* -- L Jenyns (**BATHG**). [1,2,3,5,7]
1967 *Laburnum anagyroides* -- FH Perring & SR Payne. Some clearly planted, others apparently of independent origin. [4,5]
1972 *Lactuca serriola* -- Committee Walk. [3]
2003 *Lactuca virosa* -- Committee Walk. [1,2,3,4,5]
1860 *Lamiastrum galeobdolon* (*Galeobdolon luteum*) -- CC Babington. Refound by AC Leslie, PJ Grubb & I Perry in 2007 on the north-east vallum slope south-east of Dane Bottom. [7]
1935 *Lamium album* -- Collector unknown (**CGE**). [1,2,3,4,5,6,7]
1957 *Lamium amplexicaule* -- FH Perring & RG West.
1940 *Lamium purpureum* -- EA George. [1,3,4,5]
1973 *Lapsana communis* -- Committee Walk. [1,5,6,7]
1971 *Lathyrus nissolia* -- Prof & Mrs Rodney Hill: the only record.
1940 *Lathyrus pratensis* -- EA George. [2]
1823 *Lathyrus sylvestris* -- JS Henslow (**CGE**).
1982 *Legousia hybrida* -- AC Leslie: the only record.
Pre1843 *Leontodon autumnalis* -- S Hailstone. [1]
Pre1860 *Leontodon hispidus* -- CC Babington. [1,2,3,4,5]
1971 *Lepidium campestre* -- GMS Easy: the only record.
2009 *Lepidium draba* -- AC Leslie: the only record. [2]
1982 *Leucanthemum* x *superbum* -- AC Leslie. Probably planted on north-east slope of vallum between Burwell Road and old railway, still there 2008. The only site. [2]
1952 *Leucanthemum vulgare* -- FH Perring. [1,3,4,5]
1967 *Ligustrum ovalifolium* -- FH Perring. Planted in several places. [6,7]
1951 *Ligustrum vulgare* -- CD Pigott & SM Walters. [1,2,3,4,5,6,7]
1963 *Lilium candidum* -- JW Clarke. Garden throwout: the only record.
2008 *Linaria purpurea* -- AC Leslie: the only record. [1]
1972 *Linaria vulgaris* -- Committee Walk. [1,2,3,4]
1827 *Linum catharticum* -- L Jenyns (**CGE**). [1,2,3,4,5]

1660 *Linum perenne* subsp. *anglicum* (*L. anglicum*) -- J Ray. Also listed from the Ditch by Evans (1939). In 1965 Ann Palmer recorded it 200-300 yards south-east of the A1304, past the pines, near the bottom of ditch on the far bank; in 1969 GMS Easy saw it nearby on the field edge of the ditch. No other records.
1956 *Listera ovata* -- SM Walters. Mostly recorded from open chalk grassland on the Ditch. [3,4]
1967 *Lithospermum officinale* -- JW Clarke. [1,2,3]
1958 *Lithospermum purpureocaeruleum* -- C Turner. Planted near top of bank on north-west side of old railway cutting, near Reach, last seen 1982. The only site.
1982 *Lolium perenne* x *multiflorum* = L.x *boucheanum* -- AC Leslie. [1]
1961 *Lolium perenne* -- PD Sell. [1,2,3,4,5,6,7]
2008 *Lonicera nitida* -- AC Leslie. Probably planted, the only site. [7]
1973 *Lonicera periclymenum* -- Committee Walk. [4]
1940 *Lotus corniculatus* -- EA George. [1,2,3,4,5]
1978 *Lunaria annua* -- AC Leslie. Naturalized amongst *Mercurialis perennis* just south-east of Stetchworth Road,1978-1981, but not reported since. The only site.
1981 *Luzula campestris* -- AC Leslie & JM Spencer-Smith. [5]
1958 *Lysimachia nummularia* -- JW Clarke. In section between Burwell Road and old railway. Only other record: ditch bottom, south-east of Dane Bottom, 1982, AC Leslie.
1940 *Mahonia aquifolium* -- EA George. At least one large, low-growing colony on the south-west face of the vallum by the pines may be *M*. x *decumbens* (*M. aquifolium* x *M. repens*). [4,5]
1956 *Malus sylvestris* -- SM Walters. There are numerous shrubs and some small trees attributed to this species all along the Ditch; most are clearly derived from the domestic apple (subsp. *mitis*, often treated now as a separate species), but some are intermediate in character between that and the crab apple (subsp. s*ylvestris*); individuals that seem to be closest to the latter are more frequent at the wooded south-east end of the Ditch. [1,2,3,4,5,7]
2005 *Malus* sp. -- AC Leslie. One small shrub apparently bird-sown in scrub on the north-east face of the vallum on Galley Hill; this has small, globular, yellow fruits, slightly flushed with red, the white flowers flushed pink with age. The only site. [3]
2004 *Malva moschata* -- Committee Walk. May have been deliberately introduced in some places. All plants in the colony just to the south-east of Galley Hill are var. *heterophylla.* [1,3,5]
1971 *Malva sylvestris* -- BD Jones. [1,3,5]
1972 *Matricaria discoidea* (*M. matricariodes*) -- Committee Walk. [5]
1982 *Medicago arabica* -- G Crompton: the only record.
1912 *Medicago lupulina* -- EA George. Specimens in **CGE** have been determined by PD Sell as var. *cupaniana* (1983, G Crompton & MJ O'Leary) and var. *willdenowiana* (1912, RH Compton). These are probably not the usual variants on the Ditch. [1,2,3,4,5]
1829 *Medicago sativa* -- J Downes. (**NTN**)
1823 *Melampyrum cristatum* -- L Jenyns & JS Henslow. (**CGE**). Babington (1860) also indicates he saw it at the Stetchworth end of the Ditch.
1903 *Melilotus altissimus* -- collector unknown. (**CGE**). [5]
1905 *Melilotus officinalis* -- A Malins Smith. The only other record is an undated one by CE Moss (probably pre 1917).
2008 *Mercurialis annua* -- AC Leslie: the only record. [4]
1940 *Mercurialis perennis* -- EA George. [6,7]
1830s *Minuartia hybrida* -- Rev. WH Coleman. Near Stetchworth. Also mentioned by later authors, but perhaps just repeating Coleman's record.
1860 *Moehringia trinervia* -- CC Babington. [6,7]

1958 *Muscari armeniacum* -- C Turner. Persistent where probably planted, on the north-east face of the vallum between the Burwell Road and the old railway: the only site.[2]
1957 *Myosotis arvensis* -- FH Perring & RG West. [1,2,3,4,5,6,7]
1981 *Myosotis sylvatica* -- AC Leslie & JM Spencer-Smith. [6,7]
1973 *Myosoton aquaticum* -- Committee Walk: the only record.
1981 *Narcissus* cultivars -- AC Leslie & JM Spencer-Smith. Persistent, probably where planted in most cases, but often flowering poorly. Trumpet (Div.1), Large-cupped (Div.2), Small-cupped (Div.3), Doubles (Div.4) and Tazettas (Div.8) have all been recorded. [3,4,5,6]
1950 *Nepeta cataria* -- JW Clarke. [1,2,3,4,5,7]
1905 *Odontites vernus* -- A Malins Smith. Two of the four records, only one of which is recent, have been determined as subsp. *serotinus.* [6]
1660 *Onobrychis viciifolia* -- J Ray. Both subsp. *viciifolia* and subsp. *decumbens* occur, the latter prevalent to the north-west of Galley Hill, reflecting its abundance on the old railway line. [1,2,3,4,5]
1914 *Ononis repens* subsp. *repens* -- CE Moss. [4,5]
1940 *Ononis spinosa* -- EA George. Occurs with *O. repens* on the race course section. [4]
1982 *Onopordum acanthium* -- AC Leslie. Perhaps deliberately introduced, but now persistent in small quantity on the scrub-cleared vallum slopes south-east of Galley Hill. [3]
1961 *Ophioglossum vulgatum* -- JW Clarke. In the ditch, just north-west of the Burwell Road: the only record.
1660 *Ophrys apifera* -- J Ray. [4]
1660 *Ophrys insectifera* -- J Ray. Last record CC Babington 1829. (**CGE**).
1852 *Orchis mascula* -- CC Babington (**CGE**). Near Camois Hall. This and another specimen in **CGE**, from an unknown collector the same year, are the only records.
1860 *Orchis morio* -- CC Babington. At the south-east end: the only record.
1660 *Orchis ustulata* -- J Ray. Occasionally recorded until 1955 when it was last recorded by AW Punter, on the golf course section
1901 *Origanum vulgare* -- RH Lock (**CGE**). [3,5]
1969 *Ornithogalum umbellatum* -- JW Clarke. Probably planted in most cases. Plants found in the ditch beside the July Course (2010) were subsp. c*ampestre.* [3,4]
1893 *Orobanche elatior* -- W Walton. Last seen in 1980.
1981 *Orobanche minor* -- Committee Walk. [3]
Pre1727? *Oxalis acetosella* -- J Martyn. Last recorded by JS Henslow, 1828. All precisely located records are from the wooded south-east end.
1973 *Papaver argemone* -- Committee Walk: the only record.
1940 *Papaver dubium* -- EA George and Committee Walk 1972: the only records.
2004 *Papaver lecoqii* -- AC Leslie. [1]
1972 *Papaver rhoeas* -- Committee Walk. [2,3,5]
1982 *Papaver somniferum* -- AC Leslie. Has occurred regularly between the A14 and Galley Hill. [5]
1951 *Pastinaca sativa* -- CD Pigott & SM Walters. [1,3,5]
2008 *Pentaglottis sempervirens* -- AC Leslie: the only site. [7]
2009 *Persicaria maculosa* -- AC Leslie: the only record. [5]
1950 *Phleum bertolonii* -- JW Clarke. [1,2,3,4,5,7]
c.1760 *Phleum phleoides* -- I Lyons. A specimen in the Banks Herbarium (**BM**) is labeled by Banks on the back of the sheet: 'Cambridgeshire on the banks of the Devils ditch between the turnpike & stitchworth Lyons.' The last possible record from the Ditch is a specimen collected by WLP Garnons in 1840 (**SWN**) from 'Newmarket Heath/Devils Ditch'.
1843 *Phleum pratense* -- S Hailstone (**YRK**). Very rare on the Ditch with only one possible subsequent record.

1957 *Picea abies* -- FH Perring & RG West. All planted trees. [6,7]
1860 *Picris echioides* -- CC Babington. [1,2,3,5,6]
1832 *Picris hieracioides* -- J Downes (**NTN**). [1,2,3,6,7]
1907 *Pilosella officinarum* (*Hieracium pilosella*) -- CNHS Card index. Includes records for subsp. *micradenia* and subsp. *trichosoma.* [1,2,4,5]
1829 *Pimpinella saxifraga* -- J Downes (**NTN**). [1,2,3,4,5].
1972 *Pinus nigra* -- Committee Walk. Both planted and self-sown. [4,7]
1951 *Pinus sylvestris* -- CD Pigott & SM Walters. Both planted and self-sown; self-sown plants are especially frequent along the race course section. [4,5,6]
1940 *Plantago lanceolata* -- EA George. [1,2,3,4,5,7]
1951 *Plantago major* -- CD Pigott & SM Walters. [1,2,3,4,5,6,7]
Pre1860 *Plantago media* -- CC Babington. [1,2,3,4,5]
1950 *Poa angustifolia* – FH Perring (**CGE**). [1,2,4,5]
1957 *Poa annua* -- FH Perring & RG West. [1,2,3,5,6,7]
2007 *Poa bulbosa* var. *vivipara* -- A.C. Leslie. A large colony, under beech trees on the lip of the ditch, between the Stetchworth Road and Dane Bottom, conf. T Cope (**CGE**), the only site.[7]
1960 *Poa compressa* -- JW Clarke. The only other record was on the vallum path near Reach, 1981, AC Leslie.
1828 *Poa nemoralis* -- JS Henslow (**CGE**): the only record.
1940 *Poa pratensis* -- EA George. May include records for *P. humilis.* [1,2,3,5]
1957 *Poa trivialis* -- FH Perring & RG West. [1,2,3,4,5,6,7]
1660 *Polygala vulgaris* -- J Ray. Both pink and blue-flowered plants are recorded. [1,2,3,4,5]
1983 *Polygonum arenastrum* -- AC Leslie & C Turner. [3]
1973 *Polygonum aviculare* -- BD Jones. [7]
2010 *Polystichum setiferum* -- AC Leslie. One plant on the floor of the ditch between Dane Bottom and the south-east end: the only record. [7]
1972 *Populus canescens* -- Committee Walk. On path, north-west of A14; fallen in ditch bottom 1975, not reported since. The only record.
1965 *Populus tremula* -- FH Perring. [4]
1954 *Potentilla anserina* -- HJ Griffiths: the only record.
1840s? *Potentilla reptans* -- S Hailstone (**YRK**). [2,3,4,5]
1860 *Potentilla sterilis* -- CC Babington. [7]
2008 *Primula* hybrid (Polyanthus type) -- AC Leslie. Garden throwout: the only record. [5]
1973 *Primula elatior* -- BD Jones. About six plants found in 1973; by 1982 there were 16 along c.60 m of the vallum path south-east of Dane Bottom; there are now (2008) many more and also some along the south-west lip of the ditch (spreading from the neighbouring woodland). [7]
1940 *Primula veris* -- EA George. [1,2,3,4,5,7]
[- *Primula vulgaris* -- Illustrated on the display board by the steps up to the vallum at the Camois Hall end, but never recorded on the Ditch.]
1940 *Prunella vulgaris* -- EA George. [1,2,3,5,7]
1929 *Prunus avium* -- TG Tutin. [4,5]
1970 *Prunus cerasifera* -- JO Mountford. [5]
1972 *Prunus domestica* -- Committee Walk. All the records are for subsp. *insititia,* amongst which var. *fruticans*, var. *damascena* (Damson), var. *syriaca* (both Red and Yellow Mirabelles) and var. *nigra* (Black Bullace) have all been distinguished recently. [1,2,3,4,5,7]
1973 *Prunus laurocerasus* -- Committee Walk. Both planted and self-sown. [4,7]
Pre1860 *Prunus spinosa* -- CC Babington. [1,2,3,4,5,6,7]
2005 *Pulmonaria saccharata* -- AC Leslie: the only site. [1]
1660 *Pulsatilla vulgaris* -- J Ray. Still good populations along the vallum slopes in both the

race course and golf course sections, together with a couple of plants persisting below the *Berberis vulgaris* near Reach. [1,4,5]

1982 *Pyrus* sp. (? *P. pyraster*) -- AC Leslie. Four sites are now known; the tree in the ditch between the Burwell Road and the old railway produces short, squat, pear-shaped fruits, but their texture and taste has not been tested. [1,2,4]

1981 *Quercus cerris* -- AC Leslie & JM Spencer-Smith. Both planted and bird sown. [5]

2007 *Quercus ilex* -- AC Leslie. All bird-sown. [5,6]

1860 *Quercus robur* -- CC Babington. [5,7]

1956 *Ranunculus acris* -- SM Walters. [1,2,3]

1954 *Ranunculus bulbosus* -- HJ Griffiths. [1,2,3,4,5]

1940 *Ranunculus ficaria* -- EA George. All plants seen recently have been been subsp. *bulbilifer*; there are no records for subsp. *ficaria.* [5,6,7]

1953 *Ranunculus repens* -- FH Perring. [1,2,3,5,6,7]

1660 *Reseda lutea* -- J Ray. Locally abundant after scrub clearance. [1,2,3,4,5]

1832 *Reseda luteola* -- Dr Jermyn (**CGE**). Locally abundant after scrub clearance. [1,3,4,6]

1860 *Rhamnus cathartica* -- CC Babington. [1,2,3,4,5,6,7]

1982 *Rhinanthus minor* -- N Warner. Not refound in the original site by the race course, but known since 2006 on the vallum slopes just south-east of Galley Hill. [3]

1972 *Ribes rubrum* -- Committee Walk. [4,7]

2007 *Ribes sanguineum* -- AC Leslie. Probably planted, the only site. [5]

1973 *Ribes uva-crispa* -- Committee Walk. [7]

1967 *Robinia pseudoacacia* -- FH Perring. Planted. The original record from the stretch beside Stetchworth Park (in section 7) described it as 'apparently regenerating'. [1]

1830s? *Roemeria hybrida* -- Lethorn, Hb. CM Lemann in **CGE**: the only record.

1827 *Rosa arvensis* -- L Jenyns. 'abundant in the woody part'. FH Perring (1952, old railway cutting) and Committee Walk (1973, south-east of A1304): the only records.

1992 *Rosa caesia* x *canina* = *R.* x *dumalis* -- AL Primavesi (CFG Excursion). On race course section. Also on golf course section, 2010, AC Leslie. The only records.[5]

1956 *Rosa canina* -- SM Walters. Many are white-flowered. [1,2,3,4,5,6,7]

1992 *Rosa canina x* obtusifolia = *R.* x *dumetorum* -- CD Preston & PH Oswald. In scrub at Reach end: the only record.

1992 *Rosa canina* x *tomentosa* = *R.* x *scabriuscula* -- CD Preston & PH Oswald. Grassland between Reach and old railway: the only record.

1950 *Rosa rubiginosa* -- JW Clarke. [2,3,4,5]

1970 *Rosa stylosa* -- SM Walters. Also between Reach and the old railway,1992, PH Oswald and CD Preston (**CGE**). The only records.

1981 *Rosa tomentosa* -- AC Leslie. Originally mis-identified as *R. sherardii*. Almost certainly the plant (without fruit) queried as *R. villosa* by SM Walters at the Reach end in 1950. [1,2]

1980 *Rubus armeniacus* -- AC Leslie & JM Spencer-Smith. The steady infiltration by this vigorous alien bramble must be a cause for some concern. [1,2,3,4,5]

2004 *Rubus babingtonianus* -- AC Leslie. [1,2,3,4]

1949 *Rubus caesius* -- EAR Ennion. [1]

2005 *Rubus cantabrigiensis* -- AC Leslie: the only site. [5,6,7]

1973 *Rubus conjungens* -- PD Sell. [5,6,7]

2007 *Rubus elegantispinosus* -- AC Leslie. [5]

2004 *Rubus hindii* -- AC Leslie: the only record.

2005 *Rubus idaeus* -- AC Leslie. [7]

2004 *Rubus radula* -- AC Leslie: the only site. [4]

1973 *Rubus tuberculatus* -- PD Sell. [5]

1973 *Rubus ulmifolius* -- Committee Walk. [1,2,3,4,5,6,7]

2006 *Rubus vestitus* -- AC Leslie. [7]

1940 *Rumex acetosa* -- EA George. [1,3,4]
1940 *Rumex crispus* -- EA George. [1,2,3,4,5]
2004 *Rumex crispus* x *obtusifoli*us = *R.* x *pratensis* -- AC Leslie & PR Green: the only record.
1980 *Rumex obtusifolius* -- AC Leslie & JM Spencer-Smith. [1,2,4,5,6,7]
2008 *Rumex obtusifolius* x *sanguineus* = *R.* x *duftii* -- AC Leslie: the only record. [3]
1972 *Rumex sanguineus* -- Committee Walk. [3,6,7]
1984 *Sagina apetala* subsp. *erecta* -- AC Leslie & JM Spencer-Smith. [5]
1955 *Sagina nodosa* -- PF Yeo (**CGE**). On partially infilled ditch just north-west of the pines in the golf course section: the only record.
1971 *Sagina procumbens* -- BD Jones. Also on golf tee, 1981, AC Leslie & JM Spencer-Smith: the only records.
1940 *Salix caprea* -- EA George. Female bushes considerably outnumber males along the race course section. [1,3,4,5,6]
1983 *Salix caprea* x *cinere*a subsp. *oleifolia* = *S.* x *reichardtii* -- AC Leslie, det. RD Meikle. [4,6]
1981 *Salix cinerea* subsp. *oleifolia* -- AC Leslie & JM Spencer-Smith. Very much rarer on the Ditch than *S. caprea.* [4,5]
1981 *Salvia verbenaca* (*S. horminoides*) -- AC Leslie. [1]
2009 *Salvia viridis* -- AC Leslie. Sown below golf tee: the only record. [5]
1940 *Sambucus nigra* -- EA George. [1,2,3,4,5,6,7]
1660 *Sanguisorba minor* (*Poterium sanguisorba*) -- J Ray. Most records are of subsp. *minor*. There is one record for the introduced subsp. *muricata* (Reach end, 1972, TCE Wells). [1,2,3,4,5]
1860 *Sanicula europaea* -- CC Babington and on Committee Walk, 1975: the only records, both at the south-east end.
1826 *Scabiosa columbaria* -- L Jenyns. Following a period of intense sheep-grazing this became abundant on the south-west face of Galley Hill in 2001. [1,2,3,4,5]
1973 *Scandix pecten-veneris* -- Committee Walk: the only record.
1828 *Scrophularia nodosa* -- JS Henslow (**CGE**). [5,7]
Pre1860 *Sedum acre* -- JS Henslow. Also mentioned by Evans (1939): the only records.
Pre1860 *Senecio erucifolius* -- CC Babington. [1,2,3,4,5]
1940 *Senecio jacobaea* -- EA George. [1,2,3,4,5,6,7]
1977 *Senecio squalidus* -- JW Clarke.
2004 *Senecio viscosus* -- AC Leslie: the only record
1957 *Senecio vulgaris* -- FH Perring & RG West. [1,3,4,5,6,7]
c1722 *Serratula tinctoria* -- J Andrews (**BM**). Not recorded again until listed by Evans (1939) at the wooded end; recorded by EA George in 1940 without details, and then seen on the Committee Walk in 1972 on the north-east face of the vallum just south-east of the golf tees. This population has gradually continued to expand and is now also on the south-west side of the vallum. [5]
1957 *Sherardia arvensis* -- FH Perring & RG West. At south-east end. Also on north-east face of vallum between Burwell Road and old railway,1982, AC Leslie. The only records.
1903 *Silaum silaus* -- collector unknown (**CGE**): the only record.
1977 *Silene alba* x *dioica* = *S.* x *hampeana* -- BD Jones. One clump just north-west of Newmarket railway. Another on south-west vallum face below pines in the same section, 2006, AC Leslie. The only records. [5]
2009 *Silene dioica* -- Committee Walk. One clump by vallum between Newmarket railway and golf tees: the only record. [5]
1951 *Silene latifolia* subsp. *alba* -- CD Pigott & SM Walters. [1,3,4,5,6]
1972 *Silene vulgaris* -- Committee Walk. Plants vary from being hairless to densely hairy, mixed together in the same populations. [1,3,4,5]

1972 *Sinapis arvensis* -- Committee Walk. [1,2,3,7]
1971 *Sisymbrium officinale* -- BD Jones. [1,3,5]
1940 *Solanum dulcamara* -- EA George. [1,2,3,4,5]
1839 *Solanum nigrum* -- S Hailstone (**YRK**). [5,6]
1973 *Sonchus arvensis* -- Committee Walk. [1,2,3,4,5,6,7]
1952 *Sonchus asper* -- WH Palmer. Very common in recently scrub-cleared areas. [1,2,3,4,5,6,7]
1951 *Sonchus oleraceus* -- CD Pigott & SM Walters. Much less frequent than *S. asper*. [1,2,3,4,5,6,7]
1984 *Sorbus aria* -- PH Oswald. All records of young bird-sown plants. [4,5]
1860 *Sorbus aucuparia* -- CC Babington. At the wooded south-east end, but not reported there since. Now at least 5 bird-sown plants scattered along the golf course section. [5]
1973 *Sorbus intermedia* -- Committee Walk. Bird-sown. [1,4]
2002 *Sorbus latifolia* agg. (probably *S. croceocarp*a) -- AC Leslie & JL Sharman. One bird-sown by vallum path, just north-west of Well Gap, still there 2010: the only record. [4]
1970 *Stachys arvensis* -- GMS Easy: the only record.
2004 *Stachys byzantina* -- AC Leslie. Probably planted, the only site. [5]
1957 *Stachys sylvatica* -- FH Perring & RG West. [1,2,4,6,7]
1984 *Stellaria apetala* -- AC Leslie. [3,4]
1860 *Stellaria holostea* -- CC Babington. Not reported again until 2008 when a small patch was found by AC Leslie in the ditch just south-east of the Dullingham Road. [6]
1957 *Stellaria media* -- FH Perring & RG West. [1,3,4,5,6]
1973 *Succisa pratensis* -- BD Jones. Has steadily increased especially between the golf tees and the Newmarket railway and recently found on the race course section. A pink-flowered plant was recorded near the railway in 2010. [3,4,5]
1973 *Symphoricarpos rivularis* -- Committee Walk. Probably planted. [7]
1980 *Symphytum officinale* -- Committee Walk: the only record. Identity slightly uncertain.
1984 *Symphytum officinale* x *asperum* = S. x *uplandicum* -- AC Leslie. Still just south-east of the Burwell Road: the only site. [3]
1972 *Tamus communis* -- Committee Walk. [1,2,3,5,6,7]
1905 *Taraxacum laevigatum* group -- LJ Sedgwick & CB Clarke (as *T. officinale* var. *erythrospermum*). Perhaps overlooked recently, as in 1973 PD Sell reported it 'all along in the grassland'. [1,3]
1940 *Taraxacum officinale* group -- EA George. [1,2,3,4,5,6,7]
1835 *Taraxacum oxoniense* -- CC Babington (**CGE**, probably *oxoniense*, det. AJ Richards, 2007): the only record.
1835 *Taraxacum rubicundum* -- CC Babington (**CGE**, det. AJ Richards): the only record.
1949 *Taxus baccata* -- EAR Ennion. Some probably planted, but many now bird-sown. [1,4,5,6]
[1829 *Teesdalia nudicaulis* -- J Downes (**NTN**). Crompton (2001) indicates this is a very small specimen and may be mis-identified. Requires confirmation.]
1660 *Tephroseris integrifolia* (*Senecio integrifolius*) -- J Ray. Still scattered along the vallum path between the Cambridge and Running Gaps, but more frequent on parts of the north-east face of the ditch between the Well and Running Gaps. Only a single plant recorded recently just north-west of the Newmarket railway. [3,4]
1823 *Thalictrum minus* subsp. *minus* -- L Jenyns (**BATHG**). Still frequent along the race course section, mostly at the base of the slopes and in the ditch; in very small quantity just north-west of the old railway. [1,4]
1660 *Thesium humifusum* -- J Ray. Still locally abundant especially on the south-west face of the vallum between the A1304 and the Cambridge Gap and just south-east of Galley Hill. Not seen recently on the golf course section. [3,4]
1905 *Thlaspi arvense* -- A Hosking. Also mentioned by Evans (1939).

2010 *Thuja* sp. -- AC Leslie. One self-sown on fallen beech trunk, between Stetchworth Road and Dane Bottom: the only record. [7]
1949 *Thymus polytrichus* subsp. *britannicus* (*T. drucei*) -- CD Pigott. Probably the thyme listed by Ray (1660). [1,2,3,4,5]
1852 *Thymus pulegioides* -- CC Babington. Apart from Babington's record ('between the railway and Stetchworth'), the only other record is also at the south-east end ('Devil's Ditch, Woodditton') 1994, DE Coombe and PH Oswald.
1852 *Thymus serpyllum* -- WW Newbould (**BM**, det. CD Pigott). All subsequent records appear to have been errors for *T. polytrichus.* Newbould's specimen perhaps ought also to be re-examined.
2008 *Tilia* x *euchlora* -- AC Leslie. Planted at Reach, the only site. [1]
1982 *Tilia cordata* x *platyphyllos* = *T.* x *europaea* -- Committee Walk. Planted and increasingly recorded as self/bird-sown. One young plant between the A1304 and the Cambridge Gap appears very close to *cordata*, another just north- west of the Cambridge Gap is very close to *platyphyllos*. Probably the 'lime' listed by Ennion (1949). [4,6]
1940 *Torilis japonica* -- EA George. [1,2,3,4,5,6,7]
1973 *Tragopogon pratensis* -- BD Jones. [1,3,4,5]
1823 *Trifolium campestre* -- L Jenyns (**CGE**).
1957 *Trifolium dubium* -- JW Clarke.
1971 *Trifolium incarnatum* -- BD Jones: the only record.
1981 *Trifolium micranthum* -- AC Leslie: the only record.
1940 *Trifolium pratense* -- EA George. A white-flowered plant by the vallum path between the Cambridge Gap and Well Gap, 2008, AC Leslie. Most plants on the Ditch seem to be var. *pratense*, but a plant of var. *sativum* was on the vallum path, just south-east of Galley Hill, 2008, AC Leslie. [1,2,3,4,5]
1972 *Trifolium repens* -- Committee Walk. [1,2,3,4,5,7]
1980 *Tripleurospermum maritimum* -- Committee Walk. [5]
1961 *Trisetum flavescens* -- PD Sell. [1,2,3,5,6]
1982 *Triticum* sp. -- AC Leslie.
2001 *Tulipa* x *gesneriana* -- CD Preston & SE Yates. Probably planted: what may have been the same plant was seen on Galley Hill on the Committee Walk in 2002, but has not been reported since.
1829 *Turgenia latifolia* -- Dr Jermyn (**SWN**): the only record.
1972 *Tussilago farfara* -- Committee Walk. [1,4,5]
1972 *Ulex europaeus* -- Committee Walk. Formerly just south-east of the A1304, but now gone.
2007 *Ulmus minor* -- AC Leslie. [6]
1973 *Ulmus minor* x *glabra* = *U.* x *hollandica* -- Committee Walk. Some at least are planted. [1,5,6]
1957 *Ulmus glabra* -- FH Perring & RG West. Frequent along the section between the Stetchworth Road and Dullingham Road, where some may have originally been planted; scattered in scrub further north-west. [2,3,5,6,7]
[1972 *Ulmus procera* -- Committee Walk. The only record, 'probably misidentified' *fide* G Crompton.]
1940 *Urtica dioica* -- EA George. [1,2,3,4,5,6,7]
1823 *Valeriana officinalis* -- in Hb Jenyns (**BATHG**), but also listed by J Fisher in late eighteenth century. Still at Dane Bottom, the only extant population. [7]
1822 *Verbascum nigrum* -- JS Henslow (**CGE**, det. PD Sell). Known from near the Newmarket railway since at least 1885 (and Henslow's specimen came from this general area), but not recorded there since 1983. Henslow's specimen and one collected in 1885 by AS Shrubbs (**CGE**) have been determined as var. *tomentosum* by

PD Sell. It was also sown in the experimental plots south-east of Galley Hill, but did not persist.

2007 *Verbascum nigum* x *thapsus* = *V.* x *semialbum* -- AC Leslie. One plant by vallum path just south-east of Newmarket railway. This is the former site for *V. nigrum*; *V. thapsus* is frequent on the railway nearby. The only record. [5]

2008 *Verbascum phlomoides* -- AC Leslie: the only record. [1]

2008 *Verbascum pyramidatum* -- AC Leslie. Has now spread from the old railway line on to the Ditch in two places. [1,2]

1950 *Verbascum thapsus* -- JW Clarke. [1,2,5,7]

1940 *Verbena officinalis* -- EA George. [3,7]

1981 *Veronica arvensis* -- AC Leslie & JM Spencer-Smith. [1,3,5]

1968 *Veronica austriaca* -- PHL Cook. Probably planted near Reach; it has not persisted. Perhaps an error for *Veronica spicata* (see below): the only record,

1957 *Veronica chamaedrys* -- FH Perring & RG West. [1,2,3,4,5,6,7]

2008 *Veronica filiformis* -- AC Leslie. South-west lip of ditch, just north-west of A1304, the only record. [4]

1981 *Veronica hederifolia* -- AC Leslie & JM Spencer-Smith. Both subsp. *hederifolia* [1,2,3,5] & subsp. *lucorum* [4,5,6] are recorded.

1955 *Veronica longifolia* -- FH Perring. A garden outcast, did not persist: the only record.

Pre1727? *Veronica montana* -- J Martyn. 'in the woody part'. Still present, notably along the vallum path between Dane Bottom and the Stetchworth Road and at the bottom of the ditch to the south-east of Dane Bottom. [7]

1957 *Veronica persica* -- FH Perring & RG West. [1,2,3,6]

1914 *Veronica polita* -- AG Gregor. [3]

1981 *Veronica serpyllifolia* -- AC Leslie & JM Spencer-Smith. [5]

1971 *Veronica spicata* --Transplanted in c.1951 from the 4 Mile Stable Farm site on the old Beacon Course, to two sites on the north-east side of Galley Hill by KV Cramp; it flowered there c.1953-54 but was not seen by Cramp subsequently; however, it was reported from near the Burwell Road by S Davey in 1968 and seen on the Flora Europaea Conference excursion in 1980, but on the south side of Galley Hill (opposite the site of one of Cramp's introductions). Not reported since.

Pre1860 *Viburnum lantana* -- CC Babington. [1,2,3,7]

1860 *Viburnum opulus* -- CC Babington. [1,2,3,4]

1953 *Vicia cracca* -- FH Perring. White-flowered plants were recorded by A.C. Leslie north-west and south-east of the Well Gap in 1981 and were refound by DJ & K Barden in the latter site in 2009. [1,2,3,4,5,7]

1982 *Vicia faba* -- AC Leslie: the only record.

2007 *Vicia sativa* subsp. *segetalis* -- AC Leslie. [1,4,5]

1828 *Vicia sepium* -- JS Henslow (**CGE**): the only record.

1972 *Viola arvensis* -- Committee Walk. [3]

1860 V*iola hirta* -- CC Babington. Both subsp. *hirta* and subsp. *calcarea* have been recorded; unusually small-flowered plants certainly still occur, but they do not necessarily have the other characters usually associated with subsp. *calcarea*. Plants with beardless lateral petals have also been noted recently. [1,3,4,5,6,7]

1981 *Viola hirta* x odorata = *V.* x *scabra* -- AC Leslie & JM Spencer-Smith. [4,5,6]

1947 *Viola odorata* -- Collector unknown (**CGE**). [1,3,4,5,6,7]. The following colour variants have been recorded recently: var. *dumetorum* [7], var. *imberbis* [1,5,6], var. *leucoium* [1], var. *odorata* [1,3,4,5,6,7], var. *subcarnea* [1,7].

1981 *Viola reichenbachiana* -- AC Leslie. [7]

2007 *Vulpia myuros* -- AC Leslie: the only record.

2005 *Yucca* sp. -- AC Leslie: did not persist: the only record.

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Conservation of the Chalkhill Blue and other butterflies on the Devil's Dyke

Vince Lea

This is a summary of a couple of presentations and write-ups given to the local branch of Butterfly Conservation (BC). It reports on conservation work done by the local (Cambridgeshire and Essex) branch of BC since the late 1980s. I have been organising the conservation work since 2005, and it has been a privilege to pick up the reins from a series of dedicated predecessors who have looked after one section of the dyke so well that it now scores the highest number of Chalkhill Blues (*Polyommatus coridon*) of any butterfly transect in England; phenomenal when you consider that the start of conservation work was prompted by fears that the species had become extinct on the site following several years with no sightings of Chalkhill Blues at all! It also relies heavily on data from two people in particular who have counted the butterflies systematically over the years, producing the sort of information that is essential to understand how well the conservation action is working. The other important people to acknowledge in this article are the many individuals who have given time to carry out the practical conservation work on about 40 Sundays. It is also been essential that we have had the permission of the Jockey Club to carry out this work.

The Devil's Dyke was historically a well-known location for the Chalkhill Blue, but in the early 1980s the numbers were in decline and their range had contracted to a small part of the dyke, in the area of the July racecourse (north of

the roundabout with the A1303/A1304). Formerly they had been in many parts of the dyke and across 'Newmarket Heath' which is now intensively managed as racecourse, farmland and golf course. The decline in the 1980s was attributed to the habitat changing; instead of short, open grassland full of flowers it was becoming rank, unmanaged thatch invaded by scrub. Chalkhill Blues require very short turf and a southerly aspect, so that the sward warms up rapidly in the sun, giving the adult butterflies energy required to fly and, more importantly, the larvae also get up to a temperature where they can digest their food. These habitat conditions, combined with a chalky soil, are also essential for the foodplant, Horseshoe Vetch (*Hippocrepis comosa*), which is the sole diet of the larvae. The decline in habitat conditions was largely attributed to cessation of grass-burning which the Jockey Club used to carry out at the end of summer to keep the dyke 'tidy'. After filling a trench with peat to create a training area for the horses, right next to the dyke, they became concerned about the possibility of the peat catching fire so stopped any further burning. Other parts of the dyke had once been grazed by sheep, but the economics of small low intensity grazing put a stop to such practices. Another formerly important area was the intersection of the old railway line with the dyke near Reach, which also had regular grass fires, possibly as a consequence of sparks from the passing steam trains.

Butterfly Conservation as an organisation came into being in 1968, and is organised on a regional basis, putting members together in areas; the local branch covers the counties of Cambridgeshire and Essex and was founded in 1984 with just 14 members (referred to as “the branch” hereafter). The aims are to understand the local populations of butterflies, be alert to declines, raise awareness and offer advice and practical conservation for butterflies where appropriate. Declines in the Devil’s Dyke Chalkhill Blues were a particular worry locally, as this was their main locality in the county, and it is one of the most northerly populations in the country. Being isolated, natural recolonisation would be unlikely. Numbers were really giving serious concerns in the mid 1980s – a single sighting in 1985 was followed by no further reports until 1990. Work parties had commenced in 1987, perhaps more in hope than expectation! However, a report came in from Tim Bennett of a singleton during August 1990. Singles were seen in the following two years, and then in 1993 a more thorough survey was undertaken by the branch, when double-figure counts were made on one visit and multiples on two other occasions; enough to found a permanent population.

The graph (Table 1, below) shows how the numbers then increased from 1994 onwards. It is created using data collected between 1994-98 by John Dawson, and from 2003 onwards by Sharon Hearle. The two surveyors used slightly different methods of counting, with Sharon using the standardised butterfly transect of counting in a 5m 'virtual cube' whilst walking along at a slow pace, once a week, while John counted every individual in each 50m block of the dyke several times a week. I took the two data sets and merged them by creating an index based on the best three weeks counts (they have a long flight period but a very distinct population peak each year, the exact timing of which

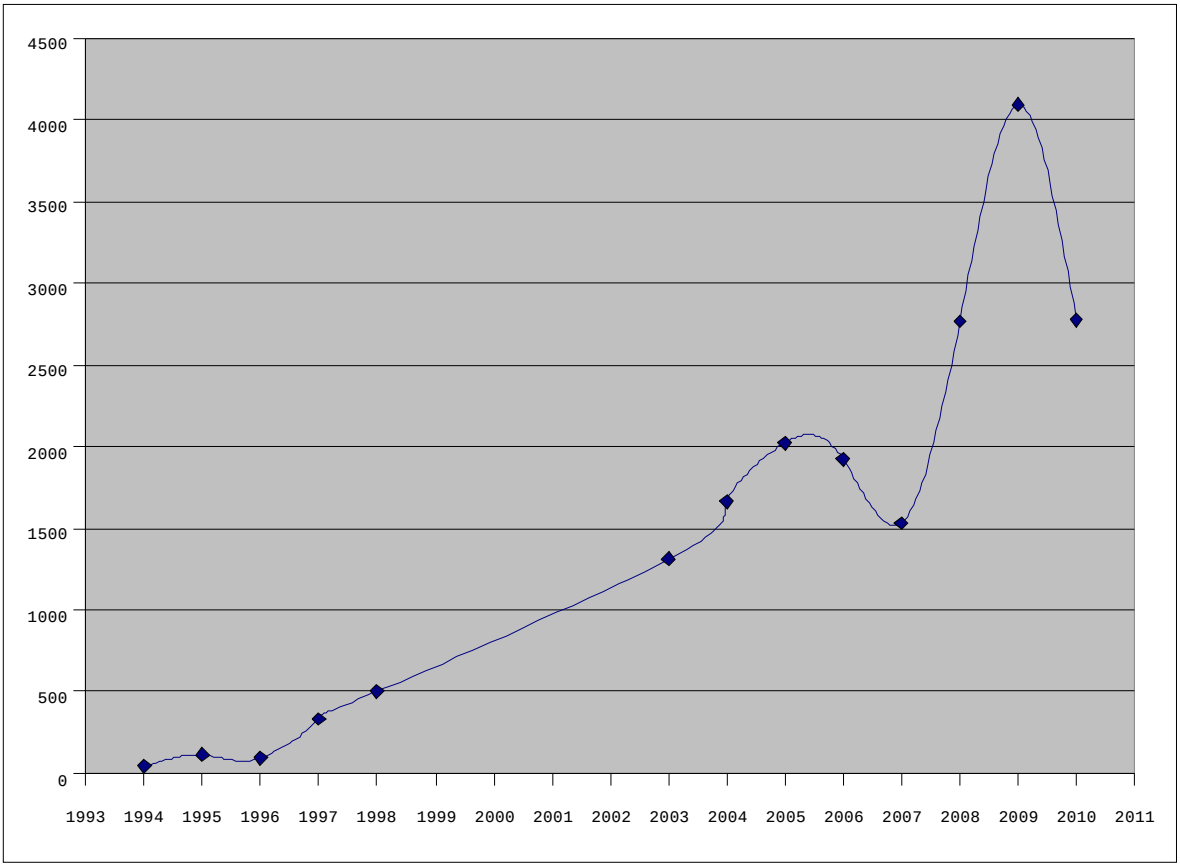

Table 1.Chalkhill blue monitoring on Devils Dyke around the July Racecourse section. The vertical axis is the summed total of the best 3 counts of the year, plotted against the year of the monitoring. Monitoring was by slightly different methods in 1994-1998 and from 2003 onwards, with an interval when no systematic counts were made.

varies from year to year). I only used John's data for the portion of the dyke which in Sharon now conducts her transect – namely, from the entrance near the roundabout as far as Well gap, some 1200m in length. John had recorded as far as the A14, so I ignored the butterflies from this extra area. I knew the butterflies had been increasing over this time, but I was amazed when the data were compiled and put into a graph, which showed that the increase had been almost consistent, apparently even during the years when no-one counted them! There are of course annual fluctuations according to specific summer weather conditions; most butterfly populations show such oscillations. But the trend is consistently and strongly upwards.

Counts are no longer made on areas which BC don't conserve, but when John was doing his survey it was shown that the increase was about 1.5 times faster than the areas we weren't working on. It must be pointed out that other conservation interests were looking after other parts of the dyke, in order to protect other species like the Lizard Orchid (*Himantoglossum hircinum*), and it is likely that these efforts also had some benefits for the butterflies. Nowadays, a walk along the dyke at peak Chalkhill season will reveal masses on the BC managed area and numbers then rapidly dwindle to isolated odd individuals on

other areas, where the sward is generally less fine and Horseshoe Vetch is a lot harder to find.

The conservation work undertaken has been a winter grass cut using petrol powered strimmers and brushcutters. In winter, the butterfly is in the egg stage of its lifecycle, and the eggs tend to drop to the ground so there is little danger to the population. A day's work can usually achieve a clear cut for about 50m of the dyke and most winters we have had two visits. All cut material is raked off and dumped at the shady bottom of the dyke. We cut different 50m sections each year so that the scrub and grassland grows up over 6-7 years before the next cut comes along, but the low fertility, dry sun-baked south-west facing slope means that the grass does not grow particularly rank in this time period. In the last few years, we have been conducting a small experiment to see if we can improve the habitat even more by cutting a large number of much smaller patches on one section and will be using the transect data to compare this method with the standard 50m clear-cut section. Advice given by Alan Stubbs of Buglife was that the mosaic method is likely to be much more advantageous for a suite of invertebrate species. Our main aim was to improve conditions for a second threatened butterfly species that occurs on the dyke, the Dingy Skipper (*Erynnis tages*). I considered that the Chalkhill Blue, with an annual count of 5000 individuals, is pretty safe whatever we do, whereas the Dingy Skipper, with a population of perhaps 100 individuals in a good year, could really do with a further boost. This mosaic cut produces a mixture of short turf interspersed with longer grass, scrub and so on, providing nectar, roost and egg-laying sites all within a short flight distance, crucial for this species of uncertain spring weather, whereas the Chalkhills fly in high summer when conditions are more favourable for insects. The Dingy Skipper is in a more vulnerable life-stage in the winter, as a larva which may be suspended high up in the vegetation, so cutting swathes of grassland will probably remove larvae from a large area of dyke.

To see Chalkhill Blues, a walk on a fine day in late July or early August on the July racecourse of the dyke is guaranteed to be successful. The second best place to see them is the old railway cutting near Reach, where the farmer has started cutting the vegetation and the Green Belt project manage the dyke itself. Anyone visiting any other parts of the dyke could see the species, and records from these less-visited areas are desperately needed. To help further the conservation work, consider either joining BC or coming out on one of our work parties. The branch website has all the details required. (http://www.cambs-essex-butterflies.org.uk/index.php).

Contributions towards a new algal flora of Cambridgeshire (Vice-county 29), VI. Phylum Chlorophyta, continued, Cladophorales, with notes on the epiphytes of *Cladophora*

Hilary Belcher, Eric George and Erica Swale

Phylum Chlorophyta, Order Cladophorales.

Chaetomorpha linum (O.F. Müller) Kützing 1845. Reach Lode, Reach Village end, 1952, E.A. George. Usually marine or brackish, but here growing in a freshwater habitat.

Cladophora fracta (O. F. Müller ex Vahl) Kützing 1843 including *C. crispata (*Roth) Kützing. Dernford Fen; Comberton; Wimpole Park; pond near Girton; Roswell Pits near Ely, near March; (G.S. West 1899). River Cam at Cambridge, 1947, 1966; at Grantchester and Haslingfield 1947, E. A. George. We (B & S) have not succeeded in distinguishing *C. fracta* with certainty from the ubiquitous *C. glomerata.*

Cladophora glomerata (Linnaeus) Kützing 1843 (including *C. crispata* (Roth) Kützing). River Cam near Cambridge; Coton; near Ely; Comberton; Dernford fen; Wimpole Park; pond near Girton; Roswell Pits near Ely; near March; G.S.West. River Cam at Cambridge, Haslingfield; Byron's Pool and Baitsbite Lock, especially in swift flowing water at locks etc, January 1948; River Granta at Abingdon on stones in current, Aug. 1947; stream between Girton and Histon, 1941, E.A. George. We (B & S) have seen it many times in streams, rivers (especially at locks, weirs etc.), natural and artificial ponds, and other aquatic sites not liable to dry up and with neutral or alkaline waters. The well-known Blanket Weed of ponds is usually *C. glomerata.* (Fig 1A and 1B). The only freshwater alga described and illustrated in Gerard's Herball (1597, revised 1633), "Hairy River Weed", or *Conferva* of Pliny, is probably this alga.

Rhizoclonium hieroglyphicum Kützing 1843. Dernford Fen; Octagon Pond, Wimpole Park; Sheep's Greeen, Cambridge; in ponds by Ely; Sutton W. Fen; in ditches near Guyhirne, frequent May to August; G.S.West. 1899. E.G. has no record in his card index. We (B & S) have not identified it in Cambridgeshire, in spite of following many narrow (l.25 μm diameter) long unbranched filaments of *Cladophora* type, as they have all ended in a branch of unlimited growth, and not in the one or two celled "rhizoid" which would denote *Rhizoclonium.* The illustration of "rhizoids" (Fig 1C) is from a sample of *Rhizoclonium* sent to us for identification from the River Blackwater at Kelvedon, Essex. Dr Ken Adams has seen it once in that county, at Hainault Forest. We would be happy to look at any possible Cambridgeshire samples (sent as a small damp tuft in a polythene bag), as we would like to find out whether it still grows in the county. It is said

to favour polluted water, have a "woolly look about it", and be quite common in some areas.

Epiphytes and epizoites on *Cladophora*

Cladophora walls possess no mucilage layer, and this permits the growth of many epiphytes on the older cells. Young cells have very few. Diatoms, especially *Cocconeis placentula,* seem to be the first to arrive, but organisms of various types can be found on the older filaments, which are densely encrusted. We have recorded the following provisional list of organisms on *Cladophora* in the vice-county in the last 20 years, mainly around Cambridge, some many times.

Chlorophyta:-

Apiocystis brauniana Nägeli
Aphanochaete repens A. Braun
Bulbochaete spp
Chaetosphaeridium globosum (Nordstedt) Klebahn
Characiochloris characioides (Korshikov) Pascher
Characium acuminatum A. Braun
Characium ensiforme Hermann
Characium ornithocephalum A. Braun
Coleochaete scutata Brébisson
Entocladia endophytica (K. Möbius) D.M. John
Mougeotia spp.
Oedogonium spp.
Podohedra sp.
Stigeoclonium spp.

Xanthophyta:-

Characiopsis borziana Lemmermann
Characiopsis longipes Borzi
Characiopsis subulata (A. Braun) Borzi
Characiopsis spp.
Mischococcus confervicola Nägeli
Ophiocytium ilkae Heering

Chrysophyta:-

No chrysophyta have been seen on *Cladophora*, but *Epipyxis utriculus* Ehrenberg 1838 and *Chrysopyxis globosa* Pascher have been seen on *Oedogonium.*

Bacillariophyta (Diatoms):-

These are the commonest epiphytes to be seen on *Cladophora*, but identifying them to species level is often impossible without detaching them from the filament, "cleaning" and mounting, as only then can the necessary details be seen. Then it is difficult to separate the hitherto attached species from the merely entangled. In late winter and early spring long brown streamers of

epiphytic diatoms may be seen on *Cladophora* in the ditches etc., mostly of the genera *Diatoma* and *Fragilaria.* The following were commonly seen at all times on older filaments:-

Achnanthes sp.
Cocconeis pediculus Ehrenberg
Cocconeis placentula Ehrenberg, the first diatom to colonise.
Cymbella spp.
Diatoma spp.
Encyonema sp.
Epithemia sp.
Gomphonema sp.
Rhoicosphenia abbreviata (Agard) Lange-Bertalot
Synedra sp.

We have not seen *Tabellaria* epiphytic in Cambridgeshire, though common in some districts.

Glaucophyta:-

A small group of algae without active chloroplasts, but with blue-green "cyanelles", probably reduced endophytic Cyanophyta.

Gloeochaete wittrockiana Lagerheim. One site only but seen several times, in pond under Geodesy Department front steps, Madingley Road, Cambridge.

Euglenophyta:-

Colacium epiphyticum Fritsch.

Rhodophyta:-

Bangia atropurpurea (Roth) C. Agardh. Once at Baitsbite Lock, River Cam.

Chroodactylon ornatum (C. Agardh) Basson, Pond at Cambridge Regional College, seen regularly.

Cyanophyta or Cyanobacteria:-

Chamaesiphon incrustans Grunow

Clastidium setigerum Kirchner, one Cambridge pond only, on Storey's Way. Seen several times.

Animals.

The following were seen on various occasions attached to the Cladophora cell walls.

Ciliates:-

Cothurnia annulata Stokes
Opercularia articulata Goldfuss
Thuricola folliculata Kent
Vorticella octava Stokes
Vorticella picta Ehrenberg

Rotifera:-

Collotheca ornata (Ehrenburg)

The above list was compiled from a trawl through our notebooks, and similar organisms were seen on *Oedogonium* and *Chara* spp. Sometimes the epiphytes sheltered various animals from ciliates and rhizopods to crustaceans like *Asellus*, and insect larvae such as *Chironomus* spp., which often disturbed the algae on our slides. A study of "blanketweed" ecosystems would prove interesting, and might vary with sites of different types. We have watched a pair of swans on a stream at Port Holme near Godmanchester swallowing quantities of the masses of "blanketweed" and no doubt deriving nourishment from the whole ecosystem, especially the protein-rich animals.

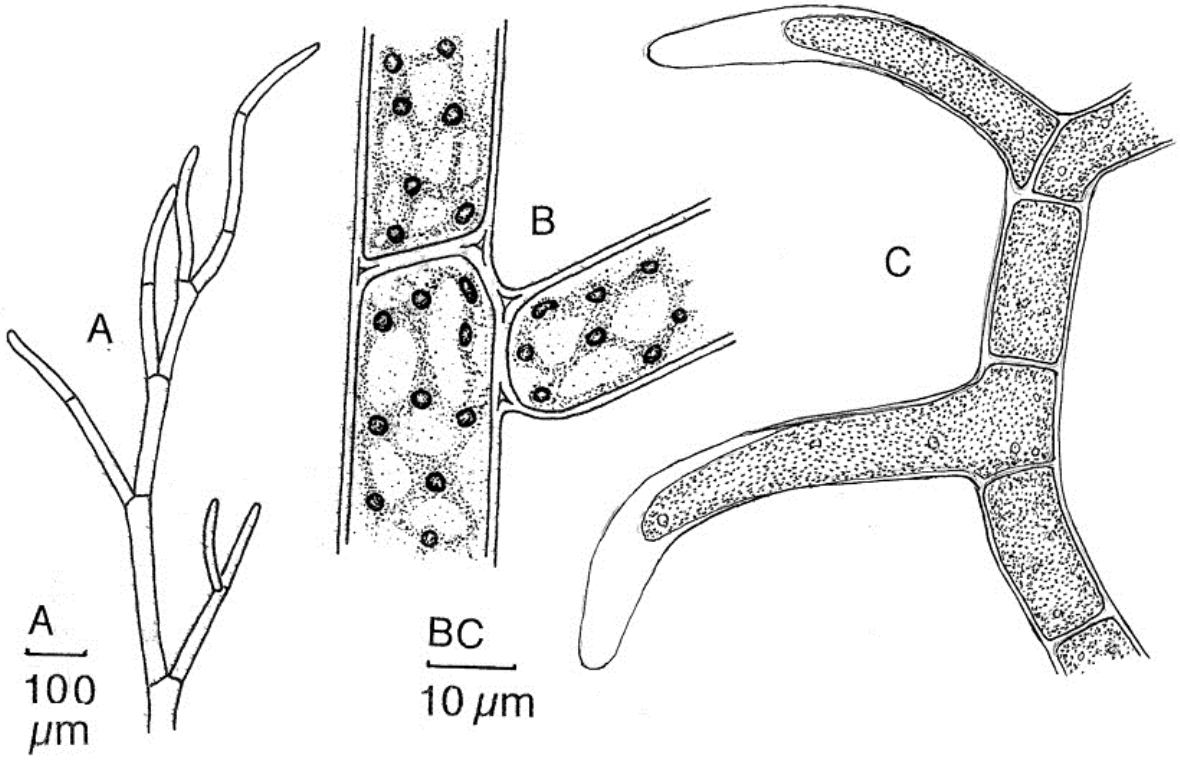

Figure 1. 1A, habit sketch of *Cladophora glomerata.* **1B**, part of a young filament of this, showing reticulate chloroplast, pyrenoids, and branching. **1C**, part of *Rhizoclonium hieroglyphicum*, with rhizoids, from River Blackwater, Essex, a postal sample. The cell contents were decomposing, and the filaments seem narrow compared to other published accounts.

Acknowledgments.

We wish to thank Dr Ken Adams and Prof. David John for comments about *Rhizoclonium*, also Ray Ruffell for sending the sample of this.

Reference

Gerard, John (1597, revised 1633). *Herbal or General History of Plants.* London

Tasteless Water-pepper (*Persicaria mitis*) and Small Water-pepper (*P. minor*) in Cambridgeshire

C. James Cadbury

Abstract

The status of *Persicaria mitis* (Nationally scarce, Vulnerable) and *P. minor* (Vulnerable) in Cambridgeshire (v.c. 29) is reviewed. An attempt was made in 2010 to survey *P. mitis* in the River Ouse flood-plain within the vice-county. Populations were found at 11 sites in five of the nine 10-km squares in which it has been recorded in v.c. 29 since 1987. It had disappeared from at least three sites since 1990. *P. minor* is a rare plant in Cambridgeshire. Since 1987 it has been recorded at only four sites in three 10-km squares; at one of the sites, a previously unrecorded one, it was seen in 2010. Occurrences have been sporadic and in small quantity, whereas *P. mitis* populations have tended to be persistent and at four sites large. *P. mitis* favours somewhat drier ground than *P. hydropiper*, with which it often grows and, being an annual, requires bare ground created by summer drawdown after flooding or partial shade of willows, together with some trampling by cattle. It is a poor competitor with tall vegetation.

Introduction

In addition to the perennial Amphibious Bistort (*Persicaria amphibia*) there are five annual knotweeds that occur in the wetlands of Cambridgeshire (v.c. 29). Redshank (*P. maculosa*, formerly called *Polygonum persicaria*) and Pale Persicaria (*P. lapathifolia*) are mainly ruderal species but they also occur in drier wetlands. The other three, Water-pepper (*P. hydropiper*), *P. mitis* (*P. laxiflora*) and *P. minor*, are virtually restricted to wetlands. This paper concentrates on the last two.

Identification

P. hydropiper is fairly easily distinguished by the yellowish-green leaves, lax, often nodding inflorescence and distinctive sharp, peppery taste. *P. mitis* has dull green leaves with little taste and a distinctly lax and extended inflorescence. The ochreae that envelop the stem in the leaf axils tend to have longer fringing hairs. *P. minor* is noticeably smaller than the last two; it has markedly narrower, linear leaves that are dull green in colour and tasteless, and the inflorescence is lax but shorter than that of *P. mitis*. The flowers of all three have pink perianth segments but those of *P. hydropiper* are usually pale.

P. lapathifolia can present some identification problems on account of its variability. More typically the inflorescence is dense and compact, the flowers are greenish-white, the peduncles and sometimes the perianth have short-stalked or sessile yellow glands, the lower leaves usually have a mat of cobwebby white hairs on the underside and there is a dark blotch on the upper side of the leaves as in *P. maculosa*; the perianth segments can be pink. The inflorescence of

P. maculosa is usually less compact and the yellow glands and the white hairs on the underside of the leaves are absent; though the perianth segments are usually pink, they can be a pure white, not tinged with green as in *P. lapathifolia*.

Though the achenes are not usually a useful identification character in the field, gathered material that is kept in a bag to dry out sheds achenes. Those of *P. lapathifolia* are biconcave or planoconcave, while those of *P. maculosa* are mainly biconvex or planoconvex. Another useful feature is that, while trigonous achenes are usually present in *P. maculosa* (10–60% in achene samples), they are very rare in *P. lapathifolia*. The achenes of *P. hydropiper* have a dull surface; those of *P. mitis* are shiny. *P. minor* also has shiny achenes but they are smaller (only 2–2.5 mm compared with 2.5–3.5 mm). These characters are taken from Stace (2010).

Ecology of the three wetland Persicarias

As annuals, these Persicarias are not good competitors with rank vegetation. They grow best where the ground is poorly vegetated and usually disturbed by cattle-trampling (poached), provided that this is not too heavy. *P. hydropiper*, true to its name, frequents permanently wet or damp sites including river-banks. *P. mitis* may grow with *P. hydropiper* but usually occurs in somewhat drier situations on ditch-banks or in ditches that have undergone drying-out in the summer. Sites in Cambridgeshire are often partially shaded by willows or a hedge, but not in dense shade. The recent finds of *P. minor* on Cambridgeshire washlands have been in damp open sites on debris cleared from a ditch (two occasions), on cattle-trampled mud (one) and in a drying ditch (one). None of the three wetland Persicarias seems to tolerate intensive grazing or trampling by cattle, nor do they survive in ditches that have become overgrown with Reed Sweet-grass (*Glyceria maxima*) and other tall vegetation. Associates include Trifid Bur-marigold (*Bidens tripartita*) and Marsh Yellow-cress (*Rorippa palustris*). The NVC community in which *P. mitis* grows has affinities with OV30 *Bidens tripartita–Polygonum amphibium* (Rodwell 2000), though *P. amphibia* is often absent.

Status of the three wetland Persicarias in Britain and Ireland

P. hydropiper is very widespread, being recorded in 1709 10-km squares in Great Britain and 602 in Ireland over the years 1987–1999. *P. mitis* is much scarcer: it was recorded in only 57 10-km squares in Britain and 27 in Ireland. Its distribution has decreased markedly, having been found in 106 squares before 1970 (Preston *et al.*, 2002). *P. mitis* is therefore considered to be both Nationally Scarce (Mountford in Stewart *et al.*, 1994) and Vulnerable (Cheffings & Farrell, 2005). *P. minor* was recorded from 106 squares in Great Britain and 63 in Ireland over the period 1987–1999 (Preston *et al.*, 2002); it is therefore not classed as Nationally Scarce. Its distribution extends further north and west than that of *P. mitis*. While new sites have been discovered, it has disappeared from many others and is classed as Vulnerable (Cheffings & Farrell, 2005).

Status of *P. mitis* and *P. minor* in v.c. 29

Records of both *P. mitis* and *P. minor* in the vice-county have been carefully listed up to about 2000 on the Cambridgeshire Flora website (Crompton, 2001, records from which are asterisked in the accounts below). The author (CJC) attempted to survey *P. mitis* in Cambridgeshire in the late summer and autumn of 2010 to investigate its current status.

Persicaria mitis

This species has been recorded historically in 14 10-km squares in v.c. 29 and over the years 1987–1999 it was found in eight of these squares (Crompton, 2001). In 2010 the author saw P. mitis at 11 sites in five squares, including one, TL47, for which there are no 1987–1999 records. All were near the River Ouse and on its washlands, where it is locally flourishing from Swavesey to the vice-county boundary upstream of Welney.

TL36 There was no sign of any annual *Persicaria* species where *P. mitis* was recorded at 358699 on 3.11.1989 by J. Green.* Annual Persicarias were also absent from the ditches choked with *Glyceria maxima* W. of High Causeway Bridge, Mare Fen, 366698, where both *P. mitis* and *P. minor* were recorded, 8.9.1990, G. Crompton & J.O. Mountford.*

TL37 a) Scattered plants with abundant *P. maculosa* in a dry ditch partly shaded by large willows in a hawthorn hedge, TL36077063–36257055, Middle Fen between Swavesey and Over, 24.9.2010, CJC. There was again no sign of any annual *Persicaria* species where *P. mitis* was recorded at 357700 in 1985 by J.O. Mountford & T. Parish and on 3.11.1989 by J. Green.*

b) Frequent with *P. hydropiper* in a dry ditch beside a belt of willows, mostly Almond Willow (*Salix triandra*), between the River Ouse and the retaining river-bank, Brownshill Staunch, upstream of Earith, 37047279–37077302, 5.9.2010, CJC. The site had been moderately cattle-grazed and poached. Persicarias were noticeably absent from an adjoining heavily grazed section of the same ditch downstream. *P. mitis* was previously recorded from Brownshill Staunch, 371727, 10.9.1992, D. Curtis & K. de Courcy.*

c) Frequent with *P. hydropiper* and occasional *P. lapathifolia* on the cattle-poached margin of a ditch on both the S. and N. sides of a belt of willows (mostly *S. triandra*) between the River Ouse and the river retaining bank, W. of Earith Bridge on the Cambridgeshire side, 38657464 (almost certainly extending further S.W.) – 39107463, 14.9.2010, CJC. Previously *P. mitis* had been recorded at this site in 1949 & 1952, S.M. Walters, D.E. Coombe & others.* There are records from the Huntingdonshire side of the river (v.c. 31) around Earith in 1949, 1953 & 1978.* The author saw it in small quantity on the river-bank at Bury Fen (v.c. 31), 37887426, 17.9.2010.

TL47 Frequent to abundant with *P. hydropiper* and occasional *P. lapathifolia* in a wet ditch beside a willow-bed on the E. side of the Old Bedford River (near the Gullet), S.W. of Sutton Gault, Ouse Washes, 42037888–42047906, 2.9.2010, CJC. Previously *P. mitis* was recorded as being frequent at virtually the same site, 25.8.2006, CJC. There is a record from Sutton Chain, *c.* 1880, A. Fryer.*

TL48 a) Several plants beside a ditch on the Ouse Washes between Sutton Gault and Mepal, 43438081, 2.9.2010, CJC.

b) Locally abundant with abundant *P. hydropiper* near the Broker's Track bridge over the River Delph (S.E. bank), Welches Dam, Ouse Washes, 47108582; also occasional in the shade of tall willows on the S.E. bank of the River Delph opposite Welches Dam, 47128586, 47148589 & 47188593; rare with abundant *P. hydropiper* and occasional

P. lapathifolia at the foot of the Barrier Bank on the N.W. side of the River Delph at the edge of a belt of *Salix viminalis* (part recently felled), 47178590–47348621; 25.9.2010, CJC. Previously recorded near the River Delph at Welches Dam *c.* 1880 by A. Fryer,* at 471860 in 1992 by CJC,* at 471859 on 31.7.1993 by P.H. Oswald & BSBI excursion,* and at 470860 in 2006 and on 29.7.2008 by CJC.

c) With *P. maculosa* and *P. hydropiper* between the Delph and Old Bedford Rivers, between Purl's Bridge and Pymore Viaduct, 487880–480870, 8.9.1988, G.M.S. Easy.*

d) Small patch on N.E. side of Pymore Viaduct, 499890, 2.9.1990, CJC.•

e) Near the River Delph between Purl's Bridge and Pymore Railway Viaduct, Ouse Washes, 49188869, 14.7.2006, CJC.

TL58 a) Occasional with frequent *P. hydropiper* on S.W. side of Pymore Viaduct at S.E. end, 50128866, 30.9.2010, CJC. Annual Persicarias were conspicuously absent elsewhere on the S.E. side of the Viaduct on that occasion. Previously recorded on the S.E. side, 500886, 1978, CJC.

b) Occasional with abundant *P. hydropiper* on N.E. side of the Viaduct at S.E. end, 50168870; also one plant at 50078881, 30.9.2010, CJC. Further N. along the borrow-ditch there was only *P. hydropiper* in abundance. Recorded on N.E. side of the Viaduct, 503887/8, 8.9.1988, G.M.S. Easy & G. Crompton.*

TL59 a) In a ditch half way across the washes, S.W. of Welney, 52479273;

b) on the washes near the River Delph, S.W. of Welney, 52549346;

c) in a dry ditch between the Barrier Bank and the River Delph, 52479273;

all 3 records 21.8.2010, A.C. Leslie, N. Millar, S. Hartley, M. Frisch & CJC.

d) Recorded previously with *P. hydropiper* and *P. maculosa* near willows on the washes between Pymore Railway Viaduct and Welney, 513914, 1992, CJC.*

Just in West Norfolk (v.c. 28), *P. mitis* was abundant along the margins of a mown track within the Churchmans' Bank on the Wildfowl and Wetland Reserve N. of the Welney road, Ouse Washes, 53429359, 21.8.2010, CJC & L. Marshall. It was previously recorded there in 2003, CJC. Between 1987 and 1999 *P. mitis* was only recorded from five other 10-km squares in Norfolk, four of which were in the east, v.c. 27 (Preston *et al.* 2002).

Away from the Ouse flood-plain *P. mitis* has occurred in three 10-km squares in v.c. 29 since 1987:

TL25 With *P. hydropiper* and *P. maculosa* in a sandy meadow with springs close to the county boundary, S. of Gamlingay, 232511, 9.9.1988, G. Crompton & R. Payne.* This site was searched by CJC on 25.10.2010; it was much overgrown with brambles (*Rubus fruticosus* agg.) and sallow (*Salix cinerea*) scrub.

TL29 Whittlesey Washes, 28-99-, 1.8.1993, G. Crompton, F.H. Perring & BSBI excursion.* This appears to be the only record for the Nene washes. It was not seen at Bassenhally Pits, 289983, in October 2010 by J. Graham.

TL44 Locally abundant with Grass-poly (*Lythrum hyssopifolia*) at the edge of abandoned arable just E. of Hoffer Brook W. of Whittlesford, 447485, 21.10.1958, D.E. Coombe & S.M. Walters.* The site was almost certainly a pingo, a clay depression of glacial origin where water would have lain in winter.

TL45 Around Cambridge, since C.C. Babington's first record for the county and an early record for Britain on 18.10.1836 and apart from further 19th-century records, there are a series of records from Sheep's Green (Coe Fen in Crompton 2001), around 446578, in 1913, 1942, 1943, 1958, 1987, 1988 and finally one plant on 19.9.1999, M. Gurney.* There was no sign of any annual Persicarias on either Sheep's Green (W. side of the River Cam) or Coe Fen (E. side) when searched by the author in September 2010. The brooks that flow through these riparian commons were largely choked with *Glyceria maxima* and Water-cress (*Nasturtium officinale sensu lato*) and there was little poaching by cattle.

There are also older records from the following squares:
TL39/49 Doddington, 1860, C.C. Babington.*
TL46 Plentiful on riverside below Waterbeach, 1860, C.C. Babington.*
TL57 Upware, 1860, C.C. Babington.* South Pit, Upware, 15.8.1912, C.E. Moss.*
TF40 Wisbech, 1860, C.C. Babington.*

Persicaria minor

This species is rare in Cambridgeshire. Historically it has been recorded in eight 10-km squares in v.c. 29 (in TL37 in 1975, perhaps incorrectly for P. mitis), but in only three in the period 1987–1999 (Crompton, 2001) and in only one (TL59) in 2010. Its recent occurrences have been sporadic and in small quantity.

TL29 Two plants on ditch spoil, with *P. hydropiper*, Bassenhally, close to the Nene Washes, 288988, 9.8.1980, A.C. Leslie.*
TL36 A few 'clumps', with *P. mitis* and *P. hydropiper*, just W. of High Causeway Bridge, Mare Fen, between Swavesey and Over, 366698, 2 & 9.9.1990, J.O. Mountford & G. Crompton.* Also recorded close by on Mare Fen, 366699, 23.8.1995, J.C.A. Rathmell.* The author could see no sign of it or any other annual Persicaria at the site, 5.9.2010; the ditches were choked with *Glyceria maxima* and there was little poaching by cattle.
TL48 Two plants on wet peat spoil, on the washes S.S.E. of Welches Dam, Ouse Washes, 472855, 5.8.1988, J.O. Mountford.*
TL58 A few plants on mud exposed by drawdown at the margin of a pool on the S.W. side of Pymore Railway Viaduct, Ouse Washes, 500886, 15.9.1973, CJC.*
TL59 a) Ouse Washes S.W. of the county boundary, v.c. 29, 516919, 5.9.1959, F.H. Perring.*

b) About 40 plants at the bottom of Mott's Legg (just on the Norfolk side of the county boundary, but in v.c. 29), 522924, 16.8.1993, T. Strudwick.*

c) Seven plants in a drying ditch with cattle-poached margins, S.W. of the Welney road in v.c. 29 but close to the boundary, 52579314, 21.8.2010, A.C. Leslie, CJC, M. Frisch, S. Hartley & N. Millar.

There are also older records from the following squares:
TL46 "Small creeping Arsmart. At the end of Water-Beach load, next to the Town, in the water", 1660, J. Ray.*
TL47 Ditches near the Old Bedford River near Sutton, 26.8.1911, C.E. Moss.*
TL48 Welches Dam to the 'Manea Engine', 1882 & 1884, A. Fryer.*

Conclusions

The River Ouse flood-plain in Cambridgeshire holds some strong populations of *P. mitis* and at six sites it has been known for between 18 to 61 years (Earith). It appears to have been lost, at least temporarily, from the Gamlingay site (last recorded 1988), Mare Fen, between Swavesey and Over (1990) and from Sheep's Green, Cambridge (1999). Being an annual, *P. mitis* requires wet, open ground created by prolonged flooding and a certain amount of disturbance, primarily by cattle-trampling. It is tolerant of partial shade, but is unable to compete with *Glyceria maxima* and other tall vegetation. The washlands of the River Ouse provide such conditions, especially where there are belts of willows. On the other hand, *P. mitis* seems to be rare at the Nene Washes. Indeed

P. hydropiper is also scarce there. The lack of prolonged flooding at the Nene Washes and thus few areas of sparsely vegetated wet mud may account for this difference. Though *P. mitis* often grows with *P. hydropiper*, it avoids the wetter sites such as the immediate river-bank. Both intensive grazing and under-grazing are unfavourable to *P. mitis*. *P. minor* remains a rare plant in Cambridgeshire and appears to be sporadic in its occurrence.

Acknowledgments

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Marsh Harriers (*Circus aeruginosus*) breeding near Cambridge

Bob Jarman

Abstract

Observations are given of the breeding behaviour of Marsh Harriers (*Circus aeruginosus*) near Cambridge. It is postulated that polygyny, polyandry and incest were breeding strategies used to establish a colony. Other observations include mutual feeding by the unsuccessful female in a polygynous relationship, theft of prey from an inexperienced male harrier by local Buzzards (*Buteo buteo*) and presenting a gift of nest material in anticipation of nesting in the following year.

Introduction

Marsh Harriers (*Circus aeruginosus)* now breed within a thirty minute cycle ride of Cambridge City centre in an area of wetland that probably marks the very southern tip of the former Fens (Rackham 1986). The site has not been identified

because nesters still steal clutches of rare breeding birds' eggs, especially raptors, although many readers of this paper will know the site.

Britain is at the north-western edge of this species' breeding range and nationally the Marsh Harrier is still an uncommon breeding bird. In the late 1960s there were only one or two breeding pairs in the tidal reed beds of the upper Humber estuary and in the early 1970s a pair regularly bred in the coastal reed beds at RSPB Minsmere, Suffolk (Clarke 1995). Clarke (1995) says that Marsh Harriers are the most susceptible of the harrier species to disturbance and will easily desert nests with eggs. A major factor in poor breeding success in the 1970s was disturbance by wild life photographers. There are now about 360 breeding pairs in the UK, mostly in the reed beds of East Anglia. In 2010 a pair bred for the first time in Cheshire (Anon 2010).

In Cambridgeshire the first breeding record in the twentieth century occurred in 1981 at Wicken Fen (Bircham 1989). By 2008 there were 21 paired females in Cambridgeshire at twelve sites, mostly on the Ouse and Nene Washes, successfully rearing a minimum of 16 young (Clark *et al* 2009). During the late summer of 2010 Marsh Harriers were reported from 24 Cambridgeshire localities (Poyser *et al* 2010a) and the highest locality count was nine pairs at Kingfisher's Bridge reserve located between the villages of Stretham and Wicken (Poyser *et al* 2010b).

Marsh Harriers are mainly summer visitors to their UK breeding sites although there are indications that more and more over-winter (Clark *et al* 2001 to 2009 incl.). This may be due to a succession of milder winters and the effects of global warming. Clarke (1995) says that: '*As the west European population has recovered there has been an increasing tendency for Marsh Harriers, mostly adult females and juveniles, to winter in a few places in north-western Europe.*' The wintering grounds of some British Marsh Harriers are West Africa; a young bird ringed in Cambridgeshire in 1985 was recovered six weeks later in Mauritania (Bircham 1981).

Marsh Harriers are not averse to over sea migration (Clarke 1995). In August 2010 the author observed an adult female on 24th August and a juvenile on 25th August flying purposefully south until well out of sight approximately two kilometres out to sea past Southwold, Suffolk; their determined flight into a strong southerly wind suggested migrants rather than local birds visiting the coast. The young disperse separately and there is no evidence that breeding pairs migrate together and remain together over winter (Clarke 1995).

At established sites Marsh Harriers are loosely colonial nesting species (Clarke 1995). The Kingfisher's Bridge site is a good example and at RSPB Lakenheath in 2010 a colony of 13 Marsh Harrier nests has become established since the reserve was opened in 1995 (David White *pers comm*). Several other migratory European birds of prey also nest colonially including Montagu's Harrier (*Circus pygargus*), which is now a very rare UK breeding bird, and three southern European migratory species: Lesser Kestrel (*Falco naumanni*), Red-footed Falcon (*Falco vespertinus*) and Eleonora's Falcon (*Falco eleonorae*).

This paper summarises the species breeding success at the site near Cambridge in 2009 and 2010 and observations made of its breeding behaviour in

2010. The site has two large reed beds; one that has been well established for over 50 years (approximately nine hectares) and a more recently established reed bed (approximately 20 hectares) that was an arable crop of Linseed about 10 years ago. Nests were established in this species' preferred breeding habitat - large reed beds dominated by Common Reed (*Phragmites australis*). In the newer reed bed Bearded Tits (*Panurus biarmicus*) were seen during the 2010 breeding season in addition to the usual reed bed species e.g. Reed Warblers (*Acrocephalus scirpaceus*), Sedge Warblers (*Acrocephalus schoenobanus*) and Water Rails (*Rallus aquaticus*). In addition six to eight singing male Grasshopper Warblers (*Locustella naevia*) can be heard there most years.

Marsh Harriers are often polygynous - males mate with more than one female - but usually only the first established nest succeeds (Clarke 1995); observations at this site in 2009 and 2010 indicated polygyny. Polygyny is known in nine out of 36 European raptors and Korpimaki (1988) predicted it is more common in nomadic birds of prey with annual pair bonds and weak territoriality such as Marsh Harriers than in resident birds of prey with longer term pair bonds and stronger territoriality. Clarke (1996) also says that Montagu's Harriers are also polyandrous (the females mate with more than one male).

In 2010 polygyny, polyandry and possibly incest were observed in breeding Marsh Harriers plus "muggings" by local breeding Buzzards and mutualism/altruism - the incubating female was fed by the unsuccessful female of the polygynous pairings.

Observations

Marsh Harriers have been regularly present at the site for the past four years. In 2009 the male was probably polygynous with two females; one nest was in the main reed bed and a possible second nest on the eastern edge of the fen towards the arable in a non reed bed location - the male was seen heading off in this direction with prey but the second nest site could not be confirmed. Four young were successfully reared from the main reed bed site in 2009; no other young birds were seen indicating that the second nest failed.

The Marsh Harriers were observed during the 2010 breeding season from their arrival on site at the end of March to the dispersal of most birds, including the young, in mid-September. The site was visited two to three times per week and the birds observed for one to three hours at each visit. The following account is a summary of the main observations.

The birds dispersed after breeding in 2009 although a female was seen over the winter of 2009/2010. The four birds seen on March 16th 2010 were probably the returning birds from 2009 (Heath 2010). By the beginning of April 2010 five birds were present:

1. An adult male.
2. Adult female 1 was very distinctive in flight as she had 3-4 missing tail feathers; she is referred to as "Tatty Tail".
3. Adult female 2 - had a distinctive cinnamon coloured upper tail (similar to a Long-legged Buzzard (*Buteo rufinus*)); referred to as "Rufous Tail".

4. A young second year male possibly one of the 2009 brood.
5. Female 3 - a very dark brown female possibly also one of the 2009 brood.

Throughout April the adult male was often seen displaying and aerial food passing to both adult females (Tatty Tail and Rufous Tail). The male was a very fine bird, in full breeding plumage at least five or six years old. He could be observed giving the "sky-dancing" display flight high above the fen, often so high up that he could only just be seen through x10 binoculars. By the end of the third week of April Tatty Tail was seen infrequently unless disturbed by the young male (bird 4 above) from a site in the main reed bed about 25 metres to the east of last year's successful nest. The young male would often land at the 2009 nest site suggesting a familiarity with his natal area and also at the new nest site in the presence of Tatty Tail.

Rufous Tail was often seen with the adult male over the newer reed-bed landing at a regular site but by the beginning of May nesting was uncertain. On May 13th the male dropped prey at this site - so it was assumed Rufous Tail was on a nest to receive the prey. The male bird was therefore polygamous servicing two females.

The behaviour of the young male was perplexing. In late April he would often fly around the main reed bed in the absence of the adult male, where Tatty Tail was suspected to have a nest and he frequently disturbed her. He would also land nearby at the 2009 nest site. In the first week of May, while the adult male was away displaying high over the second nest site, the young male was seen trying to make a food drop to Tatty Tail, often with Rufous Tail in attendance. He was so determined to make a food drop that on one occasion he almost dropped his kill to a passing Buzzard but pulled out at the last minute when he realised his error. The young male would frequently land at the main nest site when Tatty Tail was there.

On May 15th the young male flew in with prey and paraded with it over the main reed bed for 15 minutes. He appeared to be cueing up to make a food drop to Tatty Tail on the nest or call her up to make an aerial food pass as he flew low over the main reed bed nest site. He disappeared behind distant hedges then reappeared without his prey; immediately a Buzzard was seen flying away as fast as it could. It appeared that a Buzzard had mimicked the female's call and this inexperienced first year male had dropped his prey to the wrong species. He had been mugged! Then pandemonium broke out - three adult female harriers appeared squabbling in flight upsetting a perched Hobby (*Falco subbuteo*). One harrier was Tatty Tail. They quickly disappeared then two minutes later the young male was seen displaying over the newer reed bed nest site with Rufous Tail and a new female before the male landed at the suspected second nest site. This third adult female was a new bird to the site and was never seen again. The young male was seen to drop prey to a Buzzard on a second occasion.

If the eggs were laid at the main reed bed site early in the third week of April then it was calculated young Marsh Harriers would be flying by about June 15th. The author visited Woodwalton Fen and Strumpshaw Fen on June 14th and 15th respectively and saw a uniform dark chocolate-brown juvenile bird flying and

perched at both sites; the bird at Strumpshaw Fen was very active and adept and looked as though it had been flying for several days.

On the evening of June 18th three Marsh Harriers were seen: the male, now with worn and probably moulting plumage, Rufous Tail and the young darker brown female (female 3) - no young birds were seen. The behaviour of Rufous Tail suggested that the second nest in the newer reed bed had failed.

On June 20th the birds were watched for several hours. It was difficult to interpret their interactions. All the activity was taking place over the main reed bed; there was no activity over the suspected second nest site. Two females (Rufous Tail and probably female 3) were sitting about in bushes in addition to Tatty Tail who was attending the nest site in the main reed bed. At mid-day during a 20 minute period the adult male brought in four prey items (small mice or voles). The first he dropped behind bushes which was collected by a very dark bird. This bird was seen very briefly and was probably the first sight of one of the young from the main nest. The second he dropped into the nest site in the main reed bed to Tatty Tail. The third he passed aerially to Rufous Tail, who in turn dropped it to Tatty Tail in the main nest.

At one stage there were seven birds flying in the air together: the five birds mentioned above plus two very dark chocolate brown coloured birds with very creamy pale caps. This was confirmation that at least two young birds had fledged.

On June 27th three young birds were seen. Young Marsh Harriers are quite easy to identify - their plumage is uniformly dark chocolate brown except for a coffee-cream coloured cap on the head in most, but not all, young birds.

On the July 1st Rufous Tail flew over the main nest site with prey, calling as if to pass the prey she was holding. Two young birds flew up expecting a food pass but she refused. This teasing went on for 20 minutes and eventually the young gave up and she landed some way away. A few minutes later the adult male arrived and dropped prey to one of the young who was calling from the ground; two minutes later the young male arrived with prey and dropped it to Tatty Tail on the nest; Rufous Tail began parading over the main nest site again with prey but was no longer calling to attract the young birds.

On July 4th the birds were watched for three hours. At mid-day Tatty Tail arrived over the main nest site carrying a large clump of moss; the adult male was nowhere to be seen but the young male was in attendance over the nest site. One young bird flew up expecting an offer of food from an aerial exchange but was disappointed; Rufous Tail was also present. Tatty Tail appeared to have a "gift" of nest material, which, in the absence of the adult male but in the conspicuous presence of the young male appeared intended to impress him. This may have been in anticipation of a breeding relationship in 2011.

By the middle of July all three young birds were competent flyers even in force 6-7 westerly winds. They no longer sat around waiting for their parents to deliver food to them and often went hunting on their own but always within the boundary of the main reed bed. On one occasion the adult male arrived with prey and attempted to pass it aerially to the three young birds - each missed it and it fell to the ground. From wing shape alone the young appeared to be two

females and a male. On one occasion Rufous Tail was seen to arrive with prey and drop it to the young birds and on another she arrived calling as if to offer prey to the young who flew up to her but she had none to give. The young male was often seen in the distance but made no interaction with the young birds or Rufous Tail; the adult male, however, was often seen to interact with and respond to Rufous Tail.

On July 21st one of the juveniles was seen hunting alone over winter barley stubble approximately 3.5 km from the nest site. On August 15th only the adult male and two young were seen and on three consecutive visits from September 19th to September 21st only the adult male and possibly Rufous Tail were seen - the young birds and their mother, Tatty Tail, had gone.

Discussion

Observations indicated the adult male was in a polygynous relationship with two females: Tatty Tail and Rufous Tail. Observations also suggested that the nest was occupied by Tatty Tail in the main reed bed about 25 metres away from the previous years successful nest and that she was the first to lay eggs. The 2009 nest was not reused (probably a strategy to avoid residual parasitic ticks and flies).

Whilst Tatty Tail was incubating eggs at the main reed bed nest the adult male was displaying to Rufous Tail over the newer reed bed and egg-laying here probably took place two weeks later. The second nest failed early on during incubation, probably from predation, and Rufous Tail abandoned this site. Clarke (1995) says that polygyny is common in Marsh Harriers but usually only the first established nest survives unless large items of prey such as wild fowl are available (Němečkova *et al* 2008). All the prey items seen being carried by all the birds appeared small - probably either field mice or voles.

The behaviour of the young male was most interesting. His plumage indicated he was in his second year (Svensson *et al* 2009); he clearly had the "shadow" pattern of male plumage especially on the under-wing - he was one year old. His familiarity with the site, especially his proclivity to land and possibly roost at last years nest site, suggested he had returned to his natal home. Being a second year returning bird suggested that he had over-wintered in 2009/2010 either locally or perhaps in nearby continental Europe. Most migratory large birds of prey that winter in West Africa usually return when two to three years old (Clarke 1995).

From her plumage Tatty Tail was a mature female, at least four to five years old; her behaviour indicated she was familiar with the site and established a nest with the adult male about 25m away from the 2009 nest site where four young birds were successfully reared. The author suspects that Tatty Tail was the returned female from 2009 and the adult male was also a returnee from 2009; together they may have both been the parents of the previous years young including the young male seen frequently in 2010.

Throughout the early breeding period, when the adult male was away hunting, the young male would fly over the main reed bed nest site and often land when Tatty Tail was on the nest. He was seen to present her with food by

dropping it on the nest site itself, always when the adult male was away but never by an aerial food pass. It was strongly suspected that Tatty Tail was the mother of this young male. His relationship with his probable mother was discreet and never in full view of the adult male. Later during the season when the young had fledged Tatty Tail was suspected of bringing this young male (her probable offspring) a gift of mossy nest lining.

In addition the young male provided additional support feeding the young despite showing his inexperience and being "mugged" by local Buzzards.

The conclusion was that this was a sexual relationship and that the young male (who may have been her son) did form a partnership with Tatty Tail as a mated pair. Marsh Harriers are often polygynous (Clark 1995) and Montagu's Harriers are occasionally polyandrous but no account could be found of polyandry in Marsh Harriers. Davies and Hatchwell (1992) discovered variable mating systems to increase reproductive success in Dunnocks (*Prunella modularis*) from observations made in the Cambridge Botanic Gardens and that differences in reproductive success were caused by differences in male help.

However, not only did their behaviour suggest polyandry it also suggested an incestuous relationship. The young male's behaviour and delivery of food to his putative mother suggested a breeding pair bond. The unattached female 3, also a probable product of last year's successful brood, showed no close sibling relationship to her mother or the adult male, her suspected father.

In addition, when Rufous Tail's nest failed she appeared to work together with the adult male and the young male to supply food to Tatty Tail during incubation. There was clearly an altruistic/mutualistic response with three birds supplying the one incubating harrier with food on the nest. Female 3 did not appear to participate in this shared feeding.

Marsh Harriers disperse and migrate separately after breeding and mortality can be up to 50% (Ferguson-Lees and Christie 2001). It is possible that sibling recognition does not happen when birds return to breed at a previously successful site. It is possible that, for a colonial species at a recently colonised breeding site. in order to build up numbers and guarantee future breeding success, polygyny, polyandry and even incest, despite its genetic risks, are breeding strategies. The species priority is to build up numbers so that a colony can become established. Unsuccessful females and other males also help towards establishing the colony by assisting in feeding incubating females within the same polygynous and polyandrous relationships.

Conclusions

1. Marsh Harriers (*Circus aeruginosus)* are colonial species and at newly established breeding sites the breeding imperative of this species is to build up numbers to form and consolidate a nesting colony.
2. Breeding strategies to build up a colony may include polygyny, polyandry and incest. Once a colony is established then polygyny becomes the norm.
3. Young males in polyandrous relationships may provide additional support feeding the incubating female and young.

4. Unsuccessful females in polygynous relationships may contribute to the breeding success of incubating females, within the same polygynous relationship, by providing food to the incubating female and young.
5. As soon as the young are fledged and more independent, potential breeding relationships are consolidated and established in anticipation of the next breeding season should the same birds return.

The author's conclusions are based upon observed behaviours only. A more complete picture could be obtained by molecular analysis of individuals. However, this is a protected species that is very sensitive to disturbance and any collection of feathers, pellets etc should only take place from roost sites. At present Marsh Harriers do not over-winter in numbers or roost at the site.

The author would be grateful to hear from anyone who has observations of these birds to further unravel their relationships: bob.jarman@tiscali.co.uk.

References

Roger Clarke's excellent monographs on the Montagu's Harrier and Marsh Harrier are both out of print but can be purchased second-hand. Roger was Chair of the Cambridgeshire Bird Club before his untimely death in January 2007. Roger was by profession an accountant who became a world authority on the genus *Circus* and other species of raptors.

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The role of road traffic in the near extinction of Common Toads (*Bufo bufo*) in Ramsey and Bury

Arnold Cooke

Since the 1980s, Common Toads (*Bufo bufo*) have decreased over much of central, southern and eastern England (Hilton-Brown & Oldham, 1991; Carrier & Beebee, 2003). Cooke & Sparks (2004) studied three declining toad populations in Ramsey and Bury in Cambridgeshire, and concluded that road traffic had contributed by killing migrating adults. It was further suggested that unsustainable mortality on roads might be a factor contributing to declines of Common Toads more generally. This suggestion was supported by detailed fieldwork on various anuran species in Canada (Fahrig *et al.,* 1995) and Denmark (Hels & Buchwald, 2001).

Throughout the period of these population declines in England, there has been widespread concern about toads being killed on roads, and volunteers have carried them across many roads at times of peak migration (Langton, 1989, 2002). In Cambridgeshire, we have a particularly well-known, large scale initiative at Madingley that was started in 1988 (Seale, 2010). Despite the concern about road mortality, losses have usually been viewed as sustainable as regards conservation of populations (e.g. Gittins, 1983; Beebee & Griffiths, 2000). If levels of road traffic continue to increase, however, losses may eventually become unsustainable. Numbers of toads being killed are likely to increase in a situation where both a toad population and its local environment remain unchanged, apart from an increase in road traffic. Once losses become unsustainable, the population will decrease and so will numbers killed (Cooke & Sparks, 2004).

Study sites and methods

The toad breeding sites are in Ramsey and its attached village of Bury. Three principal ponds have been used by toads: Bury Pond (TL 282843), Field Road Pond (TL 283856) and Horse Pond (TL 292852). Each pond is about 1 km from the other two, and each is a traditional site that has held breeding toads for many years.

During the toad breeding season, brief daytime visits were made on most days to check when peak numbers of casualties appeared to occur. Then counts of casualties were made on foot during daylight on 12 nearby roads (see Table 1 for road names). If further significant mortality was noted, counts were repeated and the highest figure for each site was used for that year. This peak count will include an unknown proportion of the toads killed that year. Although avian scavengers such as Carrion Crow (*Corvus corone*) and Magpie (*Pica pica*) were rare in the area during the study period, casualties will have been lost before being counted due to factors such as wet weather and scavenging by mammals. Other toads will have been killed after the count was made, but road mortality on the return migration did not result in a marked increase in casualties. The

objective was not to count every casualty but to record systematically so that long-term trends in counts might reflect trends in total numbers killed. Casualties have been counted each year since 1990 on roads around Bury Pond, since 1984 beside Horse Pond and since 1974 at Field Road. This article is primarily concerned with the recent marked declines and focuses on the period 1990-2010.

Table 1. Traffic counts for the 12 roads, March 2004 and mean proportional annual change in road casualties, 1990-2004. Mean number of vehicles per 15 minute period is based on seven counts, one on each night of the week.

Road	Designation	Pond site	Vehicles per 15 minutes (mean ± SE)	Vehicles per hour	Proportional annual change in casualty counts
Field Rd	-	Field Rd	32.9 ± 2.5	131	-0.148
St Marys Rd	B 1040	Field Rd	32.1 ± 5.1	129	-0.097
Princes St	-	Field Rd	4.4 ± 0.8	18	-0.055
Star Lane	-	Field Rd	4.4 ± 1.4	18	-0.064
Station Rd	-	Field Rd	8.6 ± 1.2	34	-0.083
Ramsey Rd	B 1040	Bury	98.7 ± 11.1	395	-0.157
Grenfell Rd	-	Bury	10.7 ± 1.9	43	-0.105
The Malting	-	Bury	9.6 ± 2.6	38	-0.113
Upwood Rd	-	Bury	47.0 ± 6.1	188	-0.107
Biggin Lane	-	Bury	15.9 ± 2.3	63	-0.098
Brand Close	-	Bury	1.6 ± 0.4	6	+0.075
Wood Lane	B 1096	Horse	22.3 ± 3.9	89	-0.062

Observations on toads breeding in Bury Pond have been undertaken routinely since 1990 (Cooke, 2000), with daytime counts of adults being made during the breeding season every year. Observing events in Horse Pond was difficult because of the typically high turbidity of the water, but night counts of adult toads were undertaken in 2004 for comparison with earlier counts. No counts of adults were made in Field Road Pond because of very restricted access to the banks.

Between 5th and 27th March 2004, traffic data of relevance to toad migration was collected on the 12 roads. Between one hour after sunset and 22.00 hours, seven 15 minute censuses were undertaken on each road, with one on each night of the week. In 2004, the main toad migration occurred on the nights of 14th and 15th March. The amount of traffic on each of the roads relative to the others probably changed little during 1990-2004, so the 2004 data are used to reflect relative traffic intensities during that period. However, it is likely that road traffic has increased on all roads since 1990. An increase of 11% in the number of vehicles using the B1040 to the south of Bury was recorded between 1992 and 2002 (Cambridgeshire County Council, 2002).

Results and observations

At Bury Pond, casualty counts decreased between 1990 and 2010 (Figure 1, correlation coefficient $r_{19} = -0.660$, $P < 0.01$), as did counts of live toads in the water ($r_{19} = -0.789$, $P < 0.001$), and the two counts were also correlated ($r_{19} = 0.836$, $P < 0.001$). Live counts were zero from 2007 onwards. As declines in casualty counts at Bury Pond were synchronous with those at Field Road Pond (Figure 1, $r_{19} = 0.789$, $P < 0.001$) and Horse Pond ($r_{19} = 0.886$, $P < 0.001$), it seems reasonable to conclude that toad numbers decreased at all three sites during this period. This is supported by four night-time counts of live toads at Horse Pond: 145 in 1990, 262 in 1991 and zero twice in 2004. The combined total of casualty counts for the three sites decreased from a peak of 482 in 1991 to a single toad in 2010 (Figure 1). Four dead toads were noticed on other roads in Ramsey in March 2010.

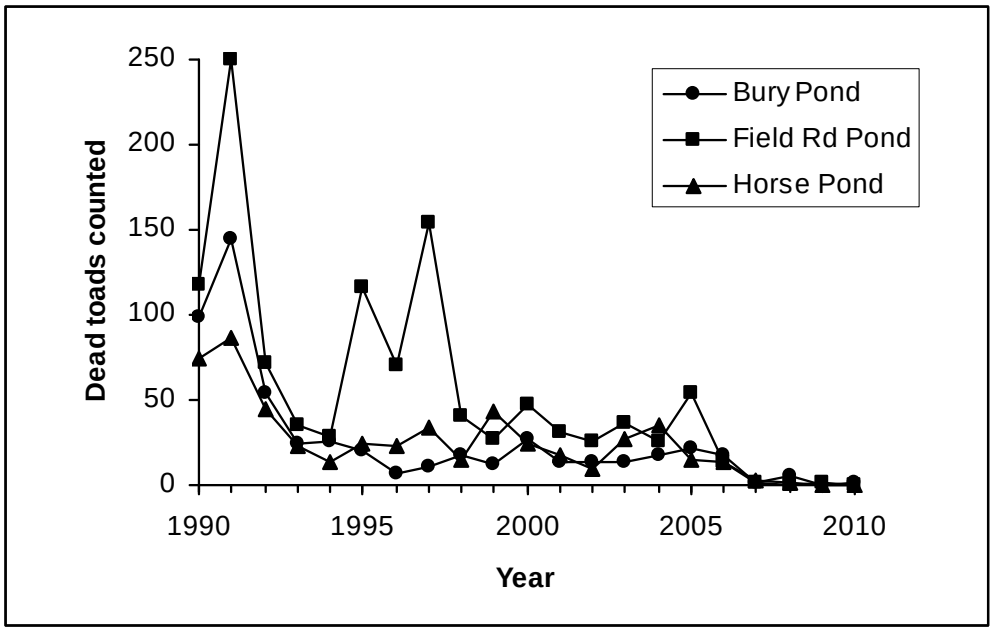

Figure 1. Casualty counts of toads on roads around the three ponds, 1990-2010.

Traffic census information is summarised in Table 1 as the average number of vehicles per hour. Lorries and similar-sized vehicles comprised only 0.5% of the traffic, so are not separated from smaller vehicles in the table. Motor cycles were not counted. The three B class roads and Upwood Road are the main roads into and out of the area. These four, together with Field Road, carried the greatest volumes of traffic. Field Road is one of Ramsey's busiest domestic roads. Traffic flow varied through the week (chi-squared = 81.0, d.f. = 6, $P < 0.001$) with the following total numbers of vehicles being counted during the 15 minute censuses on the 12 roads: Monday 273, Tuesday 300, Wednesday 289, Thursday 332, Friday 379, Saturday 267 and Sunday 177. Friday, the night with the most traffic, was more than twice as busy as Sunday, the night with the least activity.

Also included in Table 1 is the proportional annual change in casualty counts for each road, 1990-2004, calculated as in Cooke & Sparks (2004). There was a negative relationship between this measure and traffic flow rate for the 12 roads (Spearman rank correlation coefficient $r_s = -0.747$, $P < 0.01$), i.e. the rate of decrease in casualties tended to be greater on a road with more traffic.

Discussion

Numbers of toads counted dead or alive have been much reduced in Ramsey and Bury over the last 20 years. This article takes the story on another seven years from the data presented by Cooke & Sparks (2004). During this time, the situation has continued to worsen. Combined casualty counts at the three sites have not exceeded 10 since 2006. That a few casualties can still be found indicates limited breeding locally. Small numbers of toads still use the Field Road pond, but apparently remain close to it throughout the year and do not cross the roads (Peter Fearn, pers. comm.). It is possible that some toads migrate in from sites in the wider countryside (Cooke & Sparks, 2004; Cooke & Cooke, 2008).

Why then have toad numbers declined when all three breeding ponds are protected in different ways (Bury Pond is a Wildlife Trust reserve, Horse Pond is in a conservation area and the Field Road Pond is in private ownership)? Cooke & Sparks (2004) considered that although other factors were also implicated, such as loss and modification of previously suitable terrestrial habitat, unsustainable road mortality made a major contribution. Reasons for suspecting road mortality included:

- the pattern of casualties at the Field Road site since 1974 was consistent with increases in casualties as road traffic increased, until losses became unsustainable in the 1980s and casualty numbers came down reflecting a decreasing population;
- the model of Hels & Buchwald (2001) indicated that the probability of a toad being killed during a single crossing of Ramsey Road, Bury might be as high as 0.67;
- there was evidence that direction of migration was being modified with relatively fewer dead toads being found in later years on the busier roads.

This paper reports traffic flow rates on nearby roads in March 2004 during the toad migration season. A relationship was found between the rate of change of casualty counts and traffic intensity suggesting that the busier roads had a greater impact on numbers migrating. However, data for the 12 roads were not independent as what happened on one road may have affected what happened on others around the same pond. Moreover, in some situations toads had to cross more than one road to reach their pond. Nevertheless, adult toads can have a tendency to migrate to and from a breeding pond in a certain direction (Heusser, 1969; Haapanen, 1974; Latham, 1997; Oldham, 1999), and the observed relationship provides some support for the conclusion that road traffic had an appreciable impact. It should also be pointed out that a reduction in the number of toads migrating across a road does not necessarily mean that the breeding

population will be reduced as a consequence (e.g. see Oldham & Swan, 1991; Young & Beebee 2002). A population reduction is though more likely to occur if a pond is surrounded by roads. This is the situation at Bury Pond while the Field Road pond has roads on three sides and Horse Pond on two sides.

Whether overall losses on all roads are unsustainable is a more important conservation consideration than impact on just the busiest road. Numbers of road casualties have now decreased to virtually zero and it no longer seems worth continuing with the counting. Could, then, more have been done to prevent losses on the roads? The local Wildlife Trust first organised volunteers to carry toads across roads in Ramsey and Bury in 1987. This was initiated because of concern for individual toads, not because of concern for the population. By the mid 1990s very few volunteers remained, most having been deterred by the decreasing numbers of live migrant toads. Casualty numbers were not, however, particularly low in the mid 1990s, especially when compared with 1970s data from Field Road (Cooke & Sparks, 2004). In other words, the feeling was that toad lifting was not as productive as it had been. Concern for the populations did not start to materialise until several years later. With hindsight, the toad lifting operation should have been intensified when numbers began to fall away. Realisation that a population might be adversely affected by road traffic could stimulate more people to take part and help retain their commitment for longer.

This study in Ramsey and Bury appears to be the first to draw attention to the fact that the night of the week on which migration mainly occurs may also be important. Hels & Buchwald (2001) modelled the probability of a Common Toad being killed as a function of traffic intensity, taking into account observed diurnal variations in toad activity and traffic. Using their model, an increase in local traffic between Sunday and Friday nights could approximately double the number of dead toads. Local information such as this can help make volunteer patrols more effective.

Fahrig *et al.* (1995) reported fewer live or dead toads on roads with higher rates of traffic flow near Ottawa. Their observations were consistent with situations where road mortality had already considerably modified distribution and abundance. In western Cambridgeshire, the Common Toad has decreased in numbers over the last twenty years or so, and road mortality has probably contributed significantly. Widespread population declines of the Common Toad in Britain during the 1950s and 1960s were mainly caused by loss or modification of habitat (Cooke, 1972). Declines slowed in the 1970s (Cooke & Scorgie, 1983), but have become more obvious again since the 1980s in parts of central and southern England (Hilton-Brown & Oldham, 1991; Carrier & Beebee, 2003). This follow-up to the study of Cooke & Sparks (2004) does nothing to dispel concern that unsustainable road mortality may have contributed to this later wave of declines. If it can be a factor in this unremarkable rural area, then it can be a factor elsewhere.

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Tower Cress (Arabis turrita L.) – a Cambridge speciality

Philip H. Oswald

Introduction

Certain plants with no firm claim to be part of the British flora found their way into Floras in the 18th and 19th centuries and, having once been accepted, have then been retained in later ones as if they were honorary members of our flora. An example of special interest in Cambridgeshire is the central and southern European crucifer, Tower Cress (*Arabis turrita* L.). In its native range this is typically a plant of shady banks, often on limestone. I myself have seen it on a wooded roadside in the foothills of the Alpes Maritimes in France and, in February of this year, on a traditional mule-track on the monastic peninsula of Mount Athos in Greece. In Cambridge it has always been a plant of old walls.

When in flower this is a typical crucifer, with a raceme of four-petalled flowers, in this case cream-coloured (see photograph on the front cover); the leaves, both those of the basal rosettes and the clasping stem-leaves, are of a rather greyish green with short dense stellate hairs, but the really distinctive feature is the long narrow seed-pods (siliquae) up to 12 cm in length, all twisted to one side and curving downwards from more or less erect stalks (see Plate 1, inside front cover).

The status of *Arabis turrita* is described as follows by Clapham *et al.* (1987), with explanatory additions: "Introduced. Naturalized on old walls at Cambridge and formerly at Oxford [see Sibthorp, 1794] and Cleish Castle, Kinross ["at least during the years 1836–45": Walters, 1950]. Native in C. and S. Europe, Asia Minor and Algeria." Stace (1997) describes it thus: "Tufted biennial or perennial; stems erect, to 70cm, pubescent; basal leaves sinuate-toothed; flowers numerous; petals pale yellow; (2n=16). Intrd; on old walls; Cambridge, formerly elsewhere; Europe." The long fruits are mentioned in his key to the genus. Rich (1991) provides only a very brief description and no illustration but includes a map with 12 dots in the south-east and midlands of England and one in Scotland (at Cleish) but only two of them post-1949. Clement & Foster (1994) say: "An early garden escape, established since 1722 on old walls of St John's College grounds at Cambridge (Cambs); also a grain casual." Even Poland & Clement (2009) include it in their recent vegetative key.

Johnson (1633) included a description and a figure labelled "*Turritis major.* Great Tower Mustard." in his edition of Gerarde's *Herball* (reproduced by Walters 1950). He wrote of it that it was "a stranger with vs; yet I am deceiued if I haue not seene it growing in M. *Parkinsons* garden." However John Parkinson himself does not mention the plant in either of his two great works. A modern painting of the plant can be seen in Blamey & Grey-Wilson (1989) and good line drawings in Clapham *et al.* (1957) and Clement *et al.* (2005); all of these show the long curved siliquae well.

Early history in Cambridge

The first record of *Arabis turrita* in Cambridge dates from 28 June 1722,

when Samuel Dale wrote on page 2 of his first manuscript *Iter cantabrigiense* (now in Cambridge University Library): "At Cambridge I mett with Mr Andrews, …. On the walls of Trinity College we found a sort of Leucoium[†] called by Clus[ius] Turritis major." (Perring *et al.*, 1964; Crompton, 2001). Some information about Joseph Andrews (1688–1764), an apothecary of Sudbury, and Samuel Dale (1659?–1739) is given by Boulger & Britten (1918). A specimen of Dale's survives in his herbarium in the Natural History Museum (BM), labelled, apparently in his own handwriting, "Mr. Jos. Andrew shewed me this An^{o}. 1722. growing on the Garden Walls of Trinity College Cambridge." (Walters, 1950; Crompton, 2001). There is no specimen in Andrews' own herbarium, also in the Natural History Museum. Walters (1950) points out that John Ray clearly did not know this plant in his own college, so it is almost certain that it did not grow there in his time (1660, 1663).

John Martyn, the second Cambridge Professor of Botany, recorded *Arabis turrita* "on Trinity and St John's College walls" (Lyons, 1763), and thereafter there were numerous records, as listed by Crompton (2001). Professor John Stevens Henslow also recorded the plant from these two colleges, and in the Cambridge University Herbarium (CGE) there are specimens of his and C.C. Babington's labelled "Cambridge" and dated from 1823 to 1833. Some records and herbarium specimens give a clearer picture of the distribution of the plant in the first half of the 19th century: "From top of wall behind St John's Coll:"; "Walls of Trinity College Library"; "Walls in the lane between Trinity & St. John's, & on the ledges of the buildings near St John's Old Bridge"; "Old Gateway at St John's College Cambridge" (Crompton, 2001). In his Flora of 1860 C.C. Babington wrote: "Introduced since the time of Ray. … 1. Old walls about Trinity and St John's Colleges, less abundant now than formerly, owing to recent repairs. – 3. Lately established near the brook in the walks of St John's College." The numbers 1 and 3 here relate to Babington's "districts", the former being east of the river and the latter west. It seems that *Arabis turrita* was lost from the east side before the end of the 19th century, but the position is not clear since, surprisingly, Crompton (2001) did not trace any records between 1860 and 1906.

The 20th and 21st centuries

Thereafter the records are probably all from the extant site on the east side of the western boundary wall of St John's College Wilderness, where Walters (1950) thought that Babington, "concerned at the loss of most of the suitable habitats for the plant and its consequent decline", deliberately "established" it on "a comparatively recently built wall". A record by A.J. Crosfield on 3 December 1918 mentions "about 20 plants of it now" and one by James A. Whellan on 12 August 1945 "about 20 stems in two colonies, fruiting" (Crompton, 2001). I myself as an undergraduate recorded the plant on this wall "on either side of a

[†] Literally "White violet" in Greek, a name now applied to the snowflakes, close relatives of the snowdrops (*Galanthus* spp.), but a pre-Linnaean name for Wallflower (*Erysimum cheiri* (L.) Crantz).

small tool shed" on 6 June 1952, 27 April 1953 and 2 May 1954, and Gigi Crompton recorded 48 flowering plants in these two sites on 10 May 1976. Her "old tool shed" has been replaced by a substantial maintenance building; the main colony of *Arabis turrita* grows on a sloping ledge on the stretch of wall immediately south of this, but there are also two clumps behind the building. James Cadbury tells me that he found 18 plants in the former site and four small ones in the latter on 2 April last year. I visited the site and photographed the plants this year on 9 February, 4 April and 2 May; the speed with which the racemes had developed to fruiting stage between the last two visits was remarkable. On the most recent occasion I counted 20 fruiting racemes, seven of them springing from the base of larger ones, south of the building, and five fruiting racemes, one substantial but three of them subsidiary, behind it. The tallest was just over a metre in height.

Acknowledgments

I am grateful to Oliver Rackham for suggesting this article and to James Cadbury for his observations on 2 April 2010. I congratulate the relevant authorities at St John's College on the care that they have exercised to ensure the survival of this historic Cambridge speciality on their property.

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Hemiptera of Coe Fen and Sheep's Green, Cambridge

Alvin Helden

Introduction

During the 2nd and 3rd July 2010 a BioBlitz event was held at Coe Fen (TL448573) near the centre of Cambridge. The BioBlitz was one of many similar events throughout the UK, with the aim of recording as many species of plants and animals at a specific location within a 24-hour period (1300 on the first day to 1300 the following day). The Cambridge event was organised by the University of Cambridge Museum of Zoology. On the days of the BioBlitz 40 species of Hemiptera were identified (BioBlitz Cambridge 2010 species list, 2010). However a number of further species were identified subsequently and a rather more complete list of species is reported here.

Method

Although the BioBlitz event was aimed at Coe Fen, it also included surveying of part of Sheep's Green (TL447574). Hemiptera recorded were from the Heteroptera and the Homoptera (Cicadomorpha and Psylloidea). Some species could be easily identified in the field and were recorded without collecting specimens. However for most species specimens were collected using three techniques: tree beating, sweep netting and suction sampling using a Vortis suction sampler (Arnold, 1994). A range of trees and grassland sub-habitats was sampled, as were patches of Nettle (*Urtica dioica*), with the aim of collecting a range of Hemiptera species.

Results and Discussion

A total of 62 species was recorded through observation and the collection of specimens on 2nd July 2010. The species came from six different families of Heteroptera, two families of Cicadomorpha and one family of Psylloidea. Table 1 lists the species recorded according to major habitat type: trees, Nettles and grassland.

The species found were typical of those that might be expected in urban and semi-urban southern English locations (Helden & Leather, 2005). The number of species recorded reflects the short timescale of sampling available during the BioBlitz event. While nonetheless an interesting snapshot of the Hemiptera

Table 1. Hemiptera species found on a) trees, b) *Urtica dioica* and c) grassland at Coe Fen (CF) and Sheeps Green (SG) during the BioBlitz event on 2nd July 2010.

Family	Species	No. & sex	Host plant	
a) Species found on trees				
Heteroptera: Acanthosomatidae	*Acanthosoma haemorrhoidale* (L.)	1♀, 1♂	*Crataegus monogyna*	SG
Heteroptera: Anthocoridae	*Anthocoris nemoralis* Fabricius	1♀	*Salix alba*	CF
	Anthocoris nemorum (L.)	1♂	*Salix alba*	SG
Heteroptera: Miridae	*Atractotomus mali (*Meyer-Dür*)*	1♂	*Crataegus monogyna*	SG
	Campyloneura virgula (Herrich-Schäffer)	1♀	*Crataegus monogyna*	SG
		1♀	*Fraxinus excelsior*	CF
	Deraeocoris flavilinea (A. Costa)	2♂♂	*Salix alba*	CF
		1♂	*Alnus glutinosa*	SG
	Orthotylus marginalis Reuter	1♀, 2♂♂	*Salix alba*	CF
	Orthotylus ochrotrichus Fieber	2♂♂	*Salix alba*	CF
	Orthotylus viridinervis (Kirschbaum)	1♂	*Ulmus* sp.	CF
	Phytocoris tiliae (Fabricius)	1♂	*Alnus glutinosa*	SG
	Pinalitus cervinus (Herrich-Schäffer)	1♂	*Fraxinus excelsior*	CF
	Psallus ambiguus (Fallén)	3♂♂	*Salix alba*	CF
	Psallus flavellus Stichel	1♂	*Fraxinus excelsior*	CF
	Psallus lepidus (Fieber)	1♂	*Fraxinus excelsior*	CF
Heteroptera: Lygaeidae	*Kleidocerys resedae* (Panzer)	2♀♀, 1♂	*Alnus glutinosa*	SG
Heteroptera: Pentatomidae	*Pentatoma rufipes* (L.)	1	*Ulmus* sp.	CF
Homoptera: Cicadellidae	*Alnetoidia alneti* (Dahlbom)	9♀♀, 3♂♂	*Alnus glutinosa*	SG
		1♂	*Salix alba*	CF
	Empoasca vitis (Göthe)	1♂	*Salix fragilis*	SG
	Eupterycyba jucunda (Herrich-Schäffer)	Nymph	*Alnus glutinosa*	SG
	Idiocerus stigmaticalis Lewis	1♀	*Salix alba*	CF
		2♀♀, 1♂	*Salix fragilis*	SG
	Kybos butleri (Edwards)	1♂	*Salix sp.*	CF
	Kybos virgator (Ribaut)	1♂	*Salix fragilis*	SG
	Macropsis infuscata (J. Sahlberg)	1♀, 1♂	*Salix alba*	CF
	Ribautiana ulmi (L.)	4♀♀, 1♂	*Ulmus* sp.	CF
	Tremulicerus vitreus (Fabricius)	1♀, 1♂	*Populus nigra* 'Italica'	SG
Psylloidea: Psyllidae	*Psylla alni* (L.)	2♂♂	*Alnus glutinosa*	SG

b). Species found on *Urtica dioica*				
Heteroptera: Anthocoridae	*Anthocoris nemorum* (L.)	1♂	*Urtica dioica*	SG
Heteroptera: Miridae	*Calocoris stysi* Wagner	1♂	*Urtica dioica*	SG
	Heterotoma planicornis (Pallas)		*Urtica dioica*	SG
	Liocoris tripustulatus (Fabricius)	2♀♀, 1♂	*Urtica dioica*	SG
	Lygocoris pabulinus (L.)	3♂♂	*Urtica dioica*	SG
	Plagiognathus arbustorum (Fabricius)	2♀♀	*Urtica dioica*	CF
		2♀♀, 1♂	*Urtica dioica*	SG
Heteroptera: Lygaeidae	*Heterogaster urticae* (Fabricius)	2♀♀, 1♂	*Urtica dioica*	SG
	Scolopostethus thomsoni Reuter	2♀♀	*Urtica dioica*	SG
Homoptera: Cicadellidae	*Eupteryx aurata* (L.)	1♀	*Urtica dioica*	SG
	Eupteryx urticae (Fabricius)	3♀♀, 2♂♂	*Urtica dioica*	SG
c). Species found in grassland				
Heteroptera: Miridae	*Amblytylus nasutus* (Kirschbaum)	2♀♀, 2♂♂	grassland	CF
		1♀, 1♂	grassland	SG
	Capsus ater (L.)	1♂	*Juncus*/grassland	CF
		1♂	grassland	SG
	Halictus saltator (Geoffroy)	1♀	grassland	CF
	Leptopterna dolobrata (L.)	1♀, 1♂	grassland	CF
	Lygocoris spinolae (Meyer-Dür)	1♂	grassland	CF
	Megaloceroea recticornis (Geoffroy)	2♂♂	grassland	CF
	Notostira elongata (Geoffroy)	1♀	*Juncus*/grassland	CF
		1♂	grassland	CF
	Orthops basalis (A. Costa)	1♂	grassland	CF
	Pithanus maerkelii (Herrich-Schäffer)	1♀	grassland	CF
	Plagiognathus arbustorum (Fabricius)	2♀♀	grassland	CF
	Plagiognathus chrysanthemi (Wolff)	1♂	grassland	CF
	Stenodema calcarata (Fallén)	1♀	grassland	CF
		1♀	*Juncus*/grassland	CF
	Stenotus binotatus (Fabricius)	2♀♀, 1♂	grassland	CF
		2♀♀, 1♂	grassland	SG
Heteroptera: Lygaeidae	*Cymus melanocephalus* Fieber	3♀♀, 2♂♂	*Juncus*/grassland	CF
Heteroptera: Nabidae	*Nabis flavomarginatus* Dahlbom	1♂	grassland	CF
	Nabis limbatus Dahlbom	1♀, 1♂	grassland	CF
Homoptera: Cercopidae	*Neophilaenus lineatus* (L.)	1♀	grassland	SG
	Philaenus spumarius (L.)		grassland	CF
Homoptera: Cicadellidae	*Allygus mixtus* (Fabricius)	1♂	grassland	CF
	Anoscopus serratulae (Fabricius)	1♂	grassland	CF

Homoptera Cicadellidae (cont'd)	*Aphrodes makarovi* Zachvatkin	5♂♂	grassland	CF
	Arthaldeus pascuellus (Fallén)	3♀♀	grassland	CF
	Cicadula persimilis (Edwards)	2♀♀	grassland	CF
	Cicadula quadrinotata (Fabricius)	1♂	grassland	CF
	Cosmotettix caudatus (Flor)	1♀	grassland	CF
	Eupteryx urticae (Fabricius)	1♀	grassland	CF
	Euscelis incisus (Kirschbaum)	4♀♀, 4♂♂	grassland	CF
	Streptanus sordidus (Zetterstedt)	1♀, 1♂	grassland	CF
	Zyginidia scutellaris (Herrich-Schäffer)	1♀, 2♂♂	grassland	CF

community of Coe Fen and Sheep's Green, further sampling, particularly if over a range of different dates, would undoubtedly show that many more species can be found there.

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Fungi of Eversden Wood – a baseline survey

John Holden

The boulder clay woodlands of South Cambridgeshire and adjacent counties are well known and widely celebrated for their displays of spring flowers such as Bluebells and Oxlips. The heavy, often waterlogged soils have made them unsuitable for draining and ploughing, but for much of their history they have yielded valuable crops of timber, wood and kindling under the traditional coppice with standards management which has also been responsible for the spring blooms. Most of the still-extant woods have existed for several centuries, and several have been traced back to Domesday or earlier (Rackham, 1980, 2003).

Although the woods retain an historical and biological continuity with the wildwood, which is reflected in the diversity of flora and fauna which they retain, coppicing is an intensive management system which utilises and removes

almost every scrap of timber, wood and even twigs from the wood. In the past hundred years, many woods have been felled and replanted (with varying success) with conifers.

Several boulder clay woods are now managed as nature reserves by the Wildlife Trusts and Natural England, with management now directed at wildlife conservation and redressing the neglect of recent decades: thinning of the canopy and reinstatement of coppicing to rejuvenate the spring blooms, and removal of the conifers.

Relatively little attention appears to have been given to the conservation of fungi. The wholesale removal of conifers inevitably leads to loss of numerous associated species of fungi, but at least there is now a plentiful supply of dead wood, both standing and fallen, which should benefit insects as well as fungi.

Although our woods are studied intensively by naturalists, fungal records are not always kept, and where they are, they may be widely dispersed and not always easily accessible.

This paper presents a baseline "snapshot" of the fungi of a single Cambridgeshire wood in the hope that it will encourage others to record and publish their own accounts and in the process raise the profile of fungi and fungal conservation.

Eversden Wood

Eversden Wood is part of the Eversden and Wimpole Woods SSSI, notified under the Wildlife and Countryside Act 1981 (as amended). It occupies a relatively elevated plateau at 75m O.D. in the south sloping gently down to about 65m O.D. in the extreme north. Several seasonally wet ditches drain the wood in a generally northerly direction. It is an ancient coppiced woodland, which has not been coppiced for at least 60 years. Many trees grown out from coppice stools are of about this age (although the stools themselves are in many cases very much older), but there are a few much older trees including some very old pollards. The wood is a species-rich assemblage of the Ash-Field Maple-Dog's Mercury type, with an understory of Hazel and some Blackthorn. Aspen, Birch, Small-leaved Elm and Willow also occur, with some fine scattered Oaks. The modern pattern of rides does not conform to the ancient boundaries and woodbanks which formerly divided the wood (Rackham, 1990), though most of these features still remain. The wood appears to have escaped coniferisation, and remains in private ownership.

Bacon & Lea (2008) reported on the birds and lepidoptera of Eversden Wood, but I have been unable to find any reference in the literature to the fungi.

The Survey

Eversden Wood was visited ten times between the beginning of June and the end of November 2010, and all fungi and slime moulds which could be identified were recorded, together with details of substrate.

The results are listed in Table 1, in order of appearance from spring through to autumn. Ninety-one species were identified in all, including 13 Ascomycetes,

Table 1. List of species recorded during each survey visit (day.month)

	3.6	15.6	29.6	12.7	26.7	16.8	31.8	21.9	21.10	24.11
Scutellinia scutellata	+									
Xylaria polymorpha	+									
Hypoxylon multiforme	+									
Parasola plicatilis	+	+					+			
Psathyrella candolleana	+					+	+			
Armillaria mellea	+		+					+	+	
Xylaria hypoxylon	+								+	+
Daedaleopsis confragosa	+						+			+
Piptoporus betulinus	+	+		+		+	+	+	+	+
Trametes versicolor	+								+	+
Agrocybe molesta		+								
Coprinus micaceus		+								
Agaricus campestris		+								
Anthracobia macrocystis		+								
Lactarius subdulcis		+								
Hygrocybe conica		+								
Puccinia phragmitis		+								
Physarum robustum		+								
Lycogala terrestre		+	+			+				
Psathyrella lacrimabunda		+				+	+	+		
Ceratiomyxa fruticulosa		+				+		+	+	
Mycena leptocephala		+							+	+
Mycena acicula		+							+	
Daldinia concentrica		+	+					+	+	+
Russula vesca			+							
Polyporus squamosus				+	+	+				
Physarum nutans						+				
Pluteus cervinus						+				
Pluteus aurantiorugosus						+				
Laetiporus sulphureus						+				
Polyporus leptocephalus						+				+
Parasola auricoma						+				
Tubifera ferruginosa						+				
Bolbitius vitellinus						+	+			
Inonotus hispidus						+	+			
Crepidotus mollis						+			+	
Mycena haematopus						+	+	+	+	
Russula atropurpurea							+			
Microsphaera alphitoides							+			
Hypocrea gelatinosa							+			
Hymenoscyphus fructigenus							+			
Lactarius quietus							+			
Pluteus salicinus							+			
Laccaria amethystea							+			

Laccaria laccata							+	+		
Coprinellus disseminatus							+	+		
Polyporus durus							+	+		
Russula betularum							+	+		
Hypholoma fasciculare							+	+		
Inocybe geophylla v lilacina							+	+	+	
Mycena galericulata							+	+		+
Stereum hirsutum							+			+
Xerula radicata								+		
Psathyrella cf leucotephra								+		
Russula cyanoxantha								+		
Entoloma rhodopolium								+		
Hebeloma crustuliniforme								+		
Leccinum scabrum								+		
Leccinum variicolor								+		
Lactarius cf decipiens								+		
Lactarius cf camphoratus								+		
Lactarius tabidus								+		
Inocybe geophylla v geophylla								+		
Trichiloma imbricatum								+		
Paxillus involutus								+		
Clavulina cinerea								+		
Tricholoma virgatum								+		
Agaricus urinascens								+		
Lycoperdon pyriforme								+	+	+
Helvella (Leptopodia) elastica									+	
Agaricus silvicola									+	
Clavulina coralloides									+	
Ascocoryne sarcoides									+	
Bisporella citrina									+	
Trichia varia									+	
Hemitrichia clavata									+	
Clitocybe geotropa									+	+
Rhodotus palmatus									+	+
Galerina marginata									+	+
Mycena polygramma										+
Mycena arcangeliana										+
Auricularia mesenterica										+
Crepidotus variabilis										+
Diatrype disciformis										+
Dacromyces stillatus										+
Auricularia auricula-judae										+
Nectria cinnabarina										+
Postia subcaesia										+
Phlebia radicata										+
Exidia nucleata										+
Arcyria denudata										+

68 Basidiomycetes, one mildew, one rust, and eight slime moulds. Of these, 45 species (including all of the slime moulds) were found growing on living or dead wood. Familiar associations were present as might be expected, such as Birch Polypore (*Piptoporus betulinus*) on Birch, Shaggy Bracket (*Inonotus hispidus*) and Cramp Balls (*Daldinia concentrica*) on Ash, and Blushing Bracket (*Daedaleopsis confragosa*) on Sallow, along with generalists such as Sulphur Tuft (*Hypholoma fasciculare*), Honey Fungus (*Armillaria mellea*) and Stump Puffball (*Lycoperdon pyriforme*), but many familiar woodland toadstools were scarce or apparently missing.

Unlike plants, fungi are all heterotrophic, obtaining their food from already synthesised organic matter, either living or dead. In other words, they make their living either as parasites, saprotrophs, through mycorrhizal associations, or some combination of the three. For example a fungus may grow parasitically on a living tree, continue to grow on the remains after the tree's death, and may also form mycorrhizal associations with other plants.

Most plants, including forest trees such as Birch, Hazel, Beech, Oak, Willow, Lime and most conifers, depend on ectomycorrhiza for their healthy growth, and the fungi are also dependent on their tree hosts. Many common and well-known woodland fungi are mycorrhizal, including *Amanita* sp. (Fly Agaric and Death Cap amongst others), *Russula* sp. (brittle-gills), *Lactarius* sp. (milk-caps), *Cortinarius* sp. (web-caps), boletes and *Tricholoma* sp. (knights). The most abundant trees in Eversden Wood, Ash and Field Maple, do not form ectomycorrhiza, and Elm and rosaceous species such as Hawthorn and Blackthorn rarely do so. This accounts, at least in part, for the sparsity of records of mycorrhizal fungi and the predominance of wood rotters and litter decomposers.

A list of 91 species is only the tip of the iceberg, and may represent as little as 10% of the total mycota. Many vernal species were missed due to the dry spring, and it was not possible to make more visits during the exceptional peak fruiting period in October due to other commitments. It is to be hoped that the survey can be extended in future years to contribute to an increasing understanding of this fascinating wood.

Acknowledgments.

I would like to thank the owners of Eversden Wood for their generous permission to visit the wood over the past year.

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Changes in the lichens of Chippenham Fen, 1975 – 2010

Mark Powell and the Cambridge Lichen Group

A detailed survey of the lichens of Chippenham Fen was undertaken in 1975 (Laundon, 1977). This site was revisited by members of the Cambridge Lichen Group in 2009 and 2010. Annotated species lists are presented, separated in time by approximately 35 years. The differences between the two lists are considerable and are broadly similar to those observed over a similar time span at Wicken Fen (Powell, 2010).

The recent survey was designed to be broadly comparable to that conducted in 1975. In both cases Underdown Plantation was omitted. The earlier survey was carried out on 24 February, 25 March and 29 October 1975; the Fen was revisited on 18 April and 22 November 2009 and on 20 March 2010.

Extracts from Laundon's 1977 paper are quoted in italics and some of these are discussed in the light of subsequent information. In these extracts the only changes made to the original text are to update nomenclature to keep lichen species names consistent throughout this paper.

The four remaining areas of extensive semi-natural vegetation in the Fens, namely Chippenham, Holme, Wicken and Wood Walton Fens, are all examples of recent secondary woodland (i.e. woodland which has developed on land cleared of original forest) remote from areas of primary woodland. Thus the lichen flora of these fen woods is of interest because it is not derived from a relict flora as in many woodlands elsewhere in Britain, but comes largely from propagules brought in from outside. Thus the species that colonise the fen woodlands are lichens which are viable and mobile at the present time or at least in the recent past.

Laundon cites several sources which suggest that the Cambridgeshire fenland had been without woodland since at least the twelfth century. Mature willow trees along the banks of rivers and ditches would have provided the chief habitat in the fens for corticolous lichens during medieval and later times. In Chippenham parish the clearance of woodland had been completed by the middle of the twelfth century and from then onwards throughout medieval times the parish consisted entirely of open-fields except for the village itself, the fen in the north-west corner, and the heath on the chalk in the extreme south.

It was in 1796 that John Tharp made preparations to drain, enclose and plant the fen; before this time it was described as "being all inundated the greater part of the year" (Spufford, 1965). Apparently almost two million trees had been planted before 1810, chiefly in two main plantations: Forty Acre Wood and Jerusalem Wood (Kassas, 1951), both of which still exist today. Forty Acre Wood "was a young plantation of conifers in 1800" but a "coniferous wood was never established" because "deciduous trees came in as soon as the land was made ready for plantation." (Kassas, 1952) It is clear that there was no woodland on the fen before Tharp's plantations. A map of the parish, dated 1712, called "A survey of the Mannor… of Chippenham… by Heber Lands" (Cambridge Record Office R 58-16-1) shows individual trees. "Chippenham Fen, including what is now Forty Acre Wood, is shown as treeless except for a few groups of trees in the extreme east corner of the site of the wood. To the south is "The Marsh", also treeless, part of which is now occupied by the largest of the

Jerusalem Plantations" (Rackham, in litt.). The woodland at Chippenham Fen therefore dates from c. 1800, and thus most of the epiphytic lichen flora developed on the fen after this date.

Perhaps the most interesting lichens recorded are Enterographa crassa *and* Graphis elegans*, both growing low down on a few adjacent ash* Fraxinus *trees in the north-west section of Forty Acre Wood, both being quite rare in Eastern England at the present time.* Enterographa crassa *is regarded by Rose in Morris & Perring (1974, p.262) as an "old forest" lichen epiphyte which can be regarded as an indicator species and therefore used in calculating the "Index of Ecological Continuity" of the forest environment. The presence of* Enterographa *in secondary woodland dating from c. 1800 clearly shows that this lichen cannot always be regarded as an "old forest" lichen, and consideration should be given to its removal from Rose's list of indicator species. The nearest old woodland to the fen is Dalham Lawns 10 km. to the south-east (Rackham, in litt.).*

Enterographa crassa can still be considered as one of the more interesting lichens occurring at Chippenham Fen and it appears to have spread and increased in abundance since 1975. It is most abundant where Laundon found it in the north-west section of Forty Acre Wood, where it grows on a range of trees. Scattered individuals are also found in North Jerusalem Wood and South Jerusalem Wood. *Graphis elegans* was not found during the recent surveys but *Graphis scripta* was found to be very locally abundant on *Corylus* in Forty Acre Wood and also present on *Carpinus* in North Jerusalem Wood. Neither species of *Graphis* is common in Cambridgeshire or neighbouring counties so the populations at Chippenham Fen are locally significant.

Since Rose first formulated the use of lichens as indicators of ecological continuity (Rose in Morris & Perring, 1974) the "indices of continuity" have been updated but subsequent field work has largely confirmed the validity of the lichen species that were originally selected as indicators, (Coppins & Coppins, 2002). The Revised Index of Ecological Continuity (RIEC) was published in 1976 and is still used to grade the "ancient woodland" characteristics of deciduous woodlands throughout the whole of Great Britain and Ireland. *Enterographa crassa* is retained in the base list of 30 indicator lichens which appear to be faithful to woods that have retained varying degrees of ecological integrity over time. The only RIEC species that is present at Chippenham Fen is *Enterographa crassa*. The New Index of Ecological Continuity (NIEC) was developed in response to advances in knowledge of the taxonomy, ecology and distribution of epiphytic lichens since the publication of the RIEC. The NIEC is applicable to most of lowland Britain; it is based on a list of 70 species primarily devised towards grading woodlands for their conservation status. The NIEC is not intended to replace the RIEC, but to be used in conjunction with it, as the latter indicates the "ancient woodland" qualities, whilst the former has broader application to assess the overall conservation of a given woodland site. None of the 70 species listed for the NIEC assessment are recorded for Chippenham Fen. The presence of *Enterographa crassa* at Chippenham is still enigmatic. While the presence of one indicator species in isolation is of little significance, the continued inclusion of *Enterographa crassa* in RIEC suggests that it is a lichen of very limited dispersal between sites. Perhaps the "few groups of trees" in the

extreme east corner of the site of Forty Acre Wood that were mapped in 1712 contained some ancient trees that retained some ecological continuity with a time before the fens were cleared of woodland.

Despite the occurrence of Enterographa *and* Graphis*, the lichen flora of Forty Acre Wood is generally rather poor, the boles being dominated by* Lecanora conizaeoides*,* Lepraria incana*, or green algae…*

A few species of lichen do not follow the pattern of decline with increased sulphur dioxide levels, one is *Lecanora conizaeoides* which has an interesting history which was outlined by Laundon (2003). The earliest British specimen is a collection made by Rev. Bloxam from a fir tree at Twycross in Leicestershire; by c. 1862 it had been recorded from Kent and Cheshire, later spreading rapidly with the rise in background air pollution as the Industrial Revolution gathered pace. In the 1970s this lichen still formed a monotonous cover on tree bark over much of the midland counties of England. The demise of *Lecanora conizaeoides* under the declining sulphur dioxide levels has been spectacular and this lichen was not found during the recent surveys.

Hedera *is remarkably abundant in the northern part of Forty Acre Wood, where it smothers the* Fraxinus *and other trees, and, being evergreen, shades out the lichen flora, as well as directly overrunning epiphytes on the surface of the bark so that they are eliminated by competition from the climbing roots and stems. Kassas (1952) discusses and illustrates the abundance of* Hedera *in Forty Acre Wood, and Rackham (1975, pp. 50-51) remarks that "ivy is often a precise indicator of secondary parts of woods, even after centuries."*

The occurrence in mature woodland of alder Alnus*, birch* Betula*, ash* Fraxinus *and oak* Quercus*, etc., forming Forty Acre Wood and the plantation belts of Jerusalem Wood, is one of the two main reasons for the occurrence of a rich corticolous flora at Chippenham Fen in comparison with the three other fenland reserves. At the other reserves the shrub and tree colonisation is comparatively recent, having occurred during the present century, and it therefore follows that the colonisation of corticolous lichens is also more recent and therefore more limited, with an absence of lichens (e.g.* Chaenotheca ferruginea*) characteristic of old trees. The abundance of* Fraxinus *at Chippenham Fen, present because of the calcareous nature of the waters that feed it, is particularly advantageous for many lichens. This is because the bark of* Fraxinus *has a neutral pH (Barkman, 1958, p.108) and is readily colonised by many species in comparison with the acid bark of* Alnus*,* Betula *and* Quercus *which is often poorly colonised in this part of Britain. The richest lichen flora is found on the mature* Fraxinus *trees bordering the Main Ride (right-of-way) through the centre of the fen.*

In addition to the tree species listed by Laundon for the plantations of Chippenham Fen, *Acer pseudoplatanus* and *Carpinus betulus* deserve a mention. The former provides a suitable substrate for *Enterographa crassa*, on the bark of a healthy mature tree in North Jerusalem Wood and an infertile, pycnidiate occurrence on a rotting trunk in Forty Acre Wood. Both *Graphis scripta* and *Schismatomma decolorans* were found on *Carpinus betulus* in North Jerusalem Wood. Mature *Fraxinus* trees bordering the Main Ride still support noticeably rich lichen communities. *Pyrrhospora quernea* is still a feature of these ash

trees, often forming mosaics with *Lecanora expallens*. Another feature of *Fraxinus* trees in the southern part of Chippenham Fen, including beside the Main Ride, is the extensive colonies of *Buellia griseovirens* and *Opegrapha rufescens*, neither of which were recorded by Laundon. On the other hand there appear to be losses from *Fraxinus* trees beside the Main Ride; *Ochrolechia androgyna*, *Parmeliopsis ambigua* and *Trapeliopsis granulosa* were all recorded by Laundon but not re-found. All three of these lichens are typical of rather acidic conditions and the new regime of low atmospheric sulphur dioxide levels and elevated eutrophication by nitrogen compounds may have made bark an unsuitable substrate these days. During tree surgery work on the "oldest tree" in Hayley Wood (a veteran *Quercus*) in 2001 *Parmeliopsis ambigua* was present in some quantity but a revisit in 2009 failed to re-find it (Powell, pers. com.). There are two further species that appear to have declined at Chippenham since the 1970s. *Hypogymnia physodes* is described as frequent by Laundon whereas only a single specimen was found during the recent surveys. At Wicken Fen, *Hypogymnia physodes* was found to be "Frequent. In carr" by Laundon (1973) while by 2008 it was "Rare" and "restricted to corrugated roofing sheets of a school study shelter", (Powell 2010). In 1975 *Lecanora pulicaris* was reported on *Fraxinus* from several parts of the Fen whereas *Lecanora chlarotera* was not recorded at all. During the recent surveys only a single specimen of *L. pulicaris* was found while *L. chlarotera* was occasional on suitable bark. A similar decline of *L. pulicaris* (a mild acidophyte) and increase of *L. chlarotera* (a nitrophyte) was observed at Wicken Fen over a similar time scale, (Powell 2010). The decline or disappearance of acidophytes at Chippenham is overshadowed by the marked increase in the lichens over the same period of time. The corticolous species recorded in 1975 numbered 34; this had increased to 56 in 2009/10 (a 39% increase). At Wicken Fen, the increase of corticolous lichens between 1972 and 2008 was 33% (31 species and 46 species respectively).

The other reason for the rich corticolous flora is the low level of background air pollution. Comparisons of the lichen flora of the various fenland reserves show that there is a pollution gradient stretching across the southern Fens, with the highest levels in the west and the lowest levels in the east, where the Fens meet East Anglia. This gradient is probably part of the much larger pollution gradient stretching from the highly polluted west Midlands to the much cleaner air of the coastal belt of East Anglia (Hawksworth & Rose, 1970, Fig. 1). The comparatively clean air at Chippenham Fen is particularly indicated by the extensive sheets of Flavoparmelia caperata *and* Hypotrachyna revoluta*, which indicate a lichen flora of zone 7, equivalent to a winter sulphur dioxide level of about 40 µm/m³ on the Hawksworth & Rose (1970) scale.*

Sulphur dioxide levels in the atmosphere have fallen below the level where they are a limiting factor for lichen growth, but the relatively low historical levels described above may have given Chippenham Fen a "head start" in the re-colonisation of lichens over recent decades.

The nitrophilous communities which occur along the southern edge of the fen form a particularly interesting feature of the lichen flora. Ten nitrophilous species are present, namely Amandinea punctata*,* Candelariella *cf.* reflexa*,* Buellia canescens*,* Physcia adscendens*,* P. orbicularis*,* P. tenella*,* Physconia grisea*,* Ramalina farinacea*,* Xanthoria candelaria *and* X. polycarpa*. Of these species,* Buellia canescens *and* Physcia orbicularis *are especially common on the bases of trees on the bank at the western end of South Jerusalem Wood. As all ten lichens are situated at distances of under twelve metres from the edge of the fen, facing and adjacent to ploughed fields, and are absent (with the exception of a single locality for* Candelariella*) from both the interior and, so far as is known, from the edge where it adjoins meadow and rough pasture, it would appear that their presence is due to agricultural dust and fertiliser, wind-blown into the fen from arable soil as a result of farming activities. Green algae and* Lecanora conizaeoides *are both abundant in the same habitats.*

The southern edge of South Jerusalem Wood still retains a fairly distinctive lichen community which would, in some respects, have been recognised by Laundon. *Diploicia canescens* is still present on the bases of mature trees and is rare elsewhere on the fen. Most of the other nitrophytes that Laundon lists for the southern edge of South Jerusalem Wood are still to be found there but they are also more common within the interior of the fen than was the case in 1975. Additional nitrophytes have appeared along the margin of South Jerusalem Wood; *Lecania cyrtella* is abundant on *Sambucus* along with more scattered occurrences of *Arthonia radiata* and *Hyperphyscia adglutinata*.

There follows an extract from an informal report of one of the visits by the Cambridge Lichen Group, that of 22nd November 2009:

"A small but enthusiastic group of four met in bright sunshine. The enthusiasm was sustained long after the sun had given way to blustery rain in the early afternoon. The resilience of the group was rewarded towards the end of the day with an abundance of *Enterographa crassa*. A particularly beautiful lichen mosaic was found by Louise near the base of a young sycamore in Forty Acre Wood - a patchwork of *Enterographa* thalli interspersed with the tiny white columnar pycnidia of *Opegrapha vermicellifera*. Lucy produced several twigs that had been blown out of the canopy by recent high winds. These are always worth investigating and one twig yielded abundantly fertile *Scoliciosporum chlorococcum*. This lichen is common but much over-looked; it is often sterile when it is difficult to separate it from algal crusts."

Chippenham Fen is a noteworthy site for lichens in a regional context even though rare species are absent. The fact that it was thoroughly surveyed and documented in the mid 1970s ensures that it will always be of importance in the story of re-colonisation following the sulphur dioxide pollution of the 19th and 20th centuries. *Enterographa crassa* is of particular interest, occurring here in some quantity within secondary woodland. Lirellate lichens in general are well represented and the extensive colony of *Graphis scripta* in Forty Acre Wood is unusual for the region. Five species of *Opegrapha* appear to have colonised the site since 1975. Chippenham Fen has a few species in unexpected abundance. *Buellia griseovirens* forms extensive patches on mature ash trunks and *Opegrapha rufescens* coats the whole surface of the lower stems of many medium sized ash stems.

List of species recorded by J. R. Laundon in 1975 and by the Cambridge Lichen Group in 2009/10. The 1975 records are as published in Laundon (1977). The nomenclature has been updated and follows *The Lichens of Great Britain and Ireland* (Smith et al. (2009).

Amandinea punctata **1975:** Scarce. Several plants on old *Fraxinus* branch in south-east margin of Forty Acre Wood. Several plants on young *Fraxinus* in margin of High Wood. One plant in rotting *Sambucus* in margin of South Jerusalem Wood. **2009/10:** Occasional.

Anisomeridium polypori **1975:** Not recorded. **2009/10:** Occasional.

Arthonia didyma **1975:** Not recorded. **2009/10:** Rare. Large colonies on a few mature *Corylus* in Forty Acre Wood.

Arthonia radiata **1975:** Not recorded. **2009/10:** Occasional.

Arthonia spadicea **1975:** Not recorded. **2009/10:** Occasional.

Arthopyrenia punctiformis **1975:** Not recorded. **2009/10:** Rare. On *Crataegus* twigs at southern edge of South Jerusalem Wood, perhaps overlooked elsewhere.

Bacidia cf. *sulphurella* **1975:** Not recorded. **2009/10:** Rare.

Buellia griseovirens **1975:** Not recorded. **2009/10:** Occasional. Extensive colonies are present locally on lightly shaded, mature *Fraxinus* trunks along Main Ride and in South Jerusalem Wood.

Caloplaca cf. *arcis* **1975:** Not recorded. **2009/10:** Rare. On a concrete marker post "NRA meter 150", South Jerusalem Wood.

Caloplaca citrina sens.lat. **1975:** Not recorded. **2009/10:** Rare. On a single wooden fence post.

Caloplaca oasis **1975:** Not recorded. **2009/10:** Rare. On concrete marker post "NRA meter 150", South Jerusalem Wood.

Caloplaca obscurella **1975:** Not recorded. **2009/10:** Rare. On dead *Salix* bark, South Jerusalem Wood.

Candelariella refexa **1975:** (Recorded tentatively) Scarce. On old *Fraxinus* branch in south-east margin and on *Fraxinus* in south margin of Forty Acre Wood. **2009/10:** Occasional.

Candelariella vitellina **1975:** Not recorded. **2009/10:** Rare. On a single wooden fence post.

Chaenotheca ferruginea **1975:** Scarce. On south side of *Quercus* in north-west section of Forty Acre Wood. **2009/10:** Rare. On mature *Quercus* trunk, North Jerusalem Wood.

Cladonia chlorophaea **1975:** Not recorded. **2009/10:** Occasional.

Cladonia coniocraea **1975:** Scarce. Amongst mosses at base of *Fraxinus*. **2009/10:** Rare.

Cladonia fimbriata **1975:** Scarce. Amongst mosses at base of *Fraxinus*. **2009/10:** Rare. Recorded tentatively.

Cladonia polydactyla **1975:** Not recorded. **2009/10:** Rare. Growing with *Cladonia coniocraea* on the trunk of a *Betula* in North Jerusalem Wood.

Cliostomum griffithii **1975:** Scarce. Covering the underside of a dead sloping bole of *Acer pseudoplatanus* in margin of South Jerusalem Wood. **2009/10:** Rare.

Dimerella pineti **1975:** Not recorded. **2009/10:** Occasional.

Diploicia canescens **1975:** Scarce. At base of old *Fraxinus* in south-east margin of Forty Acre Wood. At base of *Acer pseudoplatanus, Betula, Fraxinus, Hedera, Quercus* and *Ulmus* in margin of South Jerusalem Wood. **2009/10:** Rare. Well developed on *Quercus, Acer pseudoplatanus, Hedera* and other along southern margin of South Jerusalem Wood.

Enterographa crassa **1975:** Scarce. Several plants at base of two mature *Fraxinus* in north-west section of Forty Acre Wood. **2009/10:** Occasional. Most abundant in the northern half of Forty Acre Wood where it grows at the base of a range of tree species. A sterile pycnidiate specimen is present on a rotting *Acer pseudoplatanus* trunk. Scattered individuals in South Jerusalem Wood and North Jerusalem Wood.

Evernia prunastri **1975:** Occasional. Chiefly on *Fraxinus*. **2009/10:** Rare.

Flavoparmelia caperata **1975:** Occasional. Always forming extensive sheets on sloping *Fraxinus* boles where it occurs. On six boles on Main Ride, on six or more boles in spinney in East Meadows, on four or more boles in Forty Acre Wood and on one bole in eastern section of North Jerusalem Wood. **2009/10:** Occasional.

Graphis elegans **1975:** Scarce. Several plants at base of mature *Fraxinus* and on a nearby shrub in north-west section of Forty Acre Wood. The plants are unhealthy, being overgrown with a thin film of alga. **2009/10:** Not recorded.

Graphis scripta **1975:** Not recorded. **2009/10:** Occasional. On *Carpinus* in North Jerusalem Wood and locally abundant on *Corylus* in Forty Acre Wood.

Hyperphyscia adglutinata **1975:** not recorded. **2009/10:** Occasional. On the bark of several trees and shrubs including *Acer pseudoplatanus* and *Hedera helix*. Most records are from South Jerusalem Wood.

Hypogymnia physodes **1975:** Frequent. Chiefly on *Fraxinus*. **2009/10:** Rare. A single record from bark of felled timber extracted from the site.

Hypogymnia tubulosa **1975:** Scarce. On boles and branches of *Fraxinus*. **2009/10:** Not recorded.

Hypotrachyna revoluta **1975:** Occasional. Abundant on a number of *Fraxinus* boles. One of the most common foliose lichens on the fen. **2009/10:** Occasional. Most frequent beside the Main Ride.

Jamesiella anastomosans **1975:** Not recorded. **2009/10:** Scarce. On *Salix* in North Jerusalem Wood.

Lecania cyrtella **1975:** Not recorded. **2009/10:** Occasional. Most frequent on *Sambucus* in South Jerusalem Wood.

Lecanora albescens **1975:** Not recorded. **2009/10:** Rare. On concrete marker post "NRA meter 150", South Jerusalem Wood.

Lecanora chlarotera **1975:** Not recorded. **2009/10:** Occasional.

Lecanora conizaeoides **1975:** Abundant. On bark of many species. **2009/10:** Not recorded.

Lecanora dispersa **1975:** Not recorded. **2009/10:** Rare. On top of wooden fence post, southern boundary of South Jerusalem Wood.

Lecanora expallens **1975:** Occasional. **2009/10:** Frequent.

Lecanora pulicaris **1975:** Scarce. On *Fraxinus* in several parts of the fen. **2009/10:** Rare. A single record from felled timber extracted from the site.

Lecanora cf. *saligna* **1975:** Not recorded. **2009/10:** Rare. On wooden fencing north of North Jerusalem Wood.

Lecanora symmicta **1975:** Not recorded. **2009/10:** Rare.

Lecidella elaeochroma **1975:** Not recorded. **2009/10:** Occasional.

Lecidella stigmatea **1975:** Not recorded. **2009/10:** Rare. On concrete marker post "NRA meter 150", South Jerusalem Wood.

Lepraria incana **1975:** Abundant on shaded bark in Forty Acre Wood; occasional at base of trees elsewhere. **2009/10:** Occasional. On dry shaded bark.

Lepraria lobificans **1975:** Not recorded. **2009/10:** Occasional. On shaded bark and overgrowing mosses.

Melanelixia fuliginosa subsp. *glabratula* **1975:** Not recorded. **2009/10:** Rare. A single record from *Betula* branch, North Jerusalem Wood.

Melanelixia subaurifera **1975:** Scarce. On two trees in Forty Acre Wood. On two *Sambucus* in south margin of Snailwell Poor's Fen. **2009/10:** Frequent.

Micarea denigrata **1975:** not recorded. **2009/10:** Rare. On sawn wood of fencing north of North Jerusalem Wood.

Micarea prasina s.lat. **1975:** Not recorded. **2009/10:** Rare. On rotting stump in South Jerusalem Wood and on *Betula* rootplate in North Jerusalem Wood.

Ochrolechia androgena **1975:** Scarce. On two mature *Fraxinus* on Main Ride. **2009/10:** Not recorded.

Opegrapha ochrocheila **1975:** Not recorded. **2009/10:** Occasional.

Opegrapha rufescens **1975:** Not recorded. **2009/10:** Occasional. Some extensive colonies are present on *Fraxinus* beside Main Ride.

Opegrapha varia **1975:** Not recorded. **2009/10:** Occasional.

Opegrapha vermicellifera **1975:** Not recorded. **2009/10:** Rare. Occasional in the northern half of Forty Acre Wood where it forms attractive mosaics with *Enterographa crassa*.

Opegrapha vulgaris **1975:** Not recorded. **2009/10:** Rare.

Parmelia sulcata **1975:** Occasional. Chiefly on *Fraxinus*. **2009/10:** Frequent.

Parmeliopsis ambigua **1975:** Scarce. Several plants on *Fraxinus* on Main Ride. **2009/10:** Not recorded.

Pertusaria amara **1975:** Occasional on *Fraxinus* in Forty Acre Wood. Two plants of form *isidiata* Harm. on *Fraxinus* on Main Ride. **2009/10:** Not recorded.

Pertusaria leioplaca **1975:** Not recorded. **2009/10:** Rare. A single record on mature *Corylus* in Forty Acre Wood.

Phaeophyscia orbicularis **1975:** Scarce. On *Thelycrania* (*Cornus*) in margin of High Wood. On exposed roots and at base of boles of *Acer pseudoplatanus, Fraxinus, Quercus* and *Ulmus* in margin of South Jerusalem Wood. **2009/10:** Occasional.

Phlyctis argena **1975:** Occasional. At base of trees. **2009/10:** Occasional. On trunks of mature *Fraxinus*.

Phylloblastia inexpectata **1975:** Not recorded. **2009/10:** Rare. Foliicolous on evergreen shrubs near south end of Main Ride.

Physcia adscendens **1975:** Scarce. Several plants on *Sambucus* in south margin of Snailwell Poor's Fen. **2009/10:** Occasional.

Physcia tenella **1975:** Scarce. On old *Fraxinus* branch in south-east margin of Forty Acre Wood. Several plants on *Sambucus* in south margin of Snailwell Poor's Fen. Many plants on rotting *Sambucus* in margin of South Jerusalem Wood. **2009/10:** Occasional.

Physconia grisea **1975:** Scarce. Several plants on old *Fraxinus* branch in south-east margin of Forty Acre Wood. Two plants at base of *Betula* in margin of South Jerusalem Wood. **2009/10:** Occasional, including on *Prunus spinosa* in South Jerusalem Wood.

Porina aenea **1975:** Not recorded. **2009/10:** Rare.

Punctelia jeckeri **1975:** Not recorded. **2009/10:** Occasional.

Punctelia subrudecta **1975:** Local. On mature *Fraxinus* on Main Ride and in Forty Acre Wood. **2009/10:** Occasional.

Pyrrospora quernea **1975:** Scarce. On mature *Fraxinus* on Main Ride. **2009/10:** Occasional. On mature *Fraxinus* on Main Ride and in North Jerusalem Wood.

Ramalina farinacea **1975:** Scarce. One plant on rotting *Sambucus* in margin of South Jerusalem Wood. **2009/10:** Not recorded.

Rinodina oleae **1975:** Not recorded. **2009/10:** Rare. On wooden fence post north of North Jerusalem Wood.

Schismatomma decolorans **1975:** Not recorded. **2009/10:** Rare. On *Fagus* in North Jerusalem Wood and on a mature *Fraxinus* trunk near the east corner of Forty Acre Wood.

Scoliciosporum chlorococcum **1975:** Not recorded. **2009/10:** Rare. On fallen twigs in South Jerusalem Wood.

Trapeliopsis flexuosa **1975:** Not recorded. **2009/10:** Rare. On rotting fence rails north of North Jerusalem Wood.

Trapeliopsis granulosa **1975:** Scarce. On mature *Fraxinus* on Main Ride. **2009/10:** Not recorded.

Xanthoria calcicola **1975:** Not recorded. **2009/10:** Rare. On top of wooden fence post at southern edge of South Jerusalem Wood.

Xanthoria candelaria **1975:** Scarce. Several plants on old *Fraxinus* branch in south-east margin of Forty Acre Wood. On *Ulmus* in margin of High Wood. Many plants on rotting *Sambucus* in margin of South Jerusalem Wood. **2009/10:** Not recorded but this may be the same lichen that has been recorded as *Xanthoria ucrainica* in the more recent survey.

Xanthoria parietina **1975:** Not recorded. **2009/10:** Occasional.

Xanthoria polycarpa **1975:** Scarce. Several plants on *Sambucus* in south margin of Snailwell Poor's Fen. One plant on rotting *Sambucus* in margin of South Jerusalem Wood. **2009/10:** Rare. On fallen *Quercus* branch in Forty Acre Wood.

Xanthoria ucrainica **1975:** Not recorded but see *Xanthoria candelaria*. **2009/10:** Rare. On fallen branch in Forty Acre Wood.

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Saving the Fulbourn Swifts

Rob Mungovan

In 1966, 164 homes were built to form the Windmill Estate in Fulbourn but 40 years later many needed replacement. As owners of a large proportion of the properties, South Cambridgeshire District Council (SCDC) worked closely with Accent Nene Ltd (Registered Social Landlord) on the planned re-development of the entire estate. The first planning application was submitted at the end of 2006.

From the start of the planning process the local community had expressed concern for the site's Swift (*Apus apus*) population. I was alerted by an email, which I followed up with a site visit and soon became very aware of how many Swifts were using the estate, and how much the local residents enjoyed seeing them return every summer. Attending pre-application planning meetings, I was able to raise the issue of Swift conservation. Fortunately, planning policy now also demands that greater weight be attached to conserving "urban" biodiversity. It was agreed that conservation of the site's Swift population would be a challenge that we should all aspire to meet.

Through research, it soon became clear that many different organisations were concerned for the fate of the Swift. The most informative source was Ed Mayer at Swift Conservation (http://www.swift-conservation.org) formerly London's Swifts). He gave examples of a wide range of nest box types on his website together with examples of conservation projects across Europe.

From observing the Swifts on the Windmill Estate, it became clear that they were nesting in gaps between the flat roofs and the pre-fabricated wall units (a Bison Wall Frame System). Each building may have supported eight or more nest sites and this is probably the main reason for the large population, although a local street named Swift's Corner suggests that there had been a noticeable population of Swifts in this area well before the current estate was built.

Swifts are very site-loyal, with the same pair returning to the same nest site for many years. Thus, the potential disruption to the their traditional nest sites would have been huge if the whole site had been re-developed in one go. However, it was confirmed at an early stage that a phased re-development could be undertaken. This was hugely important as it enabled a number of different boxes to be tested and their success to be monitored. More importantly, the remaining nests would ensure that breeding birds remained on the estate to encourage others to search for unused sites and newly placed nest boxes. Swifts are colonial breeders and one of the greatest challenges in conserving Swift populations appears to be establishing new breeding colonies – therefore retaining breeding sites should be a primary consideration for conservation projects.

On the Windmill Estate we first tested a number of external nest boxes. In 2007 some Schwegler No.17 triple chamber nest boxes were attached, immediately above closed-off nest sites, to houses due for demolition the following year. However, the birds repeatedly tried to access their former sites

and ignored the new boxes. No breeding within the boxes could be confirmed, although some dark feathers and possible nesting material were found in one.

In 2008 these nest boxes were relocated to allow demolition to progress. More nest sites had been blocked-up so 12 nest boxes of a different design, Zeist type boxes constructed of wood, were put up. These were located on properties that remained in the control of Accent Nene and not due for demolition for several years. The poor weather of 2008 made monitoring the boxes impractical. The success of these boxes was considered to be low, if not zero, although some locals reported seeing birds enter them.

In 2009, the first new houses were constructed. From the experiences of the previous two years I was reluctant to accept simple externally mounted nest boxes. I suspected that the Fulbourn Swifts, having spent all of their lives searching for internal cavities in buildings, were perhaps simply not recognising the new boxes as potential nest sites. I discussed this with Hunters (the scheme's architects), and with input from Swift Conservation, an internal nest box design was proposed. These boxes were designed to fit between the studs of the buildings' internal construction. Access through the external wall was provided through a PVC tube and external cavity panels then gave the box a finished appearance (see Plate 3, inside back cover) and also excluded pigeons. A total of 75 internal nest sites was provided.

To ensure that birds had a choice of nest sites, 50 more external boxes (1MF Schwegler double chamber boxes) were also erected in pairs on suitable walls, i.e. more than five metres above ground level with a clear flight path. To encourage use of the new boxes, CDs of Swift calls (available from Swift Conservation) were played to attract passing birds. As a colonial nester Swifts can become interested in sites where they believe other birds are already nesting.

All of the Swift features were built into, or attached to, properties that were to remain in the control of Accent Nene Ltd. This gives a greater level of confidence that the new human occupants will not remove them, or be concerned if they were considering the house for purchase. We took the general approach that walls with no, or few, windows should be selected as this would further reduce any future conflict between birds and humans.

The commitment to conserving the Swift population can perhaps be measured in the quantity of boxes that Accent Nene Ltd and their main contractors, Kier Partnership Homes, were willing to provide in fulfilment of the planning condition. In phase 1,125 new Swift nest sites have been provided, plus 10 Starling boxes, and nine sparrow terraces.

SCDC has continued to have a close role in the project and organised a community swift survey. This gave residents the chance to learn more about the birds and to understand the various measures that were being deployed to conserve them. Significant publicity was generated for the project, culminating with the BBC filming (http://www.youtube.com/watch?v=QwwnqcgZQ2o) for a regional programme. Significantly, the former Windmill Estate has been re-branded as The Swifts, demonstrating how species conservation can be good for the local community and housing associations alike.

A similar number of Swift boxes are expected in future phases. By then it is hoped that young Swifts will have taken to the various new boxes and we will have more knowledge about the specific nesting requirements of the Fulbourn Swifts. In 2009, Kier Partnership Homes employed the services of Applied Ecology Ltd to undertake detailed surveys of the site in advance of any demolition. The surveys confirmed 72 active nests making this the largest known Swift colony in East Anglia and possibly England.

Acknowledgments

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The Coton Countryside Reserve - the CNHS Survey of 2010

Jonathan Shanklin

The Cambridge Natural History Society project for 2010 was a survey of the flora of the Coton Countryside Reserve, which belongs to Cambridge Past, Present & Future, and part of Rectory Farm. We logged nearly 400 plant species, and also recorded some other phyla. Each 1km square was logged separately and individual record sheets for each area are available on the Society web pages.

Over the past few years the Cambridge Natural History Society (CNHS) has selected a different area of the city and made regular survey visits to it over the course of a year. Primarily these surveys have concentrated on the vascular plants. However other phyla have been recorded, usually on a casual basis. This year's survey covered the area west of the M11 designated the Coton Countryside Reserve, together with part of Rectory Farm which is in Higher Level Stewardship. The Reserve is owned by Cambridge Past, Present & Future (CPPF), which has slowly been converting some arable land to public access meadows, though large areas are still a working farm, tenanted by the Cambridge University Farm.

The Reserve extends over 120ha of pasture and agricultural land. It was acquired by what was then the Cambridge Preservation Society in the 1930s with some initial amenity planting and provision for public access. Further steps towards creating the Reserve waited until 2003, when grants began to be won. Provision of better infrastructure, particularly the spine road and Martin car park, and habitat creation were carried out over the next few years. Now there are over 11ha of public access land, over 5000 trees have been planted, two ponds dug and there are over 5km of footpaths. There are plans for the future: a lake to provide flood control, and a resource centre for Wheatcases Barn.

Location and field names in this report are taken from those in the CPPF plan of the Reserve.

Geology and history of the area

The lower ground is gault clay, giving poor drainage and heavy conditions for agriculture. In the autumn new mole drains were laid in several fields. The south western corner of the Reserve rises to over 40m, with marly chalk overlain by glacial till and providing an excellent viewpoint over Cambridge. The Bin Brook cuts through the north of the reserve, before turning south. It is prone to flash floods and its bed is eroding. Near the heart of the Reserve, with the Brook running to its west is an old ridge and furrow meadow; however this was "improved" by spraying until a decade or so ago, and no indicator broad-leaved species remain, though fungi appear to do rather better, with several waxcap species present. Wheatcases Barn gives hints of the early twentieth century farm management in the area, with pegs on which the harnesses of the working horses were hung.

Rare species

The online (http://www.cambridgeshireflora.com/) Cambridgeshire Flora records a few notable species for the area. Shepherd's Needle (*Scandix pecten-veneris*) had been reported from near the sewage works in 1995, but this was not refound. The chalky gault is a stronghold for three nationally rare or declining species and these were all present in the area: Dwarf Spurge (*Euphorbia exigua*), Broad-leaved Spurge (*Euphorbia platyphyllos*) and Slender Tare (*Vicia parviflora*). Dwarf Spurge and Slender Tare were scattered across the Reserve, but only half a dozen plants of Broad-leaved Spurge were found, in a habitat strip along a field margin. A remarkable display of abundant Broad-leaved and Dwarf Spurge was seen during a visit to an uncultivated field on the other side of the motorway, though this was not in our survey area. A Corn Marigold (*Glebionis segetum*) was found in a habitat corner, but this was almost certainly introduced, as was the Water Soldier (*Stratiotes aloides*) found in the pond. Mark Powell found three scarce lichens *Caloplaca ulcerosa, Lecania cyrtellina,* and *Piccolia ochrophora* on Elder (*Sambucus nigra*).

On the October excursion we found a couple of rather unusual looking ferns in Bin Brook, where it ran below gardens in Coton. One of these gardens had planted Hard Shield Ferns (*Polystichum aculeatum*) and Soft Shield Fern (*P. setiferum*), and our specimens were on the opposite bank. One specimen was described as an "odd" *P. aculeatum* by Fred Rumsey, the Botanical Society of the British Isles (BSBI) referee. The other one he determined as the hybrid between the two, *P. x bicknellii,* and this is its first record in the county.

Altogether we made 1000 records of nearly 400 vascular plant species and records of around 200 other species.

Diary for the year

The major contributors to the survey were: Monica Frisch (MF), Steve Hartley (SH), Alan Leslie (AL), David Seilly (DS) and Jonathan Shanklin (JS).

Over 50 people of all ages participated in the monthly visits, with numbers on individual visits ranging from 2 to 21.

January 1. The traditional New Year's Day outing took place under fine, cold, conditions. AL, Helen Holmes, JS, MF and SH began by searching round the information centre off the Coton Footpath, which has been seeded with meadow flowers, and where there is a new pond. We stayed here for over half an hour, finding around 30 species. We continued round the Reserve, finding a spot out of the breeze for a picnic lunch. Continuing up to View Point, we found some snow-banks persisting from the pre-Christmas snow. At the top we had splendid views across the surrounding countryside. The total for the day was 112 vascular plant species and a total of 231 records, along with a miscellany of birds, mammals, mosses, lichens and fungi.

February 21. Uncertain weather (there had been heavy sleet and rain earlier in the day) was probably the reason only two people turned out for the second survey. But apart from some hail showers early on, MF and AL enjoyed a bright afternoon concentrating on the eastern half, especially the edges of the Bin Brook and the field margins.

The vegetation had not grown much since the visit on January 1st, no doubt due to the cold damp winter, though the leaves of Lords-and-Ladies (*Arum maculatum*) were unfurling nicely, the Hazel (*Corylus avellana*) was in flower and one willow was covered in silvery pussy-willow catkins. Nevertheless we made some additions to the lists for the two eastern 1km squares. In a ditch we found two small seedlings of Buddleia (*Buddleja davidii*) and just one spike of Coltsfoot (*Tussilago farfara*) coming into flower. In the hedges we recorded Italian Alder (*Alnus cordata*), Spindle (*Euonymus europaeus*), with the remnants of a fruit to confirm the identification, and a climber which AL identified as Hop (*Humulus lupulus*) from the very rough stems. We identified Square-stalked St. John's Wort (*Hypericum tetrapterum*), Nipplewort (*Lapsana communis*) and Charlock (*Sinapis arvensis*) from dead stalks and fruits. There were fresh rosettes of Green Alkanet (*Pentaglottis sempervirens*) and leaves of Sweet Violet (*Viola odorata*).

The highlights were two clumps of snowdrops growing on the banks of the Bin Brook. These were not the common Snowdrop (*Galanthus nivalis*) but Pleated Snowdrop (*G. plicatus*), larger and with broader pleated leaves. Also on the banks but a bit further on were some leaves that AL thought might develop into a Snowflake (*Leucojum sp*.). We shall have to return to check on a future occasion [it was found to be Summer Snowflake (*L. aestivum*)]. Also to be checked is the row of poplars near Wheatcases, which seemed to be of several different species, and the docks growing under them which had leaves reminiscent of Fiddle Dock (*Rumex pulcher*).

March 28. Despite advance threats of rain from the Met Office, the weather on the day was fair. JS and MF checked the car park area round Wheatcases, noting that signs of growth were still few and far between, as were signs of anyone else

arriving. We set off towards the View Point and on crossing the road were warned by a passing cyclist that the red flag was flying indicating that firing was taking place at the rifle range. This had been very audible all morning! Nearing the top, Charles Turner rang up to ask where we were, and we suggested meeting by the road. On the way down we passed a cheery armed guard who made sure we didn't stray into harm's way (the route was off our trail anyway). In the hedgerow we came across a yellow flowered shrub, which on meeting up with Charles was identified as Cornelian Cherry (*Cornus mas*). Continuing along the brook we spotted some lighter stems close to more Pleated Snowdrop, which turned out to be Few-flowered Garlic (*Allium paradoxum*). We just made it back to the Coton Footpath at 1:30 in time for lunch as planned so as to be ready for the afternoon party.

Numbers soon swelled and around a dozen admired the mass of frogspawn in the pond, with tiny wriggling tadpoles just starting to emerge. JS showed the liverwort *Aneura pinguis* that he'd spotted on the bank of the pond, Jess Hatchett admired a large earthworm *Lumbricus terrestris* that seemed equally able to move forward or backward and then we started a slow passage round the Reserve, demonstrating some of the common and less common plants on view. There were several clumps of Pleated Snowdrop growing along the brook, often in an odd location for planting, and we thought that seeds might have been washed downstream from gardens in Coton. On the other hand we thought a clump of Blue Anemone (*Anemone apennina*) growing near the sewage works must have been introduced despite the rather odd location. Part way round we had a good view of a pair of Buzzards circling around before they flew off into the distance. There were a lot of 7-spot Ladybirds (*Coccinella 7-punctata*), some engaged in making sure that there were even more, but no other species. We encountered several queen bees, but they weren't keen to stay put long enough to confirm their identity, thought in the end the consensus was that they were all Buff-tailed Bumble Bees (*Bombus terrestris*). By the end of the day our plant count had reached over 160 species, sub-species and varieties.

April 25. The morning saw the break of the drought after several weeks without rain. Nothing daunted, JS and MF met at the sewage works to look round a field that we hadn't visited previously. Walking round the edge we added several species to the list, which would have included honeybees except that they all seemed to be in their hives in one corner of the field. Completing the circuit we carried along Bin Brook and found a completely unexpected green lane (with several garden escapes), which led into a very hummocky and unimproved meadow. Here we found Lady's Bedstraw (*Galium verum*) and Field Woodrush (*Luzula campestris*), and JS found several liverworts along the Brook. Coming back we navigated a ditch and found Crosswort (*Cruciata laevipes*) at the corner of Rectory Field. After a lunch, where we added another grass, Meadow Fescue (*Festuca pratensis*), to the list, we returned to the Coton footpath entrance to greet the afternoon party. This slowly swelled in numbers to a dozen, covering all ages. Having pointed out some of the introduced wildflowers in the entrance area, we proceeded down the spine road, often trying some of the edible plants,

including Hedge Garlic (*Alliaria petiolata*) and Dandelion (*Taraxacum agg.*), but avoiding Parsnip (*Pastinaca sativa*). The arable weeds field had a magnificent display of Hairy Bittercress (*Cardamine hirsuta*), and also a spectacular forest of the fertile cones of Field Horsetail (*Equisetum arvense*) near Bin Brook. The new pond at Wheatcases had several additions, including introduced Water Soldier and a Water Crowfoot, which seemed to key, following inspection of the nectar pits, to *Ranunculus trichophyllus*. We decided that a sedge was too far from the edge to be accurately identified. From there we continued to View Point, passing on the way some Goosegrass (*Galium aparine*), which Michaela (the youngest member of the group) found great fun sticking to her clothes. At the top we had good views across Cambridgeshire, with notable landmarks of the Schlumberger "tent", St John's, King's College, the Catholic church and Addenbrooke's hospital. Coming down we inspected a Badger sett, then proceeded across Hawks Way looking at some of the arable weeds in the set-aside. The "improved" ancient ridge and furrow grassland of Middle Green proved rather disappointing. Although we saw several species of bee, every time we tried to collect them for identification they flew off, and only Red-tailed Bumble-bee (*Bombus lapidarius*) was positively identified. The flora records for the day added a further 50 species, with a total of 120 additions, as well as miscellaneous birds, mammals, amphibians and insects.

May 27. For the first of the evening walks we visited the north west part of the Reserve, though it took a little while to get there. A small group of five met by the footpath and first inspected the vegetation of the rendezvous point, with its introduced mix of wildflowers. Progressing along the spine road we compared trefoils and medicks. Although we didn't find anything else unusual, we did add a further 25 species to the reserve list. A subsequent visit in early June by JS to patrol the areas we didn't have time to visit added more species bringing the total to over 240. He also made a further visit later in the month to check up on orchids reported by Les Bradford and found that her land included large swarms of Common Spotted (*Dactylorhiza fuchsii*) and some Southern Marsh Orchid (*Dactylorhiza praetermissa*) in the plantation, along with Bee Orchid (*Ophrys apifera*) on the higher ground.

June 24. A small group of botanists (AL, JS and MF) assembled at the Coton meeting point, and first assessed four roses that JS had collected earlier. Three had been planted - Sweet briar (*Rosa rubiginosa*) is a favoured planting in the reserve, but Short-styled Field Rose (*Rosa stylosa*) was a more unusual find in the motorway hedge. A third rose planted in the copse was not yet identifiable, but the leaves were downy. The final one was the common Dog Rose (*Rosa canina agg.)*, which as it turned out was the only one that we encountered during the rest of the evening, which was intended to target roses and brambles. The group then proceeded down the spine road, spotting one or two additions, including Slender Tare, a red-listed species, though Cambridgeshire is its heartland. Reaching the motorway bridge, we were joined by another member, and here found several new species, which appeared to like the different

environment of the bridge embankment. Species included Wild Basil (*Clinopodium vulgare*), Round-leaved Cranesbill (*Geranium rotundifolium*), Fennel (*Foeniculum vulgare*) and the only new bramble of the evening, *Rubus conjungens*. We returned through the "weed field", which has shown an interesting succession through the year, running through Bittercress, Horsetail, Groundsel (*Senecio vulgaris*) and now Sow-thistle (*Sonchus sp.*) and Willowherb (*Epilobium sp,*). A few oddities also surfaced including a few plants of the hybrid Ryegrass (*Lolium x boucheanum*). Back on the spine road we reached the new pond where a wide variety of aquatics have been introduced. Some of these were deliberate such as the Purple Loosestrife (*Lythrum salicaria*) and Tubular Water-dropwort (*Oenanthe fistulosa*), which were in flower, but others were probably accidental such as Water Bent (*Polypogon viridis*) that we found at the pond edge. The pond has been quickly colonised by invertebrates and marginal plants had many dragonfly exuviae. One was inspected and demonstrated the amazing grip of the feet, which made for a reluctant transfer from hand to hand. The party returned on the circular route, although we kept encountering interesting plants, finding Treacle Mustard (*Erysimum cheiranthoides*) on the rough ground near Wheatcases, a Pyramidal Orchid (*Anacamptis pyramidalis*) in full flower in the hedge and Dwarf Spurge along the field margin. As it got darker we sped up a little but on entering the ridge and furrow field MF pointed out Wall Barley (*Hordeum murinum*) (not new) and JS suggested that Meadow Barley (*Hordeum secalinum*) should be present and then immediately found it. By the time we returned to the meeting point the sun had set, but we had made an additional 45 records of which 22 were new species taking the total species count to around 280.

July 22. Thunderstorms were forecast, but in the event the drought did not really break and whilst threatening clouds surrounded the area, only a few drops fell. Butterflies were in short supply, in contrast to the previous day when a group from the Wednesday volunteers had seen a good selection of species including White-letter Hairstreak (*Satyrium w-album*) flying above some of the big Elms (*Ulmus sp.*). A larger than usual group assembled at the Coton Footpath entrance and were briefed about Cambridge Past, Present & Future and the Reserve by Carolin Gohler, the Chief Executive of the Society. Moving along the spine road, JS pointed out the seed heads of Strawberry Clover (*Trifolium fragiferum*) along the far side of the ditch, which Carolin said had not been introduced. Turning off past the Recreation Ground we looked at a few of the grasses along the field margin, and the Stinking Iris (*Iris foetidissima*) growing in the hedgerow. The new plantation at the end of Rowans Field had had soil from Hayley Wood introduced, but no obvious plants appeared to have come with it, although JS found an awned Bent (*Agrostis* sp.*)* on the track, which appeared to key to Common Bent (*A. capillaris*). Access to Bin Brook was rather impeded by vegetation, so we pressed on to the ridge and furrow field of Middle Green. The Brook was full of invasive Himalayan Balsam (*Impatiens glandulifera*) and one Willow (*Salix sp.)* had a strange mossy gall. Long Green had recently been topped, and only a few arable weeds were identifiable. However the motorway

bridge bank was resplendent in Teasel (*Dipsacus fullonum*), with Stone Parsley (*Sison amomum*) coming up. Returning along the Brook we noted that there had been less bank collapse in the area that was thick with Horsetail, so maybe this was a way of strengthening it. We crossed over to look at part of Hays Ends and Hawks Way which had been left uncultivated. There was some Dwarf Spurge in Hays Ends and rather more in Hawks Way, but no sign of any Broad-leaved Spurge, which JS had found earlier in the week in Further Field on the other side of the motorway. Altogether we added a dozen plant records of which five were new.

August 29. With a return to Sunday visits, SH and JS carried out the morning patrol, finding a few new species. The rate of finds was clearly dropping, suggesting that the list of vascular plants for the site was nearing its conclusion. After the usual picnic lunch we headed for the motorway bridge, casting slightly anxious looks at encroaching dark clouds. As we began to head back towards Wheatcases Barn to meet the afternoon party driving rain and wind arrived, more reminiscent of autumn than the end of summer. We found shelter in the Barn and a few more people arrived to begin the second part of the day. Fortunately as we discussed plans the rain eased and it remained dry for the rest of the afternoon. Our route took us up the hill and then back via Les Bradford's farm.

September 26. Despite a cold morning with fleeting patches of drizzle, JS covered some of the northern part of the reserve. The first find was the introduced Long-sepalled Hawthorn (*Crataegus rhipidophylla*), planted in the copse by the Coton Footpath. Some of the other plantings are also likely to be this or its hybrid with the ordinary hawthorn. Trying a slight variation of routes, the other side of the recreation ground hedge had a planted Rowan (*Sorbus aucuparia*) and Swedish Whitebeam (*Sorbus intermedia*). The wet weather had demanded Wellington boots, and this allowed some exploration of Bin Brook. A surprising addition was a Shield-fern (*Polystichum sp.*) opposite gardens in Coton, suggesting a possible planting, though it was clearly thriving. Also in this section was Enchanter's Nightshade (*Circaea lutetiana*). Heading back towards Wheatcases Barn, the fleeting showers began to get less fleeting, and by the 2pm start time of the planned lichen survey it had set in for the rest of the afternoon. These were atrocious conditions for a survey, so our attempt at completing the OPAL Air Quality survey fell by the wayside, nevertheless a stalwart band of six including Mark Powell, the County Recorder, set off up the hill. Ash trees, some quite ancient provided a good substrate, and Mark showed common species such as Yellow Scales (*Xanthoria parietina*). Along the way Mark explained some of the features of lichens. He also described how he had been looking at old wattle laths and finding lichens dating back several hundred years. The findings were being used to compile an account of lichens in lowland Britain prior to the industrial revolution. Along the brow of the hill the old Elder trees attracted Mark's attention, and he vowed to return under better conditions for another look. We still managed to identify 20 lichens with a couple more not

being nameable. Fungus expert Helene Davies was another member of the party, however fungi were rather sparse. We did spot some rather desiccated (despite the weather!) Chicken-of-the-Woods (*Laetiporus sulphureus*) on a willow, a Sticky Scaly-cap (*Pholiota gummosa*) and a ring of the relatively uncommon Satin Shield (*Pluteus plautus*) near the top of the hill. With the rain still falling, the party returned to the Barn and decided to call a halt rather than investigate any lichens on the bridges over Bin Brook and the M11. Mark revisited the elder bank on October 8, his finds including three notable lichens: *Caloplaca ulcerosa* (scarce, but throughout lowland Britain), *Lecania cyrtellina* and *Piccolia ochrophora* (rare, some eastern occurrences).

October 31. A spell of mild weather made for potentially good prospects for finding fungi. Whilst rain was in the offing we only experienced a very short shower in the morning and a few spots throughout the afternoon. The morning botanical party (AL, MF, SH and JS) began by looking at hawthorns along the edge of the copse by the Coton Footpath. There was quite a variety of fruit and leaf shapes, and we decided that whilst the basic tree was the Common Hawthorn (*Crataegus monogyna*), there was clear influence of other parents including Midland Hawthorn (*C. laevigata*) (with some plants being mostly this), *C. heterophylla* and *C. rhipidophylla*. We then moved on to the Bin Brook, to check the fern that Jonathan had found the previous month. After a bit of wading through the brook Jonathan re-found it, with Alan thinking it a bit odd, but probably *Polystichum setiferum* rather than *P. aculeatum*. A nearby garden had both species in it, and after taking specimens home Alan thought that a hybrid was possible, and this was confirmed by the BSBI referee. On the way back to the meeting point we noted several fungi in the meadow and the party had to be dragged past them to get to the start on time. Here we had our best turnout of the year, with 21 assembling, with a good boost from members of the Cambridge University Mycological Society. Led by John Holden, we started by showing a specimen of Verdigris Agaric (*Stropharia aeruginosa*) from the nearby stubble field (contrasting it with the supposed *S. caerulea* found the previous day in the Botanic Garden), and some Dog's Vomit (*Mucilago crustacea*) on grass near the entrance. We spent an hour scrabbling through the copse and scrub near the footpath, and whilst we found around 15 species, none was spectacular. One interesting find was a Red Slug (*Arion rufus*), though it was showing its pale colouration with an orange margin to the foot. We moved on to the ridge and furrow meadow, and whilst past spraying to "improve" it had removed any interesting vascular plants, the fungi were still there. There were some large specimens including Blewits (with some Field Blewit (*Lepista saeva*) being taken home to eat) and Agarics, the delicate Pleated Inkcap (*Coprinus plicatilis*) and at least four waxcap species including a Parrot Waxcap (*Hygrocybe psittacina*). In total we found around 34 different species of fungi.

November 28. When reminding members of the CNHS about the bryophyte excursion an injunction was given that it would only be cancelled in the event of a blanket of snow covering the ground. A light dusting of snow and an overnight

temperature of -7°C did not therefore deter the group of stalwarts who assembled at the Martin car park with the temperature still at -3°C, and which did not rise above freezing all day. Mark Hill, Chris Preston and Tom Charman provided expert assistance with identification and recording, with JS and Kevin Hand completing the party. We started by looking round the car-park and showing some of the common bryophytes, including *Brachythecium rutabulum* a pleurocarp moss which is abundant in Cambridge lawns, *Fissidens taxifolius* an acrocarp moss which has flat shoots and *Syntrichia ruralis*, colloquially known as the car-park moss on account of its predilection for tarmac. Jonathan led the group on a circular, clockwise walk that was designed to look at a variety of habitats and visit all the 1km squares of the Reserve. Going up the hill we found a small amount of the liverwort *Pellia endivifolia*, one of the commoner thallose liverworts that grows on shaded stream banks. Attempting to find some additional mosses in the new copse by Rectory field we noted several lichens on the Ash trees (including *Lecanora sp* and *Xanthoria parietina*). Lunch was taken near the top of the hill and we descended down to Bin Brook to look at an older area of stream and scrub. Along the Brook, in an area visited several times previously JS spotted some Hartstongue Fern (*Asplenium scolopodendrium*), which we had not previously found within the reserve boundaries. Returning via the scrub at the end of the meadow we joined the spine road, where the ditch bank turned up a few additional species, including a small piece of the liverwort *Aneura pinguis* and *Bryum gemmiferum*. A detour via the motorway bridge found a few more species, but the left-aside field proved disappointing and we returned to the car-park as cloud began to cover the sky. Despite the conditions we found around 40 species, all characteristic of the general arable chalky clay environment.

The 2011 survey is covering The Backs. Although the present CNHS group tends to concentrate on plants, we make records of other organisms too and would welcome beginners and experts with other interests. Do come and join in. Dates for the monthly surveys, and flora lists for many of the wildlife sites near Cambridge are on the Society web page at http://www.cnhs.org.uk

Thanks are due to David Barden and Alan Leslie for comments on my original text, and to Monica Frisch for making notes on the February visit.

Vascular Plant Records

Alan Leslie

The list of records below demonstrates that Cambridgeshire still has plenty of rewards for botanists prepared to go out and record; whether this is as a result of methodical and regular quartering of a particular patch or casting about more widely for anything that is of interest. More targeted recording, chasing up

records for a particular species, can also produce handsome dividends, such as those reported in James Cadbury's account of *Persicaria mitis* and *P. minor* in this volume. Sometimes areas that at first sight seem unpromising can be unexpectedly productive, as Jonathan Shanklin has shown in surveying the predominantly agricultural 'Wicken Vision' area, which has produced sites for three very local plants: *Torilis arvensis*, *Fumaria muralis* subsp. *boraei* and *Galeopsis speciosa.* In much the same way David Barden and I have been independently walking over parts of the great expanse of Newmarket Heath and he has unearthed a significant colony of Meadow Saxifrage (*Saxifraga granulata*), which has never before been reported from the Heath. Between us we have also now refound all of the special plants recorded by David Coombe in the 1980s on the area of glacial stripes and polygons between the Devil's Ditch and the Rowley Mile course, as well as adding a new calcifuge species to the flora of this area in the shape of *Agrostis vinealis.*

New alien records continue to surface in all sorts of places. It seems extraordinary that a plant as big as *Ferula communis* can be present on the side of a very busy main road (the A47 near Wisbech) for at least 8 years without a formal report reaching our record book, but then perhaps we have too few botanists in the north of the county. Only a chance overheard remark during a botanical outing has resulted in its inclusion here now. Equally surprising is the discovery of a large population of a viviparous variant of Bulbous Meadowgrass (*Poa bulbosa* var. *vivipara*) apparently long naturalised and perfectly happy under beech trees by the Devil's Ditch. This could very easily be being overlooked elsewhere in such an atypical habitat both in this county and elsewhere.

Our list of maritime invaders has grown again with the addition of *Artemisia maritima* and *Chenopodium glaucum*, whilst many others previously recorded continue to be seen more widely. Great care must be taken when searching for these on busy main roads as this community is often best developed right at the edge of the verge. In some cases the abundance of these plants is startling: along the A11 for example, between Four Went Ways and Stump Cross, there are now ribbons of Sea Barley (*Hordeum marinum*) stretching for hundreds of yards.

A number of new or unusual hybrids have also come to light during the year and it is perhaps of interest that at least one of these (*Phygelius aequalis* x *capensis*) is derived from two alien species, whilst the hybrid fern *Polystichum* x *bicknellii* is in this instance probably derived from spores self-sown from planted individuals of the two native parents. Two other hybrids (*Arum italicum* x *maculatum* and *Dipsacus fullonum* x *laciniatus*) represent crosses between one alien and one native taxon, whilst *Primula elatior* x *veris* and *Rumex obtusifolius* x *palustris* are both native combinations.

The Cambridge Flora Group excursions have again produced some good finds (see for example the records for *Oenanthe crocata* and *Persicaria minor* below) and these trips often give one the opportunity of visiting areas that are otherwise difficult to access legitimately. All are welcome to join us for these meetings and the more pairs of eyes we have the more interesting records we will make. Our thanks are due to all those that have taken part in these trips and

all those who have assisted the vice-county recorders in fulfilling the requirements of the current BSBI Threatened Plants Project.

The new Flora of Cambridgeshire is continuing to take shape and as predicted last year I am now almost a third of the way through preparing the accounts. I am grateful to those that have answered queries, searched for plants or who have provided their expertise to confirm or identify material. There is plenty more to come! Gigi Crompton is also making good progress with revising Part 1 of her unique web-based Catalogue of the Cambridgeshire Flora (www.cambridgeshireflora.com) and this should be available during 2011. Please keep sending in your records so that both these notes, the new Flora, the web Catalogue and the vice-county records can be kept up to date with your finds.

[In last year's notes the records for *Galium saxatile* and *Carex pilulifera* were given without a date. They were both found on 9 May 2009]

Agrostis vinealis A small patch in the centre of a colony of *Serratula tinctoria*, Newmarket Heath (between the Rowley Mile grandstand and the Devil's Ditch), TL61536211, A.C. Leslie, 3 July 2010 (**CGE**); a few more small patches just to the south-east, as far as 61596204. This is the best area on the Heath with a calcifuge flora associated with glacial stripes and polygons, but *A. vinealis* has not been recorded here before. It is a rare grass in the county, only seen for certain recently at Gamlingay Cinques. This and *A. canina* may be being overlooked, but any candidates must be accompanied by voucher material as awned forms of other species can cause confusion.

Alopecurus aequalis Scattered over several square metres of water in a drain between Clay's Bridge and the R. Cam, Waterbeach, TL52916979, C.D. Preston & M. Gurney, September, 2010. A new site for a very local Cambridgeshire plant, but one that is often sporadic in its appearance at any site. There have been a number of other records along the Cam valley north of Cambridge, the most recent being Graham Easy's from Quy Fen in 1969.

Artemisia maritima A large patch in the central reservation of the A14, south-west of the Devil's Ditch footbridge, south-east of Swaffham Prior, TL59256213 (taken at the edge of the road!), J.L. Sharman, 25 July 2010, conf. ACL. Another addition to our list of maritime invaders on main roads: it is found with us as a native by the tidal R. Nene north of Wisbech. A further large patch occurs on the central reservation just a bit further east on the Suffolk section of the A14 as it bypasses Newmarket. A voucher from the latter patch is in **CGE**.

Arum italicum x *A. maculatum* Several distinct clones in amongst a population of *A. maculatum* (containing plants with both plain green and black-spotted leaves), bank of dry ditch below hedge, along field track, north of Burton End, West Wickham, TL62284997, A.C. Leslie, 7 April 2010. There was no evident *A. italicum* and the site is some way from any garden. Whilst both parents are very variable the various clones of the hybrid combined pale leaf veining (not present in *maculatum*), some with black spots (very unusual in *italicum*), intermediate leaf shape and in the two cases seen with flowers with either a reddish purple spadix or a yellow spadix flushed with purple (yellow in *italicum*, purple or yellow in *maculatum*). In addition none of the plants was yet in leaf by late November 2010, when *italicum* in cultivation was in full leaf (*maculatum* does not have fully developed leaves until well into the New Year and often much later). First confident v.c. record, although other likely candidates have been seen recently at Ely, Little Shelford and Hildersham.

Buphthalmum salicifolium Four plants apparently self-sown on a brick wall, The Range, Ely, TL53808016, A.C. Leslie & J. Davis, 12 August 2010. First v.c record for a central European native, with narrow leaves and yellow daisy-like heads; said to be increasing as a garden escape on the continent. Another probable site, on a very tall wall in Green Lane, Ely needs to be confirmed when in flower.

Carex arenaria Scattered over a large part of a new bank above the R. Nene, behind the car park for new offices, North Street, Wisbech, TF46100986, A.C. Leslie, 13 June 2010 (**CGE**). Clearly an introduction here, perhaps with soil to make up the bank, although there is evidence of 'wildflower' mixes being used in this area.

Carex pilulifera Gamlingay Wood, T. Charman, 7 May 2009. Nick Millar followed up this report and found Pill Sedge occasional to frequent for c.35m of the heathy ride developed over a sand lens in this predominantly boulder clay wood, close to its junction with the main ride, TL24165351-24195348, 22 June 2010. Last reported in this wood in 1909 and our third recent record for this species which had been thought extinct!

Chenopodium foliosum One plant on a soil tip above Reach, TL56406564, A.C. Leslie, 19 August 2010 (**CGE**). Other than as a weed in the University Botanic Garden (2007), our only other record for Strawberry Goosefoot was at Cambridge Station, in 1921: another record from Thriplow, in 1951, is now known to have been the closely related *C. capitatum,* which shares the swollen, red, strawberry-like fruits.

Chenopodium glaucum Probably several hundred small plants on bare, shallow depressions in the salt splash zone on the west side of the north-bound carriageway of the A11, just south of Four Went Ways, Little Abington, TL52054991, A.C. Leslie, 11 July 2010 (**CGE**). Last recorded in the county as a single plant on well-manured ground at Bourn in 1976. Probably native in some seaside localities in the south of England; this would appear to be yet another maritime invader in Cambridgeshire.

Chenopodium murale Frequent at edges of sandy fields between the A14 and Kennett Station (TL700672) and at the south-western corner of the same field system just east of the Moulton/Chippenham road (TL682671), A.C. Leslie, 24 September 2010. It is clearly well naturalised in this area bounded by the A10, A14 and the B1085: David Coombe first recorded it here in 1945 and Graham Easy noted it as an 'established weed in Kennett arable' in 1980.

Crambe hispanica subsp. *abyssinica* Four plants scattered along the southern verge of the old main road, west of the A428 Cambourne roundabout, TL31526045, A.C. Leslie, 23 October 2010, **CGE**. First v.c record for Abyssinian Kale, reported now to be grown in this country as an oilseed crop, although not yet spotted on a field scale in Cambridgeshire.

Clematis cirrhosa Self-sown at wall base, in front of 51 Humberstone Road, Cambridge, TL4559, A.C. Leslie, 18 April 2010. First v.c record for this evergreen, winter-flowering clematis.

Danthonia decumbens Three plants in a heathy 'stripe', Newmarket Heath (between the Rowley Mile grandstand and the Devil's Ditch), TL61536213, A.C. Leslie, 3 July 2010. First recorded in this area by David Coombe in 1986/87 but not seen since despite repeated searches. Formerly also on the Beacon Course (1975) and on the July Course (1973); it would be good to refind these other sites. A very local grass in the county.

Dipsacus fullonum x *D. laciniatus* (*D.* x *pseudosilvester*) One plant, with hundreds of both parents, on the disused railway line between HM Whitemoor prison and the Twenty Foot River, March, TF40810042, A.C. Leslie, 24 July 2010. Both parents may have been introduced here, but are now self-sowing in great quantity. This was the only hybrid located after a prolonged search. First v.c. record.

Elytrigia atherica In his *Flora of Cambridgeshire* (1860) Babington recorded Sea Couch 'above and below the town of Wisbech abundantly', but apart from Derek Wells's record at Ring's End in 1997 all our subsequent records have been below the town, mainly at Foul Anchor. Investigation of the area between Wisbech and Ring's End by ACL in 2009 and 2010 has shown that it persists on the river walls in Wisbech itself (TF46130985), in the river wash opposite Guyhirn (TF399034) and in many places along the north side of North Brink, as well on the A141 at Ring's End (TF39820280) and along the south side of the Nene on the banks and verges of the A47 up to at least a verge just west of the old railway crossing south of the town (TF45210745). This species is occurring more widely now on salted road verges elsewhere in the county.

Epilobium obscurum Several plants along fence base, north side of University Rugby Ground, off West Road, Cambridge, TL43895826, A.C. Leslie, 4 August 2010. Previously recorded from Cambridge in 1957 as a garden weed and otherwise a very scarce plant in the county. Still at Gamlingay, recently recorded from a number of Fenland towns and villages and perhaps slowly increasing its range; easily overlooked.

[*Eccremocarpus scaber* cf. *Nature in Cambridgeshire* **52**:68 (2010). Apologies to Graham Easy for claiming the record listed as the first for the county: he had earlier recorded this species on three previous occasions]

Erucastrum gallicum Two plants on the margin of a pea crop, east of Limlow Hill, Litlington, TL328416 and 329416, A.C. Leslie, 18 July 2010, a further two nearby on the edge of a sown strip of *Phacelia tanacetifolia*. Apparently naturalised at this site as it was recorded from here by Peter Sell in 1998. Hairy Rocket was naturalised on waste ground by the Devil's Ditch at Newmarket from at least 1876-1980 and it might be worth checking up on the sites of other records.

Ferula communis subsp. *communis* On the south-east facing bank of the A47, just south-west of Oak Tree Farm, South Brink, south-west of Wisbech, TF422056, Mrs Stella Taylor, 21 April 2003; shown to ACL on 1 June 2010 (**CGE**) when two large clumps (one flowering) and one smaller seedling plant were present; according to Mrs Taylor in some years young plants appear along the flat part of the verge but get mown off; accompanied on this bank by a big population of *Elytrigia atherica*. First v.c. record for this Mediterranean umbellifer, which has been known on a verge near Barton Mills (Suffolk) since 1988.

Fumaria muralis subsp. *boraei* (a) one plant, White Fen Droveway, Bottisham Fen, TL52786433, J.D. Shanklin, 31 May 2010, last recorded in this general area, from Swaffham Prior, by J. Downes in 1829 (b) abundant along the top of south-west facing bank, on south-west side of Mildenhall Road, Littleport, TL59668656, A.C. Leslie, 6 May 2010, also on track off White House Road (60278654) nearby, last recorded in this area by Frank Perring in 1958. A very local plant in the county which, with us, seems predominantly a plant of Fenland.

Galeopsis speciosa About six plants on the side of a recently cleared ditch, north end of Bottisham Fen, TL52056652, J.D. Shanklin, 11 July 2010. This very attractive hemp-nettle

was at one time much more frequent as a field weed in the Fens, but has now become very scarce. It was recorded from Bottisham Fen by C.C. Babington in 1849.

Lathyrus tuberosus A patch over c.6ft of grassy bank bordering a cornfield, below south-west side of road to Morden Grange Farm from the A505, south-west of Royston, TL31263952, A.C. Leslie, 18 July 2010 (**CGE**). First v.c. record for the alien Tuberous Pea.

Oenanthe crocata In an old brick pit, now the King's Dyke Nature Reserve (South), Whittlesey, TL25199771 (one flowering plant and a few seedlings) and TL25209769 (one large and one smaller flowering plant), CFG Excursion, 19 June 2010. Second v.c. record for naturally occurring Hemlock Water Dropwort, which may be expected to spread further in coming years.

Parapholis incurva A small patch containing numerous plants, on the edge of the verge on the south-east side of the south-eastern carriageway of the A505, Royston bypass, TL33854088, A.C. Leslie & T.J. James, 30 June 2010 (**CGE**). Second v.c. record for this seaside grass. The verge also held *P. strigosa*, *Sagina maritima* and a number of other maritime invaders. First recorded on a similar verge near Stow-cum-Quy in 2003. Probably overlooked elsewhere.

Persicaria minor Seven plants in the cattle-poached margin of a ditch (which also held *P. mitis*), running at right angles to the R. Delph, south-west of the Welney Road, Ouse Washes, TL52579314, CFG Excursion, 21 August 2010. A new site for the elusive Small Water-pepper, just north-east of a 1993 record at Mott's Legg. Only seen recently in two other sites in the county

Phalaris paradoxa At least four plants in the corner of a potato field, east side of A141, north of Westry, TL394997, A.C. Leslie, 24 July 2010. Perhaps being overlooked in Fenland field margins, it was in a similar situation in arable fields west of Littleport in 2007.

Phygelius x *rectus* (*P. aequalis* x *P. capensis*) One flowering plant self-sown into damp brickwork just above the water level, by the mill race, north end of Sheep's Green, Cambridge, TL44695801, J.D. Shanklin, 29 June 2010 (det. A.C. Leslie). First v.c. (and possibly first British) record for a fertile garden hybrid between these two South African species. There is no immediately apparent source, but Cape Figworts are quite frequently encountered in College gardens.

Physalis philadelphica One plant flowering at junction of pavement and bridge parapet, east side of Elizabeth Way bridge, Cambridge, TL46105911, A.C. Leslie, 24 August 2010. Second v.c. record for the Mexican Large-flowered Tomatillo, more often grown in warmer countries for its edible fruits. Previously recorded from Cambridge sewage farm.

Polystichum aculeatum x *P. setiferum* (*P.* x *bicknellii*) At least one plant, of intermediate form and with poorly formed spores, on the steep south bank of the Bin Brook, behind gardens at Coton, TL40795850, CNHS excursion, 31 October 2010 (**CGE,** det. A.C. Leslie, conf. F. Rumsey). Both parents are planted in gardens a little further up stream. The site was first discovered by Jonathan Shanklin on 26 September 2010 when he recorded the small collection of c.5 plants as *P. aculeatum*. At least one of these is indeed *P. aculeatum* (confirmed by Fred Rumsey, although not entirely morphologically typical, it had well-formed, 'good' spores); this is only our second recent record for Hard Shieldfern. The identity of the other individuals in this population needs checking and it is clear that any other claims for the hybrid need to be backed up by spore examination. First v.c. record.

Poa bulbosa var. *vivipara* Probably several thousand plants scattered in more-or-less bare (or moss-covered) flat ground, under beech trees along the south-west side of the fosse of the Devil's Ditch, by Stetchworth Park Stud, Stetchworth, TL64665905, A.C. Leslie, first seen 20 May 2007, but initially misidentified by ACL, the species later suggested by M. Wilcox and this and the variant confirmed by T.A. Cope (**CGE**). First v.c. record for this proliferous variant, which here also has distinctive long, very narrow leaves, springing from bulb-like bases which build up into large rock-hard clumps in the shade of the trees. A very different non-proliferous variant, with much shorter, broader leaves is well naturalised on road verges around Newmarket and on the Heath. Normally a plant of dry open areas near the coast and presumably introduced here, though whether accidentally or on purpose it is hard to say. Could easily be being missed in similar situations elsewhere in the county.

Populus nigra Eleven self-sown plants (all now 20-30ft tall), in a ditch along the north-west side of A10, just south-west of Shepreth Mill, TL39834710, A.C. Leslie, 31 May 2010. There is a well-known female tree in the grounds of the mill on the other side of the road, which is the presumed seed parent. The nearest Male Black Poplars are recorded from Bassingbourn and Shepreth. These appear to be the first definite self-sown plants recorded in the county.

Primula elatior x *P. veris* (*P.* x *media*) One plant, amidst a colony of *P. elatior*, on the steep bank of a stream running parallel to the old railway line, east of Cardinal's Green, TL62664636, A.C. Leslie, 24 April 2009 (**CGE**). A rarely recorded hybrid, typically found only in small quantity. Here part of an unusual oxlip colony, first reported earlier in the season by David Barden, which runs for some distance along this stream, detached from any woodland and accompanied by many cowslips. Although no primroses were seen in this area the oxlip colony also contains at least one putative hybrid with that species.

Rubus macrophyllus Clambering over hedgerow shrubs, south side of the B1085, just east of the entrance to Dane Hill Farm, Kennett, TL693682, A.C. Leslie, 27 June 2009 (**CGE**), det. A.L. Bull. First v.c. record for a native bramble that is widespread in central, southern and eastern England. Remarkably, this same hedge is the only extant site in the county for *R. dasyphyllus*.

Rubus nemoralis Scattered under trees in Roundabout Plantation, Chippenham, TL678695, A.C. Leslie, 27 June 2010 (**CGE**), det. A.L. Bull. Previously only known in Wilberforce Road in Cambridge, by the railway at March and by the King's Dyke at Whittlesey: it persists in all these sites.

Rubus polyanthemos (a) one patch at margin of woodland, Old Hollow, Newmarket, TL667632, A.C. Leslie & D.J. Barden, 26 June 2010 (**CGE**) (b) several large patches in or on the edge of Heath Plantation, Chippenham, TL682693, A.C. Leslie & D.J. Barden, 27 June 2010. Previously only recorded from the Gamlingay greensand (where it still occurs) and in both Hayley Wood & Borley Wood, from neither of which has it been reported recently.

Rubus watsonii Clambering through and over shrubs near the centre of the University Botanic Garden, Cambridge, TL455571, A.C. Leslie, 2 July 2009 (**CGE**), det. A.L. Bull. First v.c. record for a native species that is not cultivated in the Garden and was presumably introduced by birds: it is widespread in the south and east Midlands and in other parts of East Anglia.

Rumex palustris x *R. obtusifolius* (*R.* x *erubescens*) One plant, 5ft tall, with both parents, on the muddy, north-west bank of the tidal R. Nene, Guyhirn, TF39850342, A.C. Leslie, 24 July 2010 (**CGE**). Listed for v.c. 29 in Stace (*Hybridization and the Flora of the British Isles*,

1975), but the basis for this record has not yet been traced. The riverside docks along these muddy margins are notable for their size and luxuriance: plants 5-6ft tall are quite normal.

Salix cinerea x *S. myrsinifolia* (*S.* x *strepida*) One large bush by the gate and stile at the west end of the North Meadow, Chippenham Fen, TL64346946, CFG excursion, 10 July 2010, conf. R.D. Meikle (**CGE**). Second v.c. record for this hybrid willow, previously recorded from Fordham Woods, the only other possible native station for *myrsinifolia* in the county.

Saxifraga granulata Scattered in turf over an area of c.30 x 100m, c.100m south-west of the Rowley Mile course, at the northern edge of the area of stripes and polygons, Newmarket Heath, TL61676233-61776230, D.J. Barden, 9 May 2010. At least 50 plants, some of which are substantial clumps. A remarkable new find for a scarce Cambridgeshire plant that has not previously been reported from the Heath. David Coombe and Gigi Crompton reported it in similar conditions from Long Hill, east of Newmarket in 1987.

Serratula tinctoria (a) Thirty plants scattered over c.25m of ditch bank, by the footpath just west of the county boundary, south of Linton, TL548455, D.J. Barden, 12 April 2010, a completely new site for a very scarce plant in the county, growing here with *Anemone nemorosa, Hyacinthoides non-scripta* and *Mercurialis perennis* (b) refound on Newmarket Heath, between the Rowley Mile grandstand and the Devil's Ditch, TL61536211, D.J. Barden, June 2010, clearly the same area from which David Coombe picked up mown stems in 1988, but not reported before or since in this area; another patch was located by ACL nearby on 3 July. First recorded on the Devil's Ditch in c.1722 by Joseph Andrews.

Stranvaesia davidiana One plant, c.3ft tall, bird-sown on the top of the tall wall separating the Scholars Garden, Clare College from King's College grounds, Cambridge, TL446584, A.C. Leslie, 13 April 2010. First v.c. record for an evergreen Chinese shrub, grown for its clusters of round, red berries; the old leaves often also going an attractive red before falling.

Torilis arvensis Locally frequent on top of the south-west bank of reservoir, south side of Swaffham Prior Fen, TL52916696, J.D. Shanklin, 11 July 2010. A new site for a now rare umbellifer, which appears to be persisting better in Fenland than elsewhere in the county. In this general area it was recorded from Swaffham, Bottisham and Reach in the nineteenth century, across the river in Waterbeach in 1957 and at Horningsea in 1978.

Tripleurospermum maritimum subsp. *inodorum* var. *eradiata* Entrance to lane leading west from the Trap Road, between Steeple Morden and Guilden Morden, TL284434, P.D. Sell, 24 September 1988 (**CGE**, PDS no.88/428). Peter Sell reports (August 2010) that this rayless variant of Scentless Mayweed is still at this locality. First v.c. record.

Umbilicus rupestris One small flowering plant on top of brickwork, in front of the Museum of Zoology, New Museums site, Cambridge, TL4458, J. Holden, 12 June 2010. Marked as a Cambridgeshire plant by Ray (1670) in his *Catalogus Plantarum Angliae*, but we have no other note of its occurrence until it was recorded as a garden weed in Gilbert Road, Cambridge in 1992. Dr Henry Tribe reports that it was at one time cultivated on the roof of the Zoology Department and had started to sow itself there, although there was no sign of it on the roof in 2009. The present record may derive from this source.

Verbascum densiflorum One flowering plant on an old soil heap on waste ground just south of the village, Duxford, TL48744532, A.C. Leslie, 8 August 2010. First definite record for an ornamental, large-flowered mullein; very similar to *V. thapsus,* but with larger flowers and a characteristically very strongly decurrent, rather than capitate stigma. Previous records have proved to be other species or have not been satisfactorily confirmed.

Bryophyte records

T.G. Charman and C.D. Preston

With the completion of the formal recording for the proposed new bryophyte flora of Cambridgeshire (v.c. 29) at the end of 2009, the main focus of the British Bryological Society's Cambridgeshire Group has switched to Huntingdonshire (v.c. 31). This therefore seems an appropriate time to extend the scope of these records to cover both vice-counties. The records below have been compiled by Tom Charman and Chris Preston, B.B.S. vice-county recorders for Huntingdonshire and Cambridgeshire respectively. The bryophytes of Huntingdonshire are less well-known than those of Cambridgeshire, as shown by the number of new vice-county records reported below.

We would like to thank Mark Hill for his help in compiling the Cambridgeshire records with C.D.P. over the last decade. Mark and Tom have now taken on the organisation of the Group's excursion programme. We continue to welcome anyone interested in recording bryophytes to these excursions, which are held approximately fortnightly during the winter months.

Mosses

Dialytrichia mucronata **31:** On the banks and concrete embankment of the R. Kym around the ford N. of Hail Weston, TL172631, M.O. Hill & C.D.P., 3.4.2011, BBSUK, conf. T.L. Blockeel. New to v.c. 31. This predominantly southern species is a plant of the flood zone of streams and rivers. It occurs, albeit rarely, in v.c. 29, so this is perhaps a not unexpected find.

Orthotrichum obtusifolium **31:** On a leaning *Fraxinus excelsior* in Warboys Wood SSSI, TL2989981914, J.G. Duckett, 6.3.2011, BBSUK, conf. T.L. Blockeel. New to v.c. 31. A rare species, until recently virtually confined to parkland trees in north-east Scotland. This adds to a handful of recent records in the east of England.

Orthotrichum striatum **31:** On *Acer campestre* in Little Paxton Wood SSSI, TL1647763748, C.D.P., 3.4.2011, BBSUK, conf. T.L. Blockeel. New to v.c. 31. This is one of a number of epiphytic *Orthotrichum* species that are spreading in southern England, following improvements in air quality. It is widespread in the north and west of Britain, but is still rather scattered in the east of England.

Rhynchostegium megapolitanum **31:** On the peaty bank of a drain in the northern tip of Holme Fen NNR, TL2090, M.O. Hill, 16.10.2010, BBSUK, conf. T.L. Blockeel. New to v.c. 31. A reasonably common species that is probably overlooked as it often grows in rarely bryologised rough grassland.

Liverworts

Calypogeia fissa **29:** In very small quantity on top of shaded and frost-fractured sandstone rock beside lake, with *Cephalozia bicuspidata* and *Campylopus introflexus*, Cambridge University Botanic Garden, Cambridge, TL4572, J.J. Graham, 1.2011. Both *Calypogeia fissa* and *Cephalozia bicuspidata* are calcifuges which have been recorded previously on acidic

substrata in the county's woods and fens; they have presumably been introduced to the Botanic Garden.

Cololejeunea minutissima **29:** On *Crataegus* by main drain near footbridge, with *Metzgeria furcata*, *M. violacea* and *Frullania dilatata*, Barnwell West L.N.R., TL47855861, J. Shanklin, 8.3.2011. Two small patches on a *Salix*, Linton Pocket Park, TL56684641, J.S., 26.03.2011. Forty or more small colonies in total on four neighbouring trunks of *Salix* near pond, Hoo Fen, Anglesey Abbey, TL52446202, J.S., 30.1.2011. Small patches on *Salix* by pond, with *Metzgeria furcata*, *M. violacea* and *Frullania dilatata*, Hare Wood, TL62234806, J. S., 9.4.2011. **31:** Small patch on trunk of *Fraxinus excelsior* on edge of shaded ride, Warboys Wood SSSI, TL30288188, J. Shanklin, 6.3.2011, BBSUK, conf. S.D.S. Bosanquet. New to v.c. 31. This tiny epiphytic liverwort is spreading in eastern England; it was first recorded in v.c. 29 in 2007 but it is now clearly very well-established here.

Metzgeria consanguinea (*M. temperata*) **31:** Large patch on sloping *Salix* trunk, Warboys Wood SSSI, TL29988212, J.G. Duckett, 6.3.2011, BBSUK, conf. S.D.S. Bosanquet. New to v.c. 31. Although common in the north and west, this is a very scarce liverwort in the east, with only three recent East Anglian records, all from Suffolk. The allied *M. violacea* (*M. fruticulosa*) has certainly increased in frequency in recent years and perhaps *M. consanguinea* is another epiphyte benefiting from improvements in air quality.

Invertebrate records

Louise Bacon

This is the annual focus on records of invertebrates which have never previously been recorded in vc29, are rarely recorded, or have shown unusual occurrence patterns or behaviour.

Contributions have come from various sources, mostly county recorders or other keen amateur naturalists. Records of significant invertebrates can be sent to the data officer at Cambridgeshire & Peterborough Environmental Records Centre, Manor House, Broad Street, Cambourne (email via data@cperc.org.uk) and will be passed to county or national scheme recorders for verification

Na and Nb are measurements of national scarcity based on 10km square distribution.

Coleoptera: Carabidae (Ground Beetles)

Chlaenius nigricornis (Nb), Ouse Washes, Welney (in administrative Norfolk but vice-county 29 Cambs). This species was in good numbers in a minor ditch with a soft, moist, peaty base beneath a canopy mainly of Trifid Bur-marigold. The beetles were disturbed as members of the Cambridgeshire Flora Group walked along the ditch bottom and were first spotted by Steve Hartley and identified by Nick Millar. Both colour varieties (the common form and var. *melanocornis*) were present.

Diptera: Syrphidae (Hoverflies)
Volucella bombylans has two colour forms (red tailed and white tailed bumble bee mimics). Peter Moule noticed a mating pair, one each of each colour form, near Over - he has never noticed this before. We have followed up this observation, with the following response from the Bedfordshire Hoverfly recorder, John O'Sullivan: "A mixed pair of the two common colour-forms (the typical *bombylans* and the pale variety *plumata*) was noted by the pioneering British dipterist Verrall in 1901. It remains an infrequent and striking sight, but is probably normal behaviour for the species. I know that in-depth studies have been done in, for instance, Russia, and these may well shed interesting light on how the offspring of such matings are sorted for colour. Certainly, the great majority of specimens one sees are clearly one or the other, though I have recently seen a *plumata* with some reddish in the tail, and there may be other possibilities. I am sure that there is a great deal more to this subject, and I am certainly not at all well informed."

Eristalis abusivus, TL3569 Fen Drayton Lakes, 10 July, one male and two females on Bindweed flowers, during a survey conducted for the RSPB (Peter Herkenrath, John O'Sullivan). An easily overlooked species, rather scarce away from the coast.

Hemiptera: Rhopalidae (one of the true bugs)
Corizus hyoscyami, a local insect, probably one of the furthest inland records to date. An unmistakable red and black bug which has been spreading inland during the last five years, although historically mainly confined to the west and south coasts. A specimen was photographed in Foxton on 8th August 2010 by Guy Manners. This would appear to be the first record for Cambridgeshire.

Hymenoptera: Parasitica (Ichneumenons**)**
Nick Ballard photographed a very striking insect in Mill Road Cemetery, Cambridge, and after much searching, we finally managed to identify it courtesy of the BWARS (Bees, Wasps and Ants Recording Society) discussion forum as *Callajoppa cirrogaster*, one of our showier ichneumonids. It is a parasitoid of hawk-moths, such as Eyed Hawk-moth and Poplar Hawk-moth. They emerge from the pupa but oviposit into the host when it is a larva. The NBN Gateway has a single record for the whole of the UK of this species, from Wicken Fen in the 1930s.

Hymenoptera: Aculeata (Bees, Wasps and Ants**)**
In our report for 2008 we commented on the finding of a colony of *Formica cunicularia,* a scarce ant from Furze Hills, at its only site away from Over on the guided busway. In May 2010, Louise Bacon and Trevor Grange recorded this ant in the Over cutting, in the surviving embankments above the guided busway. Several nests and workers were observed, so it is reassuring to know that this rare ant has survived at its main county site.

Last year we reported the finding of a colony of a charismatic mason bee, *Osmia bicolor* in Over. which makes its nest in vacant snail shells. This was the first vc29 record for about a century. Following this, we now have a second colony, at Shepreth-L-moor, found following our 2009 report by the reserve warden John Holden. Trevor Grange and Louise Bacon can confirm that the Over population is doing well – many females were seen building nests in snail shells in May 2010.

Lepidoptera (Moths and Butterflies**)**

It appeared to be a fairly quiet year in terms of migrants or spectacular occurrences across this group of insects.

The main interesting observations of butterflies were actually in showy species which we thought we had lost until recent times. Silver-washed Fritillaries (*Argynnis paphia*) were seen in the county at several sites in 2006, and it appears a population probably settled at Brampton Wood in Huntingdonshire. Colonies began appearing around the same time in Essex. This year, Silver-washed Fritillaries have appeared in several woods in Cambridgeshire, often more than one individual being seen, so can we hope that this beautiful large butterfly has re-colonised our county of its own accord? Sightings were from Hayley Wood, Gamlingay Wood and Waresley and Gransden Woods, and a singleton was also seen in Cambridge Botanic Gardens. Another large fritillary, a grassland species this time, the Dark-green (*Argynnis aglaja*), also appeared this year – singles were seen on Fleam Dyke and near the Roman Road, and also in the Peterborough area at Bedford Purlieus NNR and in a Peterborough garden.

OBITUARY

Peter William Hudson (1932–2010)

Peter Hudson was born in Pontardawe in West Glamorgan on 30 March 1932. He was educated at Pontardawe Grammar School and the University of Wales, Aberystwyth, where he obtained an Honours degree in Agricultural Botany. In July 1957 he joined Fisons as a trainee and he worked for that firm and its successor, Schering, for his whole career. He married Elizabeth (Beti) Roberts at Alltwen on 20 July 1961. Peter worked abroad until 1976, mainly in Africa (Nigeria, Sudan and Kenya) but also in Sri Lanka and Malaysia, on a wide range of crop-plants including coffee, cocoa, tea, cotton, rubber and oil-palm and latterly on horticultural crops. In July 1976 he and Beti returned to their house in Toft and Peter was responsible at Harston for the overseas development of the insecticide Ficam before moving to Schering's Berlin headquarters, from which he travelled widely overseeing its use in South America and the United States. Subsequently he served as Regional Technical Manager for the Far East, Australia, New Zealand and South Africa till his retirement to Toft in July 1992. Peter was a registered Chartered Biologist, being a Member of the Institute of Biology, later the Society of Biology.

Peter was a keen gardener, but his approach to gardening was unorthodox, his previous experience leading him to experiment at Toft with plants that he had come to love when abroad. Weeds did not worry him: some he even encouraged, and it was Beti who did the weeding and tidying of the garden. As a committee member of the Bourn Garden Club Peter was given new and exotic seeds to try to persuade to grow outdoors. He particularly liked tomatoes, which he grew on his allotment and only rarely in his small greenhouse, which was generally reserved for special exotics.

Soon after his retirement Peter joined the University of the Third Age Botany Group founded by Mrs Kathleen Tucker in 1991 and originally organised jointly by her and Dr Beti Evans and, when Kathleen retired in 1994, he joined Beti as joint organiser, a role that he maintained till he handed it over to Dr Peter Payne at the end of the 2007 field season, remaining however on the planning committee. Peter was always modest about his considerable botanical knowledge and unwilling to take a leading role in the group's field and winter meetings, but his quiet and efficient organisation was greatly valued by us and all its members and we are deeply grateful to him.

We thank Beti Hudson for providing most of the information given in this obituary.

Beti Evans & Philip Oswald

BOOK REVIEWS

A Flora of Suffolk. *M. N. Sanford with R. Fisk. D.K. & M.N. Sanford, Ipswich, 2010. Hardback. 549pp. ISBN 978 0 9564584 07*

My eagerly-awaited copy of the first printing of this publication arrived unexpectedly one morning in the hands of Martin Sanford, the senior author, as he emerged from his car in our driveway! He had clearly concluded that hand delivery in Suffolk was the cheapest option for such a heavy book. Weighing in at 2.5 kg, its 549 pages are sufficiently dense to produce high-quality printing, maps & photographs. Settling down to scan its contents I was immediately very impressed. Several months later, after thoroughly reading it, my view has not essentially changed.

Barring the introductory sections, 368 pages are devoted to the Angiosperms, the Gymnosperms, Pteridophytes and the Characeae, and at the end of the book, 85 pages to the Bryophytes, written by Richard Fisk. The latter is a welcome addition, but unfortunately I am not competent to review it. The introductory sections give comprehensive accounts of various aspects of the county, its soils, landscape history, climate, habitats and the history of botanical recording in the county. The authors fully exploit colour in the Soils section to demonstrate the rather complex surface-soil distribution, as well as in the altitude and relief maps. The only place this is not successful is in the demonstration of acidic and basic surface soils in Breckland as the authors use orange for the former and an orangey-red for the latter and it is very difficult to distinguish between the two. The star section, though, is the one dealing with habitats. Fourteen broad habitats are described, several subdivided, all supported by splendid photographs of habitats and characteristic plant communities growing in them. The superb use of colour is exemplified by the map of the coverage of heathland in the county from 1783 to the present day (p.51). Throughout this section, many sites are mentioned, all with public access. As a resident of Suffolk for only nine years (and 30 years before that in Cambridgeshire) it is an ideal vehicle for deciding where to go to see the plants of unfamiliar parts of the county. The same will apply to botanists living in neighbouring counties such as Cambridgeshire. The last of the introductory sections is entitled “Recording”. Martin points out that Suffolk is a large county with a rather small number of active (field) botanists compared to Cambridgeshire or Norfolk. The recording throughout has some deficiencies: Martin for instance commented that well-known subspecies are mostly not recorded, the Poaceae are under-represented, and the polypod ferns and glassworts often not identified to species level. Nevertheless Martin considered that he had enough to provide a reasonable picture of the range and distribution of most species and this is certainly true.

The species descriptions, which could easily have been brief, dry and simply functional, have been extended in many cases in one or more of several ways to greatly enhance the overall appeal of the book. The origins of the names of some plants, such as goosegogs and greengages (the latter particularly pertinent to Suffolk) are described; as are specialised uses to mankind, for instance the use

of crab-apple wood to make cogs for mill workings, how horse radish was planted in former times at inns and the roots made into a drink for weary travellers, and how inhabitants of Aldeburgh resorted to eating the pods of sea pea in the famine of 1555. Martin is at pains to indicate which of the plants he thinks have been under-recorded, due to confusion with other species, and where subspecies distribution has been ignored. Interestingly, and unusually, the key characteristics which would confirm identification of these similar-looking taxa, are often described. Finally the geographical origin of many alien species is mentioned, occasionally rather loosely. For instance, it would have been much better if the native location of Douglas Fir was described as the western seaboard of North America, rather than the very imprecise "America".

The descriptions are spaced out with photographs of plants, not so much of plants showing habitats, as at the beginning of the book, but by close-ups, often of inflorescences and sometimes of single flowers. Although not everybody's cup-of-tea, I think it generally very effective. Not many people would regard cock's-foot grass as a particularly beautiful plant but the close-up photograph of its inflorescence, with spikelets gaping and anthers shedding pollen, is exactly that.

In summary this book is beautifully presented, it is written well with interesting information added to basic species accounts and the photographs are in the main a pleasure to view. This book will grace anybody's coffee table.

Dr Peter I. Payne

Handbook to the Natural History of Cambridgeshire. Edited by J.E. Marr and A.E. Shipley. Originally published 1904. Reprint published January 2010. Cambridge Library Collection. Paperback. 280 pages. Two colour illustrations. ISBN 9781108007665.

You may be wondering why we are reviewing a book published one hundred and seven years ago. I will start this review with an explanation.

Cambridge University Press have launched a new product line of "print on demand" hard to find long out of print books from their long publishing history, and Marr & Shipley's classic review of the county is one of the titles available. There are many titles across a wide range of themes; Cambridge University, Cambridge history, Darwin's writings, Victorian travelogues including famous botanists such as Kingdon-Ward's trips to China, and many other titles, and as recent as the Perring & Whitehouse Flora of Cambridgeshire (1964). Most of the print-on-demand titles are reasonably priced paperbacks (£15 - £25), and probably represent excellent value for very hard to find titles.

Marr & Shipley's compilation was probably the best summary of geology, palaeontology and natural history of its era, and was followed 34 years later by the Victoria History of the County of Cambridgeshire volume, which took much

of its material from the Marr & Shipley. Nothing like this has been published since.

I feel the value of texts like these is that, whilst never going into huge detail, there is a wealth of information available across the widest range of natural history, and one starts to get a feel for the serious amateur naturalist's findings, something we are possibly in danger of losing but which we value so highly at Nature in Cambridgeshire.

The first part of this relatively short compilation deals with what Cambridgeshire actually comprises – its underlying geology and the fossil record which is to be found within it. Whilst a degree of geological knowledge is assumed, this is not at a complex level, and is easily understandable to the lay person (as almost all naturalists would have been a century ago) as well as of value to the scientist. A nice feature is the mention of specific sites - one can always look on a map and this can often give a clue to odd little pits or features on the map which have never meant anything until now (for a county mapaholic like myself, anyway!). Palaeontology is always fascinating - mentions of ancient crocodiles and icthyosaurs in villages with which one is familiar are always good for the imagination. The fossil record is dealt with based on the geological divisions already set out, and whilst not up to the exciting standards of some parts of the globe, it shows what sort of fossils had been (and sometimes still are today) unearthed in the county.

The main body of the book then deals with the "current" fauna and flora systematically, starting with the mammals and working backwards. Those of you familiar with the Victoria County History will instantly recognise the format employed here. Each taxonomic group starts with an introduction, and those groups with not many species, such as mammals, the whole account is laid out as a narrative, often with fascinating little facts; "the badger can only be considered as a very occasional wanderer, though possibly still breeding near Wimpole. The Polecat is not very uncommon, especially in the fen district and northern half of the county where one or two examples are killed each year". This also shows how much has changed - Badgers are now very common and the Polecat, not having been seen in the county for nearly a century has re-established itself in the past year or so. The invertebrate taxa, being more abundant, get a less narrative approach but no less useful - most groups have the introduction, often highlighting one or more interesting species and in the case of mollusca, a nice table of variation found at Cambridge sites for one species; these small snippets of long-forgotten research may well be useful again one day - sometimes including species which have been lost, then followed by a list, often with collectors names (where Jenyns features regularly) for each species. Although a little less easy to follow, this provides a valuable resource when trying to find out if something has been recorded in the past if no recent records can be found - I have referred to Marr & Shipley and the follow-up Victoria County History on numerous occasions when modern literature fails to provide an insight into the likely presence of the insect in my hand or sample tube. The final chapters deal with the county flora, and archaeology, the last chapter

following more the narrative of the opening sections, split along geological lines.

I would certainly recommend that anyone who has never browsed this book to invest in a copy, as a century on it provides a fascinating account of what our county contained before the influence of modern man changed it to what we have today, and at £15.99 the Natural History of Cambridgeshire is affordable and possibly a bargain. My only complaint is that they do not seem to have reproduced the two folded maps from the back of the book, as they are very usefully marked with several of the features and topography mentioned in the text.

Louise Bacon

Weather Summary for 2010 from Cambridge University Botanic Garden

John Kapor

The following account is based on the observations and records from the Botanic Garden during 2010. **January** saw the cold theme continue from the previous December with an air frost on the first ten nights, ground frost on 25 nights and a minimum of -5.5°C. Snow was observed to fall on nine days but no accumulations exceeded 3.3cm. **February** was also cold although temperatures were less severe than in January, with a minimum of -3.8°C and with four days when the maximum reached double figures. There were twelve air frosts and 3 cm of snow fell on the 22nd. It was also a wet month with 65.9 mm of rainfall. So the winter had seen consistent frosts and several snowfalls. Remarkably, many plants had made it through the winter relatively unscathed with only a limited number of losses. Others suffered greater damage than experienced in many recent winters.

During **March** winter finally lost its grip with all the air frosts occurring in the first half of the month and a maximum of 17.9°C reached on the 24th. March was dry with less than half the average rainfall. **April** continued dry and proved to be the driest month of the year with only light rain at the beginning and end of the month. The three weeks between the 3rd and 24th saw only 1 mm of rainfall. **May** again proved dry with 27.7 mm of rain, of which 12.8 mm fell on the 1st. There were several late frosts in the middle of the month with -1.8°C in the air and -5.2°C on the grass on the 12th.

June was another very dry month with below average rainfall, most falling in the first ten days and the remainder receiving only 2 mm. The first half of 2010 proved to be very dry with the Garden receiving only 209.5 mm of rainfall. However, it was not quite as dry as 2006 when only 193.8 mm fell and 2005 with 194.2 mm in the first six months.

The dry theme continued into **July** with only 4.2 mm falling during the first three weeks and 23 mm for the month. The warmest day of the year was the 9th with 30.3°C. With a run of five dry months the Garden was beginning to take on a brown and dusty appearance and some plants were showing signs of drought stress.

August saw a very dramatic change with the dry spell coming to an abrupt end, with heavy showers and active bands of rain throughout the month. The wettest 24hrs was on the 25th when 45.0 mm fell, making this the wettest day since 21st October 2001. A short but heavy shower produced 14.5mm in 20 minutes on the 17th. This all helped to contribute to a total of 136.4 mm for the month. **September** saw the majority of the 55.1 mm rainfall fall in the last five days, with 14.5 mm measured on the 29th.

October saw our first touch of frost with -1.7°C in the air and -5.5°C on the ground on the 21st. In contrast 20.5°C was reached on the 8th, and 21°C on the 10th. **November** started off on a mild theme with a maximum of 17.3°C on the

4th, the records showing this to be the fourth highest maximum in the last 24 years. After the 26th sharp frosts took over, with -8.1°C in the air and -11.7°C on the grass on the 28th. Historical comparisons of previous November minimums show there are only four when the air minimum has been lower, 1904 being the coldest, 1952, 1973 and 1978. Many trees lost their leaf canopy abruptly as a result. There was some light snowfall at the end of the month.

December was cold and there were 23 air frosts, several of them sharp. The 19th was the coldest with -10.9°C, followed by the 20th with -9.6°C c, the 21st saw -8.0°C and on the 26th -7.7°C. These are comparatively low temperatures and we have to go back to December 1981 to find a colder night for this month. The grass minimum reflected the air and 26 ground frosts occurred, which were also sharp and on the 20th -14.6°C was recorded. The maximum temps were also low with four days when the maximum failed to get above freezing and on the coldest a maximum of only -2.5°C on the 20th. It was a dry month with 22.7 mm and a percentage of this falling as snow on 7 days, the 18th seeing 4 cm of snow blanketing the garden. With the frozen ground it remained for some time until 4.5mm of rain combined with a maximum of 4.0°C on the 27th saw the thaw finally get underway.

Maximum and minimum temperatures for 2010 (°C)

Date	Max	Min
Jan	9.2	-5.5
Feb	11.3	-3.8
March	17.9	-5.2
April	22.3	-1.0
May	27.8	-1.8
June	29.0	5.8
July	30.3	7.8
Aug	25.6	4.9
Sept	24.0	3.4
Oct	21.0	-1.7
Nov	17.3	-8.1
Dec	8.3	-10.9

Plate 2. *Mycena haematopus* from Eversden Wood. (Photograph by John Holden) (See article on page 57)

Plate 3. Internal Swift boxes with external cavity panels. (Photograph by Rob Mungovan) (See article on page 71)

Plate 4 Chalkhill Blue (*Polyommatus coridon*). (Photograph by Vince Lea) (See article on page 24)

Plate 5 The ichneumon wasp *Callojoppa cirrogaster*. (Photograph by Nick Millar) (See article on page 90)