Nature in Cambridgeshire

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Plate 1. Common Frogs spawning in the pond at Regatta Court. (See article on page 31)

Plate 2: A male palmate newt showing the diagnostic features of a pale pattern-less chin (above) and a filament at the end of a lightly spotted tail (below). The black webbing can also be seen on this individual's hind feet. (see article on page 36)

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Cover Illustration: Pasque Flower (*Pulsatilla vulgaris*) (Photograph: Henry Arnold.) (See article on page 3.)

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Articles for consideration for future issues should be submitted to the Editor, Mr H.R. Arnold, Windyridge, Shillow Hill, Bury, Huntingdon, Cambridgeshire, PE26 2NX. (email henry@shillow.eclipse.co.uk)

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EDITORIAL

This year we welcome two new members to the Editorial Board: Dr Peter Stroh, who will be well known to local botanists, and Dr Peter Brown, who will be familiar to many for his work on ladybirds and their distribution.

The current issue contains a wide variety of topics. Two articles deal with the Devil's Dyke; one more generally looking at the history, wildlife and restoration, and the other describing a detailed study of the terricolous lichens

Vertebrates are well covered with papers on the recent Otter Survey, the Amphibian Survey, the discovery of a previously unknown population of Palmate Newts, and a report on the animals found as road casualties.

Few people, perhaps, consider the importance of collections of specimens, particularly of fungi. Nathan Smith's article should make readers realise their value. We also have a paper describing how the study of micro-fungi, a rather neglected group, can discover new and fascinating species.

Somewhat of a new departure for Nature in Cambridgeshire is Chris Preston's detective story, answering the question "Where was the Hill of Health"

We have obituaries of Hilary Belcher and Elizabeth Platts, both of whom made huge contributions to this journal. At the end of last year we learned of the death of Henry Berman, who will have been known to many of our readers, especially those who regularly attended the CNHS Conversazione. The regular contributions are the CNHS Survey report, Bryophyte and Vascular Plant records, plus Weather Notes from Cambridge.

As I was preparing this volume, I heard the sad news of the death of Colin King, our printer for many years until he retired and passed his business to TargetPrint. He was always extremely helpful, and will be very much missed.

Devils Dyke, Cambridgeshire: its wildlife, history and restoration

Martin Baker

Introduction

The Devil's Dyke is the finest Anglo-Saxon earthwork in the country and is also a chalk grassland of national and international importance for wildlife. It is located in East Cambridgeshire and stretches in a near straight line for 11.5 km (7 miles) from the fen edge at Reach, across the open chalk landscape near Newmarket and ends in woodland at Ditton Green.

It consists of a ditch (or fosse) and an embankment (or vallum). The ditch is open to about four metres below present ground level, and the bank is up to five metres above adjacent ground level. Its highest point is Galley Hill where it is 10.5 metres in height and at its most extensive it is 36.5 metres wide. Its total area is 89 hectares (222 acres) and is the largest monument of its kind in Britain. The Dyke runs north-west to south-east so it provides contrasting steep south-west and north-east facing slopes along its length.

The Devil's Dyke is a striking physical feature in its own right. However, within the context of Cambridgeshire, its impact on the landscape is even more evident. The county is gently undulating and low-lying, which makes the Dyke visible from many places. It also provides extensive views as far as Ely Cathedral.

The site is designated as a Scheduled Ancient Monument, a Site of Special Scientific Interest, and part is also a Special Area of Conservation (SAC) for its orchid-rich grasslands.

History

Archaeological investigations have been unable to date accurately the construction of the Dyke, and it is thought to date anywhere from the 5th to early 7th centuries (Malim *et al* 1996). The Dyke is thought most likely to have been constructed by East Anglian Saxons as a defensive feature against attack by Mercians from the west (Fox 1923). When constructed, it would have spanned the narrow, open chalk landscape that lay between the wet and impassable fens to the north and the rolling, thickly wooded landscape on the clay ridges to the south-east, so making circumnavigation difficult and forming an effective barrier.

While we will never know its purpose, it is clear that it took many years to build. A layer of silt in the bottom of the ditch suggests it may have become redundant very quickly, perhaps over-taken by wider geo-political events.

Wildlife

Following construction and abandonment, the Dyke would have been colonised by native plants and was eventually incorporated into farms. For centuries it was used as grazing land, allowing the development of the distinctive chalk grassland flora on the shallow chalk soils. The Dyke also hosts extensive areas of chalk scrub and towards its southern end, on the higher ground around Stetchworth and Woodditton it supports mature woodland.

The embankment is home to a variety of wild flowers, herbs, and insects, many of which are nationally or regionally rare. The grassland is of a type characteristic

of chalklands of south, central and eastern England and represents a habitat type now very restricted in distribution and extent throughout its British range and in Cambridgeshire in particular. The species-rich grassland on the Dyke can be classified under the following community types; CG3 *Bromopsis erecta*, CG4 *Brachypodium pinnatum* and CG5a *Brachypodium pinnatum-Bromopsis erecta* grassland. Within these communities, a range of typical species is present including Salad Burnet (*Poterium sanguisorba*), Common Rockrose (*Helianthemum nummularium*), Eyebright (*Euphrasia spp.*), Carline Thistle (*Carlina vulgaris*) and Milkwort (*Polygala vulgaris*). There are four nationally rare species of flowering plant on the Dyke (Spring Sedge (*Carex ericetorum*), Lizard Orchid (*Himantoglossum hircinum*) (Plate 5, back cover), Spotted Cat's Ear (*Hypochoeris maculata*) and Pasque Flower (*Pulsatilla vulgaris*) (Front Cover)). There are also four regionally rare chalk grassland species (Purple Milk-vetch (*Astragalus danicus*), Bloody Cranesbill (*Geranium sanguineum*), Field Fleawort (*Tephroseris integrifolius*) and Bastard Toadflax (*Thesium humifusum*)) and three species which although regionally rare on chalk, are more common on other soils (Marjoram (*Origanum vulgare*), Hawkweed Ox-tongue (*Picris hieracioides*) and Saw-wort (*Serratula tinctoria*)).

The chalk scrub is dominated mostly by Hawthorn (*Crataegus monogyna*). together with Buckthorn (*Rhamnus catharticus*), Wild Privet (*Ligustrum vulgare*) and Rose (*Rosa spp.*), but some areas are dominated by Blackthorn (*Prunus spinosa*) and a few small areas by Dogwood (*Cornus sanguinea*).

The grassland, scrub and woodland habitats combined are valuable for a number of insects now uncommon in the county including Chalkhill Blue (*Polyommatus icarus*), Brown Argus (*Plebeius agestis*), Dingy Skipper (*Erynnis tages*) and Green Hairstreak (*Callophrys rubi*) butterflies. Small Blue (*Cupido minimus*) butterflies have been recorded where the former Cambridge to Mildenhall railway line cuts through the Dyke. Other notable invertebrates include the Hawthorn Jewel Beetle (*Agrilus sinuatus*), Downy Back Beetle (*Ophonus puncticollis*), Green Tiger Beetle (*Cicindela campestris*), the flies *Cistogaster globosa, Dolichopus agilis, Eudorylas arcanus* and *Thecocarcelia acutangulata*, and various hymenoptera such as Large Garden Bumblebee (*Bombus ruderatus*), Two-coloured Mason Bee (*Osmia bicolor*), Grey-gastered Mining Bee (*Andrena tibalis*) and Lobe-spurred Furrow Bee (*Lasioglossum pauxillum*).

The south-east to north-west orientation of the ancient earthwork provides two contrasting microclimates that help some wildlife to adjust to changing weather conditions. Take, for example, the Heath Snail (*Helicella itala*). In hot, sunny summers this rare mollusc makes its home on the shaded north side and in wetter, cooler summers it lives on the sunnier south face.

The site also provides an attractive nesting and feeding area for many birds, including Whitethroat (*Sylvia communis*), Yellowhammer (*Emberiza citrinella*), Skylark (*Alauda arvensis*) and Meadow Pipit (*Anthus pratensis*) in a part of the country where cover and semi-natural habitats are scarce.

20th Century Decline

With the changes to agricultural practices over the past two centuries, and increasing specialisation in farming practices, most of Cambridgeshire's farmland has been converted to arable farming, made easy by the gently undulating land and lack of steep slopes. Much of this took place in the nineteenth century and continued into the twentieth century. The only places where chalk grasslands survive are ancient monuments, former quarries, golf courses, racecourses and associated training areas, and road verges. The Devil's Dyke is now one of the most extensive and varied areas of species-rich chalk grassland in Cambridgeshire.

As mixed farming and numbers of livestock declined in Cambridgeshire, grazing of the Dyke eventually stopped. With this, as with chalk grasslands across southern England, scrub began to take hold and expanded rapidly at the expense of species-rich grassland, particularly following the crash in Rabbit (*Oryctolagus cuniculus*) populations in the 1950s following the arrival of myxomatosis.

With the loss of grassland, species were either lost from the site or suffered much reduced populations and in some cases became restricted to very small areas. Photos from early in the 20th century showed the Dyke to be almost devoid of scrub, but by the 1970s and 1980s large swathes had become dominated by scrub.

Two exceptions to this were Galley Hill, where the landowner, John Clarke, took an interest in wildlife and kept his section of the Dyke clear of scrub. The other was the Newmarket Racecourse section which was kept clear of scrub through annual burning during the twentieth century up to the 1980s (see Donald, 1979). This is the section where a large population of Lizard Orchids is found at one of the species few English locations.

Early conservation efforts

The earliest recorded conservation scrub clearance dates from 1959 when a Civic Trust party spent a week here (Anon., 1960). In the 1970s, volunteers from Cambient (The Cambridgeshire & Isle of Ely Naturalists Trust, now the Wildlife Trust BCN) and the Cambridge Conservation Corps (later Conservation Volunteers), together with students from Cambridge University cleared scrub from patches of surviving grassland. They also extended these by clearing areas of dense scrub in two places. These were colonised by "weedy invasive species" but then became dominated by grasses of mesotrophic grassland, mainly Cocksfoot (*Dactylis glomerata*) and False Oat-grass (*Arrhenatherum elatius*), rather than the desired chalk grassland species.

Professor Peter Grubb, of Cambridge University, obtained a grant from the Natural Environment Research Council to investigate the reasons for these observed outcomes, and employed Barbara Key as a research assistant. The research involved extensive soil analyses, and looked at the growth of weedy species (Cleavers (*Galium aparine*) and Prickly Sow-thistle (*Sonchus asper*)) in soils from chalk grassland and from under dense scrub. This work demonstrated that not only were there higher concentrations of total nitrogen and phosphorus in topsoil under scrub, but also there were much greater amounts of available nitrate

and phosphate, and these resulted in much more vigorous growth of the weedy species (Grubb & Key 1975).

A further element to the research tested the hypothesis that sowing of Upright Brome (*Bromopsis erecta*) on soil cleared of scrub will lead to a decrease in fertility and thus provide suitable soil conditions for the establishment of chalk grassland. In the late 1970s and early 1980s some of the areas cleared of dense scrub were sown with Upright Brome seed collected from elsewhere on site. Initial results in the first couple of years did not show much impact; however after six or seven years there had been a significant reduction in soil fertility, compared to unsown areas. This was demonstrated in an unpublished undergraduate project by Robin Pakeman, supervised by Professor Grubb, using bio-assays of the soil with Cleavers and chemical analyses of the plants.

A significant section of the middle part of the Dyke is within a Cambridgeshire County Council farm tenancy, Ditch Farm. In 1991, a new County Council tenant entered his portion of the Dyke into a Countryside Stewardship scheme and re-introduced grazing, which was also extended to John Clarke's land, now being looked after by his son. The area managed runs from TL59956305 in the south to TL57606525 in the north. This helped to keep open one of the largest remaining areas of grassland, though there were often tensions between the intensity and timing of grazing and some of the wildlife interest, especially maintaining structurally diverse grassland for invertebrates.

In the 1990s the Cambridge Green Belt Project, based at the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire, began organising regular volunteer work parties to maintain some of the remaining open grassland areas, as well as trying to secure money to extend and link them. These work parties supplemented the work of the Cambridge Conservation Volunteers and local Butterfly Conservation volunteer groups. However, it was clear that the scale of the task had become too great without a significant injection of funding and this was recognised by a number of other potential partner organisations.

Restoration

The advent of the Heritage Lottery Fund provided the opportunity to seek the scale of funding required to restore the site. A partnership was formed between Cambridgeshire County Council (land owner and with responsibility for access and archaeology), English Nature (now Natural England), English Heritage (now Historic England) and the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire, supported by the multiple landowners and the Friends of Devil's Dyke.

The Devil's Dyke Restoration Project was funded by the Heritage Lottery Fund to undertake major work between 2002 and 2007 to restore the site to its former glory. As well as restoration of the ancient monument and species-rich chalk grassland, the project also included significant aims related to education and improved access. This article however only looks at the ecological aspects of the restoration project.

A condition of the grant was that the partners undertook to continue the on-going task of management of the sensitive habitats and archaeology for a period

of at least ten years. The aim at the outset was to restore the site to grassland and install grazing infrastructure that would allow landowners to effectively graze or arrange grazing of their land in the future. All landowners would be encouraged to enter into an agri-environment scheme, and eventually take on responsibility for the ongoing management of their own sections.

Restoration aimed to clear 90% of the scrub from the four "grassland" sections of the Dyke, covering over five miles of its length from Reach to the Newmarket railway line (TL57006580 to TL63056055, see map). This was a compromise between the archaeological objective of no scrub (or at least none large enough to fall over and damage the structure of the monument), versus the ecological objectives of creating a species-rich chalk grassland habitat with chalk scrub habitats of value for invertebrate and avian fauna.

The general plan was to work section by section, clearing scrub and treating the stumps with an approved herbicide, re-seeding the cleared slopes, installing fencing and gates, undertaking follow up treatment of scrub re-growth and finally commencing either a grazing and/or flail-mowing grassland management regime.

Scrub was cleared in the autumn and winter months, and stock fencing and access gates installed over the spring and summer. Seeding was undertaken in either spring or autumn following scrub clearance, and the seed was applied using a method known as hydro-seeding, which is widely used in major landscaping schemes on steep slopes such as new motorway road verges.

Using the evidence from Professor Grubb's work from the 1970s and 1980s, seeding was undertaken using Upright Brome with a view to reducing available nutrients for other species. This was sown in a 50:50 mix with Sheep's Fescue (*Festuca ovina*) which was used because its smaller seeds were more likely to establish on the steep slopes, as well as to help meet the requirements of the archaeologists for the growth of rapidly stabilising vegetation. Sowing rates were 4 kg/ha (4 g/m^2). While locally native seed was desired, it was only possible to collect Upright Brome locally (from Therfield Heath or Newmarket Heath). The Sheep's Fescue had to be bought in but was of southern English wild provenance.

Monitoring

Unfortunately the original HLF grant did not include any provision for formal monitoring, and the only monitoring undertaken during the early phases of restoration was carried out by Professor Grubb. In 2007, the Wildlife Trust, with the advice of Professor Grubb, established two monitoring plots. These were located within two sections of the Dyke (Ditch Farm and Railway) that included small areas of remnant grassland and significant areas cleared of dense scrub that were re-seeded using hydro-seeding between 2003 and 2005. Each plot was 500 metres long and was divided into ten 50 metre transects. A combined transect / quadrat method for recording plant species was selected. Recording was on the south-west facing slopes only. Transects of 50 metres in length were located at a random distance of between one and ten metres from the top of the slope (from where the slope breaks). A 50 metre tape was laid out and quadrat points located every five metres. A quadrat size of 0.25m^2 was used in the form of a custom made 100 cm by 25 cm wire quadrat. Within each quadrat, the presence or

absence of key desirable (chalk grassland) and undesirable species was noted. In addition, the presence of bare ground and an estimate of sward height were also recorded. Most surveys were undertaken in July, usually during the first two weeks.

The monitoring has demonstrated good establishment of the core grasses Upright Brome and Sheep's Fescue in both plots. Less desirable grasses, such as Cock's-foot and False Oat-grass have generally remained suppressed (**Figures 1a and 1b**).

The two monitoring plots are located in areas where the hydro-seeding has proved largely successful. In other areas, the hydro-seeding was less successful and they have become dominated by Cock's-foot and False Oat Grass, as predicted by Professor Grubb's earlier work. The cause of this failure was usually spring sowing that coincided with spring droughts, which are a common feature of Cambridgeshire, one of the driest counties in England.

There has also been an increase in numbers of chalk grassland indicator species recorded from each monitoring plot over the recording period (**Figures 2a and 2b**). Overall, nearly 80% of the available chalk grassland species have colonised (which compares with 57-68% in the original 1970s plots at a similar stage). However only about 20-25% of these species are more than rare and colonisation remains a slow process. In those areas where hydro-seeding was less successful and coarse grasses have become dominant, fewer than half of the chalk grassland indicator species have colonised.

Figure 1a: Frequency of Desirable and Undesirable Grass Species at Ditch Farm Section

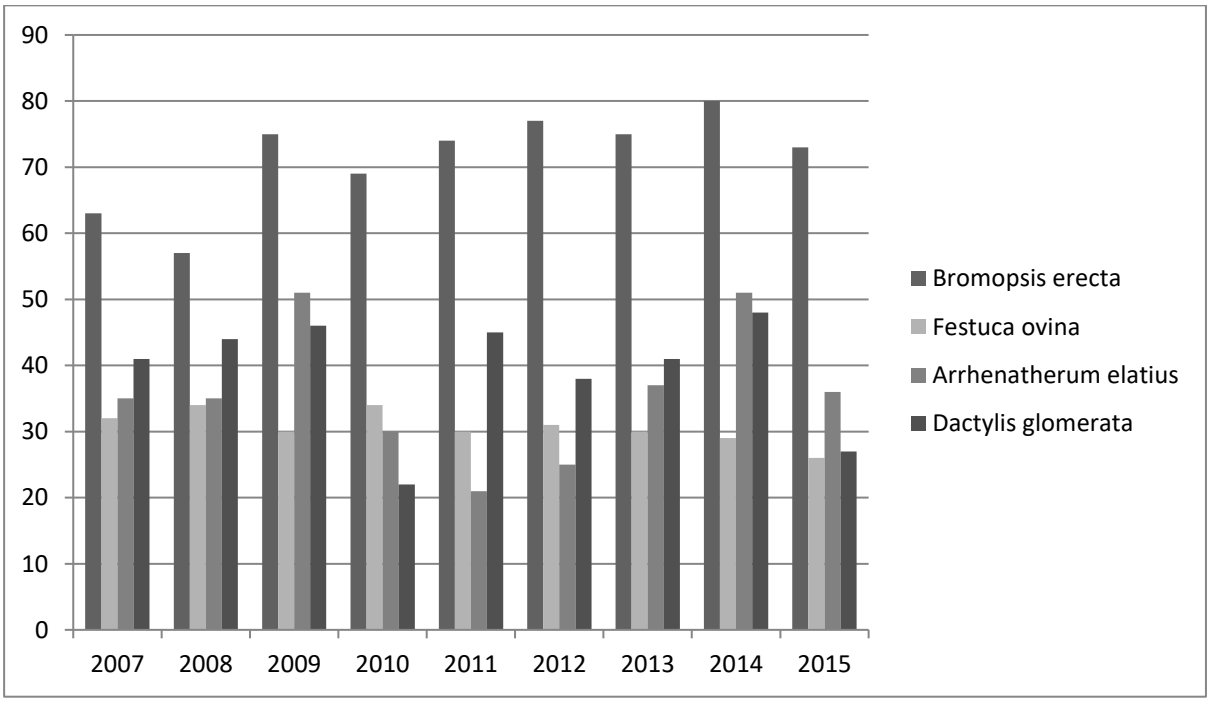


Figure 1b: Frequency of Desirable and Undesirable Grass Species at Railway Section

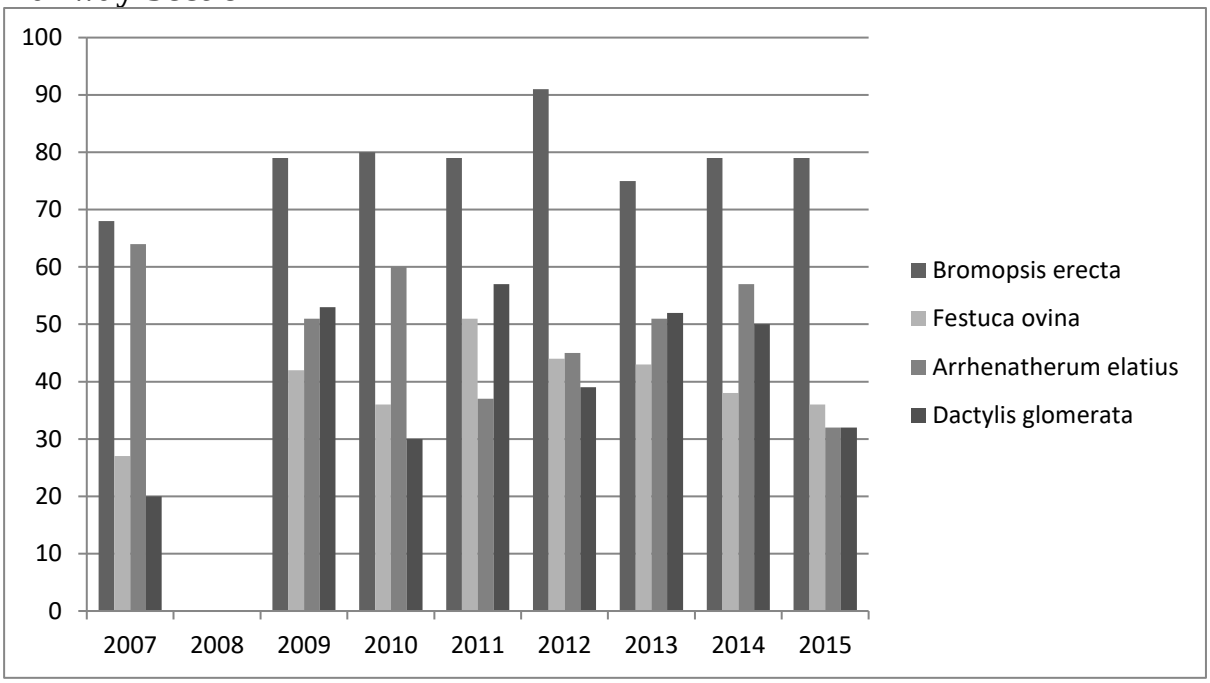


Figure 2a: Numbers of Chalk Grassland Species at Ditch Farm Section

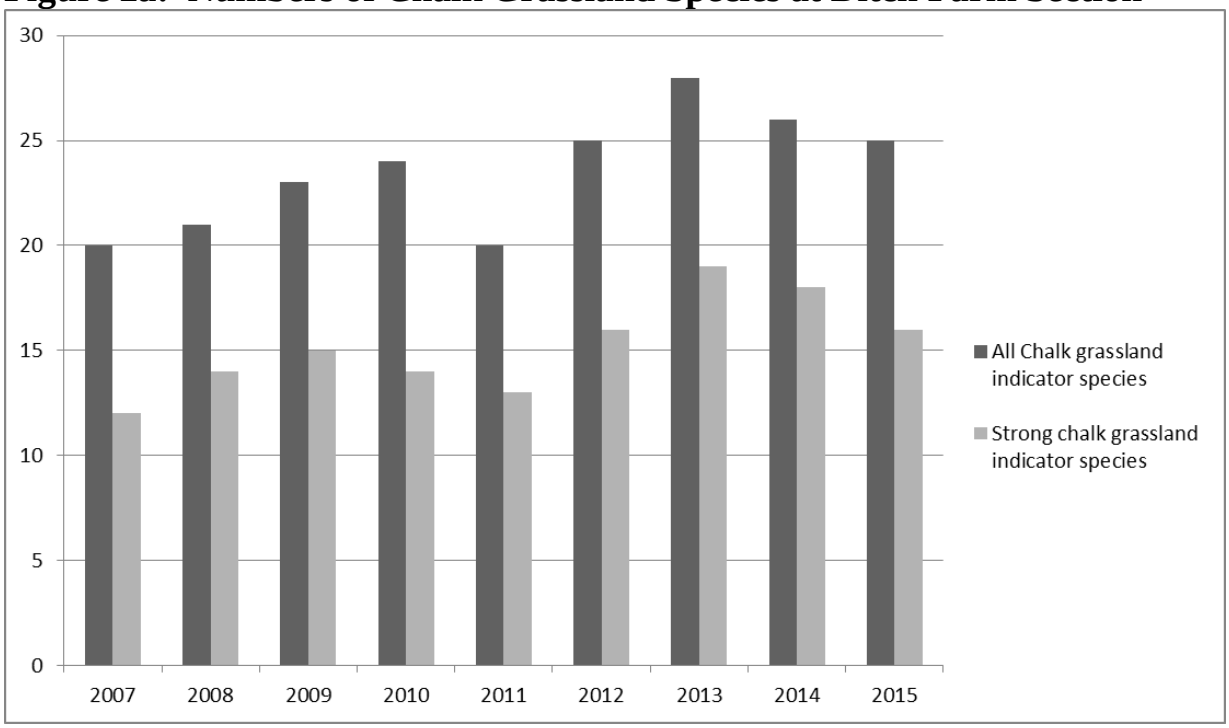
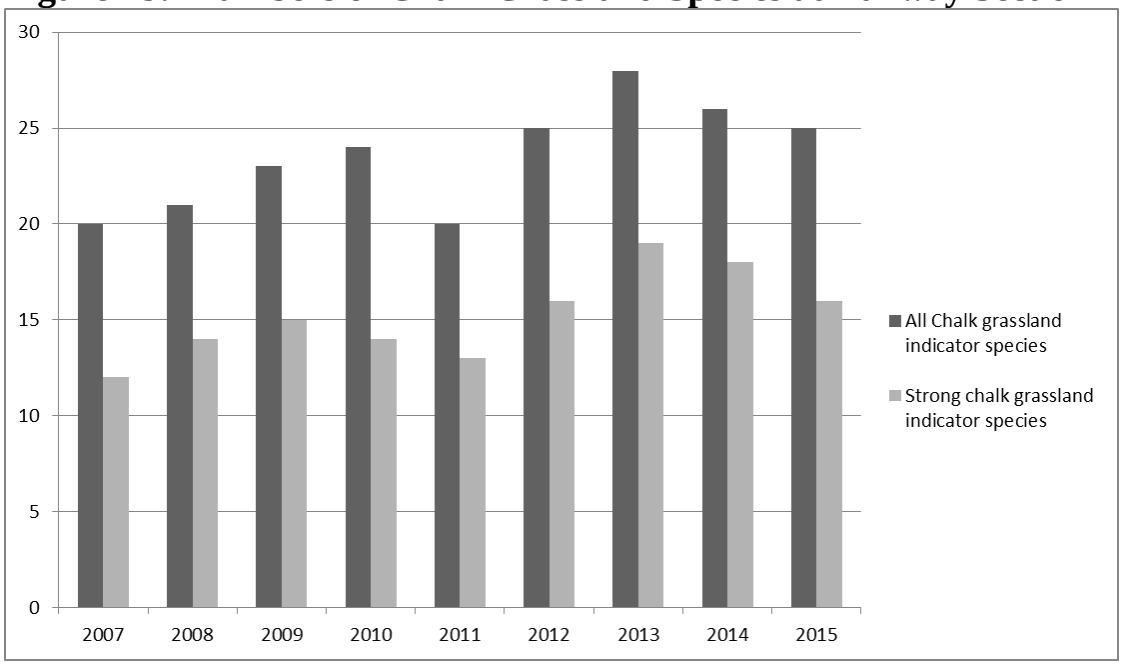


Figure 2b: Numbers of Chalk Grassland Species at Railway Section



Scrub is returning to both monitoring plots. The dominant scrub species prior to the restoration project were Hawthorn followed by Blackthorn. These are still present in both plots but stable; however, there have been noticeable increases in Privet and Bramble (**Figures 3a and 3b**). This pattern has been repeated across all areas of the site.

Figure 3a: Frequency of scrub Species at Ditch Farm Section

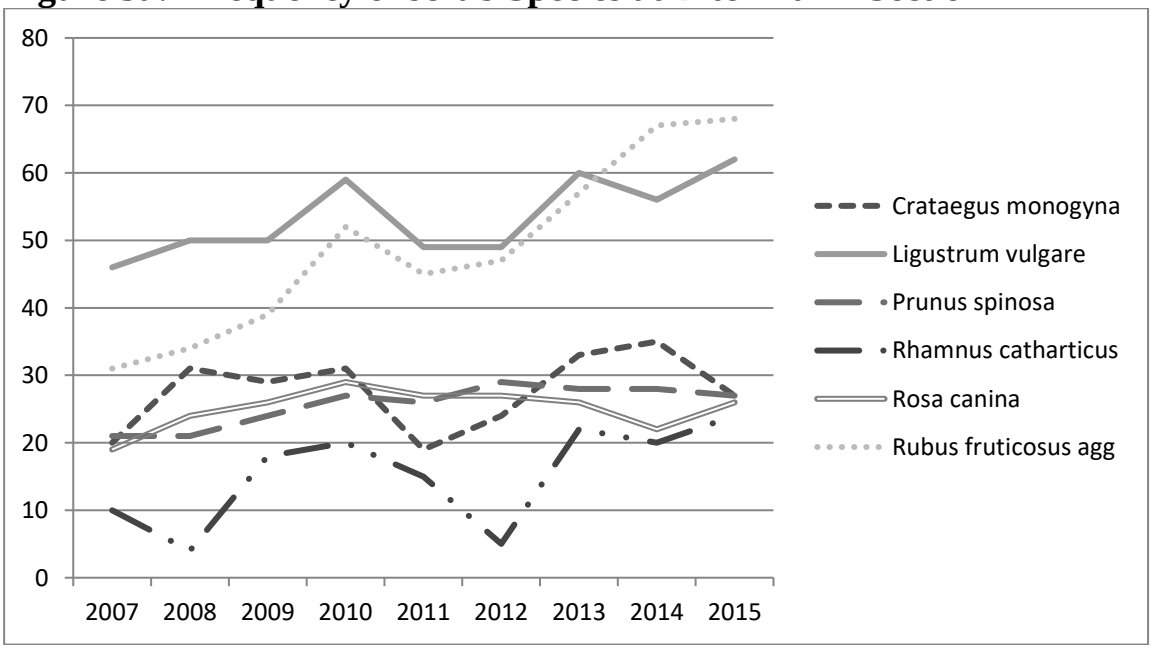
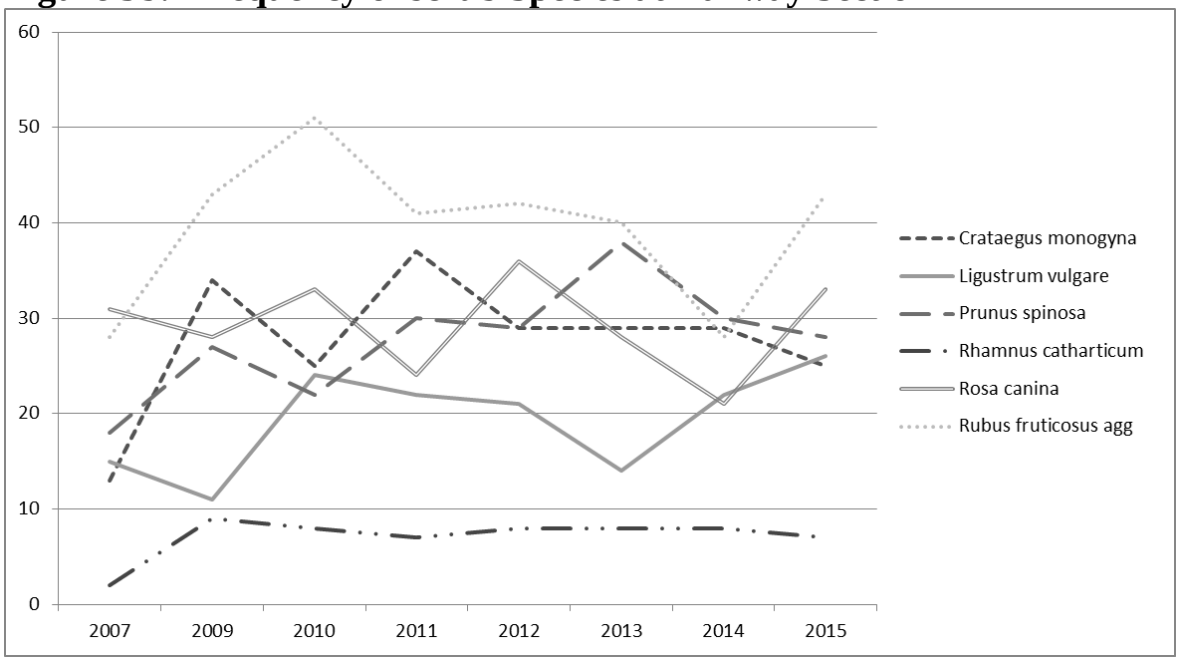


Figure 3b: Frequency of scrub Species at Railway Section



The original scrub treatment involved a mixture of drilling holes in larger stumps and applying herbicide or painting a herbicide mix onto cut stumps. Most compartments also received a follow up treatment, selectively spraying scrub re-growth the summer following cutting. However, while this was effective on a high proportion of the larger bushes, it was less successful on the smaller scrub. This has then been compounded by there not being adequate livestock to graze all the newly cleared compartments sufficiently hard, due to the large extent cleared in each of the five years of the restoration project. Flail mowing has also encouraged suckering amongst some of the young scrub and particularly Privet which has spread. This if anything has made future treatment more difficult.

Future challenges and lessons learned

While the objectives of the HLF project were largely met, challenges remain. The two biggest challenges are linked, that of securing sufficient grazing at the right times and control of scrub re-growth. There is only one owner / tenant with livestock currently able to graze the Dyke but he has insufficient hardy livestock to meet the grazing needs of the whole site. This is contributing to the increase in scrub re-growth that will lead to some parts of the site eventually returning to dense scrub. Where sufficient grazing has occurred there has been good control of scrub re-growth. Grazing initially used a mixture of Norfolk Horn and a modern commercial sheep breed, but for a few years relied on non-traditional breeds not well suited to the difficult grazing. In recent years the sheep grazed have been Exlana, a composite breed specifically designed for grazing marginal land. A further challenge was that not all landowners immediately signed up to grazing

and it has taken several more years to secure grazing on the "Golf Course" section owned by the Jockey Club.

Elsewhere at other nearby chalk grassland sites mechanical removal of scrub, including the roots, has been undertaken successfully, significantly reducing the amount of scrub re-growth. However, this is not an option at the Devil's Dyke as the process would damage the ancient monument.

Most of the grassland compartments of the Devil's Dyke are now in agri-environment schemes, which was another key aim of the restoration project. However, while payment rates are fine for grassland compartments where scrub is under control, they do not reflect the costs of managing an awkward linear site in a largely arable landscape, where significant scrub control is an ongoing requirement. The one compartment that is not in any scheme (Reach & Railway) has two owners, with their boundary along the top of the bank. Unless one of them voluntarily enters into an agri-environment scheme, this compartment will continue to be under-managed except for the occasional volunteer task. The future of agri-environment schemes post-Brexit is also a threat looming on the horizon, but may turn into an opportunity depending on the policy decisions taken.

The Jockey Club agri-environment agreement is also far from ideal as they do not allow any grazing on the Newmarket Racecourse section. This is managed by cutting, however, the cutting arm does not reach to the top of the bank and the arisings are not removed which encourages coarse grasses at the expense of more species-rich chalk grassland.

The other two lessons that we have learned, are firstly not to sow grassland in spring in Cambridgeshire (unless you have saturated soils after winter and the prospect of good spring rainfall immediately following sowing). The second lesson is not to clear such large areas of scrub in a short space of time unless you can guarantee having sufficient livestock and the resources to do multiple repeat herbicide treatments of scrub re-growth. Even then colonisation by the desired chalk grassland species will be slow.

However, overall the Restoration Project has been largely successful with respect to the initial restoration works. Grazing has been re-introduced to more of the Dyke and there are larger areas of chalk grassland in good condition with others in the process of restoration. The Dyke now has a more secure future and it will be interesting to re-visit it in another ten to fifteen years to assess the long-term impacts of the restoration. Significant challenges remain and there is a danger that without sufficient on-going management some of the recent gains will be lost. For the time being though the Devil's Dyke is once again a visible and impressive monument.

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Terricolous lichens at Devil's Dyke and Fleam Dyke

Mark Powell and the Cambridge Lichen Group

Trees and shrubs provide the most extensive surfaces for lichen colonization at Devil's Dyke and Fleam Dyke, but the species involved are mainly common and widespread across lowland England. Worked timber in the form of fences and gates are mainly of chemically treated wood; weathered oak is now a rare habitat in the landscape. The chemicals in modern timber stimulate an interesting community, more typical of metal-rich sandstone. *Lecanora stenotropa* collected from a wooden gate at Devil's Dyke is one of these lichens. Although large areas of ground in the form of grassland are present at both sites, lichens are very restricted in their extent. The trodden paths at these sites cover only a fraction of the surface area but are where the most notable and surprising lichens grow.

For convenience, lichenologists often categorize lichens into three polyphyletic groups based on morphology. Fruticose (shrubby) lichens (at least those that grow on bark) tend to be more susceptible to pollution and are most luxuriant along the relatively clean west coast of Britain. At Devil's Dyke and Fleam Dyke, only two fruticose lichens were found on bark (*Ramalina farinacea* and *R. fastigiata*).

The most common lichen in lowland England, and at the sites considered here, is the foliose (leafy) lichen *Xanthoria parietina*, which is favoured by high levels of nitrogen compounds.

Crustose lichens are common on most substrata.

Terricolous lichens exist in all three morphological forms. Those competing with grass tend to be shrubby while those on trodden paths are mainly crustose.

Devil's Dyke was visited on three occasions (10th January 2013, 8th October 2015 and 19th October 2017) during which the complete length of the site was examined (from near Stetchworth in the south to Reach in the north). Fleam Dyke was visited on just one day (9th December 2017) covering the section north of the A11. The discovery of an interesting terricolous lichen community on the chalk path at the top of the vallum at Devil's Dyke prompted the visit to Fleam Dyke where the same community was found.

Lichens gain competitive advantage in situations where plants struggle (such as on roof tiles). Most lowland grassland has a sward which out-competes the

lichens. The Cambridgeshire landscape is generally too fertile and agricultural to support terricolous lichens. On chalk sites, over-steepened slopes (such as cuttings) and paths create localized stress which can result in conditions favouring lichens. The slopes of Devil's Dyke, while impressive, are almost completely unsuitable for terricolous lichens.

The paths along the top of the vallum support the most notable lichen habitat at Devil's Dyke and Fleam Dyke. Gilbert (2000) wrote about the value of human paths on chalk:

Paths, especially broad, long-established ones created by people (not sheep) moving up and down spurs, can also produce conditions suitable for terricolous lichens. It was one such path on Watlington Hill in the Chilterns that first alerted me to the potential richness of this habitat for lichens. In the centre of the path the grassland was worn to a height of only 4 mm and was fairly open. It supported a lichen cover of 15-35% composed of seven species including large patches of Diploschistes muscorum *and* Sarcosagium campestre. *A similar phenomenon can be seen on Box Hill in Surrey, Ivinghoe Beacon and at other beauty spots. An advantage of trampling by shoes is that unlike the hooves of sheep, which tend to disrupt the sward, shoes compact it and most terricolous lichens favour a compact rather than a loose substratum.*

Those sections of path which are trodden bare in the middle are the most significant and especially where bare chalk is exposed (rather than mineral soil). Such paths support the nationally rare *Polyblastia philaea* at both sites. Apart from a record on clay in old brick pits near Peterborough, the closest locality for *P. philaea* is in Dorset. *P. philaea* is inconspicuous because its tiny fruiting bodies as well as its thallus are both largely immersed in the soil. Nevertheless, with experience, the pastel green patches of soil which contain it can sometimes be picked out while walking. *Lecidea lichenicola* is usually recorded on loose chalk pebbles but at Devil's Dyke and Fleam Dyke it is quite a feature of embedded chalk fragments in the paths. *L. lichenicola* is currently considered endemic to England, is nationally scarce and a species for which Britain has International Responsibility. *L. lichenicola* is one of the few lichens that is easier to find when wet (most species show their distinctive colours and textures best when dry). In dry conditions, the tiny immersed apothecia of *L. lichenicola* (less than 0.2 mm diameter) appear almost black and are difficult to distinguish from the many pyrenocarps which grow on chalk. When wet the fruiting bodies swell slightly and glow deep red. Extensive colonies of the nationally scarce *Leptogium biatorinum* occur at Devil's Dyke along with a single small patch of *Placidium squamulosum*. A small colony of *Leptogium schraderi* occurs at Fleam Dyke. None of the lichens mentioned in this paragraph are known elsewhere in Cambridgeshire. Most lichens use an alga as their photosynthetic partner, but *Leptogium* (among other genera) use a cyanobacterium. These 'Jelly-lichens' tend to be dark in colour and gelatinous when wet.

The trampled paths also support a small number of commoner terricolous lichens including *Bilimbia sabuletorum* (on moss) and *Collema tenax*.

Although the sides of the vallum at both sites are steep, they are covered in a rather dense sward of vascular plant vegetation and opportunities for terricolous lichens are limited. Along the race course section of the Devil's Dyke, between the Cambridge and Well Gaps (at TL611621), the west-facing bank of the vallum has a sward which is sufficiently thin to allow a small proportion of terricolous lichens to survive. Here *Cladonia pocillum* and *C. rangiformis* are present, both are species which prefer calcareous soils. *C. pocillum* is one of the 'Pixie-cup' lichens with coarse granules inside its goblet-shaped stalks. *C. rangiformis* has a shrubby form, resembling the lichens that are used to simulate shrubs on model railways.

A small 'cutting' where a path strikes downslope across the vallum of Devil's Dyke, just south-east of the Well Gap, at TL6136212, has a bank where chalk fragments are exposed. One of the fragments was dominated by *Clauzadea metzleri* which is new to VC 29. *C. metzleri* is one of many 'black dots' that grow on chalk. The fruiting bodies are about 0.5 mm diameter, partially immersed in the chalk, and microscopic examination is required for reliable identification. A shaded pebble picked at random from beneath the shade of scrub just east of the B1061 (TL633602) was found to support *Steinia geophana*, the sole record for Cambridgeshire. The lichens on chalk pebbles would make a fascinating study. Gilbert (2000) found that the chalk pebble community is dominated by a rather small number of lichens but that a long 'tail' of unexpected species has been found, which suggests that it is something of a habitat for opportunistic lichens. He states that "A total of 65 species has been recorded from this microhabitat; most are small, with immersed fruiting bodies, and need a microscope to confirm their identification." Such sentences lead people to imagine that if one spends an evening engaged in careful microscopy, all the species will be identified. That is far from the case. Three chalk fragments were collected from Devil's Dyke, on which grow lichens which I cannot identify. Chalk pebbles support a range of species in the family Verrucariaceae, quite a few of which do not comfortably sit in the current published species concepts. Here is a potentially fascinating study in which there is a good chance of discovering undescribed taxa. The person or people engaged in such a study would benefit from competency in three disciplines. First is the ability to make good microscopic observations. Second, ability to undertake molecular taxonomy. Thirdly, it would be useful to have someone who has the patience to search through old literature and examine old type specimens to find out which taxa have already been described but later forgotten about.

The only area of mature woodland in the area studied occurs at the southern end of Devil's Dyke and here a particularly gnarled oak tree was examined in some detail, including a careful search of deep bark crevices in which *Chaenotheca trichialis* was found. *Chaenotheca* is a genus of 'pin lichens' whose minute fruiting bodies are born on stalks; many of the species grow in crevices where they are perhaps protected from pollution and form relic populations. The tree also supports *Schismatomma decolorans*, another species that often indicates long periods of ecological continuity. *S. decolorans* forms pale pinkish brown, dusty crusts with negative spot reactions to the reagents carried by lichenologists.

One helpful characteristic arises from the *Trentepohlia* alga that is its partner, which results in a yellowish scratch, whereas most lichens scratch green. Most of the other corticolous lichens at Devil's Dyke are likely to have been rare or absent during most of the 20th century due mainly to atmospheric sulphur dioxide levels. These have now fallen below the limiting level for most lichen species. It is currently an exciting time to be a lichenologist in lowland England as many species which had retreated to the relatively clean air on the western seaboard of Britain are now re-colonising. Another factor affecting lichen communities is the increased influence of compounds of nitrogen which results in the abundance of species of *Xanthoria* and *Physcia* which currently dominate twigs right across the Cambridgeshire landscape. The pace of change is rapid. *Catillaria nigroclavata* and *Halecania viridescens* started to appear in Cambridgeshire during the current decade and *Catillaria fungoides* (found at both sites) was not known in Britain before 2015. *Catillaria fungoides* cannot be described as beautiful, being a blackish powdery crust. By contrast, *Chaenotheca brachypoda* produces minute pin-shaped fruiting structures, the pin head with a yellow pruina as if dusted with sulphur. *C. brachypoda* is present in sheltered bark crevices of the large ash tree at the bottom of the Devil's Dyke, in the Ditch Farm section, at TL5860264271. *Lecanora conizaeoides* was the background crust during the decades of sulphurous pollution when it dominated tree bark as well as built structures. Now it has retreated to become a specialist of acidic substrata such as weathered timber and was not found at either site.

Elder (*Sambucus niger*) bushes tend to support more than their share of interesting lichens and those just south of the A1304 (TL62846066) did not disappoint. *Ramonia interjecta* has been found just once before in Cambridgeshire. It is doubtfully lichenized but is adopted by lichenologists since it behaves like a lichen (not aggressively rotting its substrate) and tends to be ignored by mycologists. At Fleam Dyke, *Psoroglaena stigonemoides* was found on shaded Elder stems, a lichen often passed over as an algal crust. *Dacampia cyrtellae*, found just south of the A1304 at Devil's Dyke, is the second British record of an interesting lichenicolous fungus which infects *Lecania cyrtella*. The first British record was also on Elder, in West Norfolk earlier in 2017. Lichenicolous fungi are fungi which grow on or in lichens. Many are pathogenic and host-specific, being fungal diseases specific to their host lichens. The lichenicolous fungi represent a wealth of under-recorded and undescribed diversity and they are currently a fashionable pursuit for lichenologists.

Our surveys recorded exactly one hundred taxa (ten of which are lichenicolous fungi). A good rural churchyard usually contains over one hundred taxa while a good ancient woodland seldom contains as many as fifty. As of January 2016, the database of the British Lichen Society held 377 taxa of lichens and lichenicolous fungi for VC 29, though with many recent additions the total will now be over 400. If it were not for the chalk paths, the lichens found at Devil's Dyke and Fleam Dyke would be unremarkable.

Full reports of these and other surveys by the Cambridge Lichen Group can be found at:http://fungi.myspecies.info/content/projects-and-surveys

Images of the species listed in the Appendix are available on the Fungi of Great Britain and Ireland website. For example:
http://fungi.myspecies.info/all-fungi/lecidea-lichenicola

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Appendix. List of lichens and lichenicolous fungi recorded at both sites.
Column A gives the standard British Lichen Society number for each taxon.
Column B gives the name of the taxon.

A	B	Devils Dyke	Fleam Dyke
2683	*Arthonia parietinaria*	x	
212	*Amandinea punctata*	x	
49	*Anisomeridium polypori*	x	
69	*Arthonia radiata*	x	x
70	*Arthonia spadicea*	x	
1542	*Arthopyrenia punctiformis*	x	
2015	*Athelia arachnoidea*	x	
165	*Bilimbia sabuletorum*		x
207	*Buellia griseovirens*	x	
242	*Caloplaca cerinella*	x	
	Caloplaca cf. phlogina	x	
247	*Caloplaca citrina s. lat.*		x
249	*Caloplaca crenulatella*		x
2315	*Caloplaca flavocitrina*	x	x
2527	*Caloplaca holocarpa s. str.*	x	
283	*Caloplaca ulcerosa*	x	
291	*Candelariella aurella f. aurella*	x	x
297	*Candelariella reflexa*	x	x
298	*Candelariella vitellina f. vitellina*	x	
2647	*Catillaria fungoides*	x	x
316	*Catillaria nigroclavata*	x	x
470	*Chaenotheca brachypoda*	x	
349	*Chaenotheca trichialis*	x	
384	*Cladonia fimbriata*	x	

407	*Cladonia pocillum*	x	
412	*Cladonia rangiformis*	x	
749	*Clauzadea metzleri*	x	
429	*Cliostomum griffithii*	x	
440	*Collema crispum var. crispum*	x	
	Collema sp.		x
459	*Collema tenax var. tenax*	x	x
911	*Cyrtidula hippocastani*	x	
2689	*Dacampia cyrtellae*	x	
2166	*Didymocyrtis slaptoniensis*	x	
491	*Diploicia canescens*	x	
511	*Evernia prunastri*	x	
1704	*Halecania viridescens*	x	x
1125	*Hyperphyscia adglutinata*	x	x
2468	*Hypotrachyna afrorevolata*	x	
2577	*Hypotrachyna revoluta*	x	
2071	*Illosporiopsis christiansenii*		x
613	*Lecania cyrtella*	x	x
614	*Lecania cyrtellina*	x	x
616	*Lecania erysibe s. str.*		x
159	*Lecania naegelii*		x
627	*Lecanora albescens*		x
635	*Lecanora campestris subsp. campestris*	x	
639	*Lecanora chlarotera*	x	x
641	*Lecanora confusa*	x	
646	*Lecanora dispersa*	x	x
649	*Lecanora expallens*	x	x
661	*Lecanora muralis*	x	
680	*Lecanora stenotropa*	x	
740	*Lecidea lichenicola*	x	x
797	*Lecidella elaeochroma f. elaeochroma*	x	x
1629	*Lepraria finkii*	x	x
1974	*Lepraria incana s. str.*	x	x
827	*Leptogium biatorinum*	x	
845	*Leptogium schraderi*		x
2087	*Lichenochora obscuroides*	x	x
2108	*Marchandiobasidium aurantiacus*	x	
997	*Melanelixia glabratula*	x	
1020	*Melanelixia subaurifera*	x	x
938	*Opegrapha atra*	x	
948	*Opegrapha herbarum*		x

953	*Opegrapha niveoatra*	x	x
954	*Opegrapha ochrocheila*	x	
958	*Opegrapha rufescens*		x
964	*Opegrapha varia*	x	x
965	*Opegrapha vermicellifera*	x	
2441	*Opegrapha viridipruinosa*	x	x
943	*Opegrapha vulgata*	x	
2135	*Paranectria oropensis subsp. oropensis*	x	
1015	*Parmelia saxatilis*	x	
1022	*Parmelia sulcata*	x	x
1008	*Parmotrema perlatum*	x	
1107	*Phaeophyscia orbicularis*	x	x
1110	*Phlyctis argena*	x	
1112	*Physcia adscendens*	x	x
1120	*Physcia tenella*	x	x
1127	*Physconia grisea*	x	x
1608	*Placidium squamulosum*	x	
206	*Polyblastia philaea*	x	x
1630	*Psoroglaena stigonemoides*		x
1989	*Punctelia jeckeri*	x	
2070	*Punctelia subrudecta s. str.*	x	x
1234	*Ramalina farinacea*	x	x
1235	*Ramalina fastigiata*	x	
456	*Ramonia interjecta*	x	
1289	*Rinodina oleae*	x	x
1315	*Schismatomma decolorans*	x	
1349	*Steinia geophana*	x	
1375	*Strigula jamesii*	x	
2242	*Taeniolella phaeophysciae*	x	x
2068	*Telogalla olivieri*		x
2260	*Unguiculariopsis thallophila*		x
1871	*Verrucaria elaeina*	x	
1507	*Verrucaria muralis*	x	
	Verrucaria murina agg.	x	
1530	*Xanthoria parietina*	x	x

Cambridgeshire Mycological Collections, 1998–2018

Nathan Smith

Checklists are an important method of documenting the natural history of a region. However, without the retention of reference material, these are subject to a degree of uncertainty, particularly for rarer or more obscure taxa. This is particularly true for mycology, where the taxonomy remains relatively fluid and the same binomial has often been used for multiple species. To this end, it is important for a region to have easily accessible mycological collections. The error rate in publicly available, taxonomically important DNA sequences for fungal samples is up to 20% (Bridge *et al*, 2003). This is likely to be at a similar level if not substantially higher in the observations on which checklists are based due to the potentially reduced levels of assessment. Additionally, sporocarp collections allow for the repeated independent redetermination of species identity at later date, whether to correct an error or to update records as taxonomies change and species are split into multiple new taxa. Finally, as molecular biology and conservation continue to intertwine, historical collections can provide an important and vital resource in assessing the health and dynamics of populations within a region through providing a view of species diversity across time and documenting when new species are recorded.

According to currently available collection databases, the Kew Fungarium holds c. 80% of all mycological collections from Cambridgeshire (excluding the collections of the International Mycological Institute, whose database is particularly inaccessible when investigating records at the county and vice-county level). The majority of the rest of the collections are held by the University of Edinburgh Herbarium with smaller collections (<20 samples) in other globally ranging herbaria. The Cambridge Herbarium also likely possesses a substantial collection though this has yet to be databased. Indeed, the majority of collections within all these institutions have yet to be databased and so numerous collections are likely to be missing and multiple layers of bias are likely to have influenced the current databases, such as the significance of the collectors and/or the research interests of those using the collections. Therefore, any analysis of the whole collections is limited and must take account of "invisible" collections not yet databased.

The work presented here focuses on the collections from Cambridgeshire between 1998 and 2018. The primary reason for this is that the Kew fungal database system was introduced in 1997 and therefore all collections after its introduction should have been databased, removing many of the biases previously mentioned. All samples for this period from the Cambridge Herbarium have also been databased, and all samples from the Edinburgh Herbarium are also likely to have been databased though there is some uncertainty about this. Furthermore, by focusing on collections gathered in the last twenty years, the current state of mycology within the region can be assessed and brought into focus.

Cambridgeshire is particularly active in its pursuit of mycology. The Huntingdon Fungus Group (HFG), formed by Sheila Wells in 1994, and the South

Cambridgeshire Fungus Group (SCFG), which developed from the Melbourn Mushroom Club formed by Hélène Davies in 1995, are two active fungal societies within the county that regularly host forays and other fungal-focused events. Peter Walker, a founding member of the HFG has run a fungus identification workshop in collaboration with the Wildlife Trust. Additionally, the Cambridge Natural History Society and the Huntingdonshire Fauna and Flora Society also conduct regular forays. Within the University of Cambridge, yearly forays are hosted by the Department of History and Philosophy of Science, headed by Professor Nick Jardine, and the Department of Zoology, headed by Professor William Amos. Professor Oliver Rackham (1939-2015) was also active in this period, as his digitised notebooks show, and he recorded numerous fungal species within Hayley Wood, often detailing distinguishing features and providing sketches of notable species.

The lichenous fungi (not addressed in this article) are particularly well served by Mark Powell and the Cambridge Lichen Group. In terms of publications since 2000, several checklists have been published in this journal for non-lichenised fungi for specific areas within Cambridgeshire (Tribe, 2004; Holden, 2007; Shanklin & Tribe, 2011), all of which are primarily observation based (a voucher specimen was made of the *Russula vesca* sporocarp observed in Eversden Wood), though all make good use of repeat observations to minimise error. Finally, a fungal survey was conducted by Mariko Parslow and Peter Walker at RSPB Grange Farm in 2001–2002 which identified 491 species and from which several specimens where deposited within the Kew Fungarium. The results of this survey were published by Kirby et al. 2003.

Materials and Methods

In addition to the University of Cambridge Herbarium's modern collections (CGE), databased herbarium records were obtained from the Royal Botanic Gardens, Kew (K), the Royal Botanic Gardens, Edinburgh (E), the Manchester Museum (MANCH) and the Glasgow Museum (GLAM). Online catalogues were searched for the herbarium of Harvard University (FH, GH), the New York Botanical Garden (NY), the Smithsonian Department of Botany (US), the University of Michigan (MICH), the French National Museum of Natural History (PC) and the Centre for Agriculture and Bioscience International (IMI). Additionally, the Biological Collection Access Service and JACQ Virtual Herbaria were also used, both of which provide specimen results from a variety of herbaria. Collectively, these were used to compile a list of databased samples collected from the modern county of Cambridgeshire (including the historical county of Huntingdonshire and the former Soke of Peterborough) between 1998 and 2018 inclusive. Species names were updated to the current accepted taxonomy using Index Fungorum and samples representing lichenised species or non-fungal organisms were removed from this database. A total of 27 samples across 18 genera were identified as being described with outdated synonyms and these were updated. Additionally, a database was compiled for all catalogued voucher specimens collected from Cambridgeshire unrestricted by date of collection and these were similarly updated. This database is separate from the

true number of collections from Cambridgeshire in each herbarium, with the percentage representation of databased samples varying for each collection. For Royal Botanical Gardens, Edinburgh, the online database represents about 27% of their total collection. This was used as a comparison against the modern database.

The Collections

In total, 877 collections of non-lichenised fungi from Cambridgeshire between 1998 and 2018 were traced, with 527 of these from VC29, 336 from VC31, and 14 from VC32.

The Royal Botanic Gardens, Kew, Fungarium holds 491 of the specimens. There were 148 collections attributed to VC 29 with 329 collections from VC 31 and 14 collections from the former Soke of Peterborough which is in VC32. Compared to nearby vice-counties (VC18-20,25-32,53), which have an average of 215 modern collections (the lowest being five from South Lincolnshire and the highest being 608 from Hertfordshire), this number of collections is above average for VC31 but below slightly below average for VC29. However, the last accession from both our vice-counties was made in 2013. This coincides with the year of the last BMS Autumn foray in the region from which many samples were collected. This was held at Pidley with Monks Wood, Woodwalton Fen and Holme Fen receiving focused attention. The only county with a longer period since the last specimen was deposited at Kew is South Lincolnshire.

A further two samples were identified from Edinburgh Herbarium, both collected from VC29. The small number is not surprising as the vast majority of the Cambridgeshire fungi at Edinburgh were collected by Edred John Henry Corner (1906-1996), former Professor of Tropical Botany at the University of Cambridge, who gave his collection to Edinburgh before his death. For the Cambridge Herbarium 15 samples (10 from VC29, five from VC31) were collected in this time period, representing 15 species across 13 genera. These were all collected by John Holden, who was a member of the South Cambridgeshire Fungal Group. Additionally, Dr Christopher Preston is currently in the process of curating a substantial number of microfungal specimens collected in 2017 and 2018. These number at least 471 true fungi, with 431 identified to at least the level of genus. All these samples were collected in VC29 and as of the 13th of March 2018, 367 samples have been curated in the Cambridge with 366 identified to at least genus level. These samples only will be addressed in this paper. Finally, two further samples were identified from global herbarium records with one at the University of Vienna (WU) and one at the Westerdijk Fungal Biodiversity Institute (formally the Centraalbureau voor Schimmelcultures (CBS)).

Across both vice-counties 520 species within 258 genera were identified, including anamorphs. There were 127 ascomycete and 130 basidiomycete genera with one zygomycete genus. Three specimens that were identified to genus level only were members of genera that had no sample identified to species level within the past 20 years. One of the these (*Sphaeropsis*) represented a completely unique genus across all databased records of the region. The genus with the most species was the rust genus *Puccinia*, with 32 species from 71 collections. In contrast, 190

genera were represented by one species only. The most sampled genus was *Erysiphe* with 92 samples representing 29 species of these powdery mildews. However, 167 genera (65%) were represented by one sample only, with only 17 genera represented by five or more samples, highlighting that genus diversity in collections may not be representative of genus diversity of the region and is likely constrained by the number of collections.

Within Cambridgeshire (VC29), 262 species (50%) across 138 genera (53%) are present within herbarium collections from the past 20 years. The most diverse genera are *Erysiphe and Puccinia,* with both having 29 species identified from 91 and 56 collections respectively. In Huntingdonshire, 278 species (53%) are represented across 176 genera (68%). The most diverse genus is *Puccinia,* though only eight species were identified in the vice-county from 15 collections. For the former Soke of Peterborough, the 14 collections represented 14 species across 13 genera.

Huntingdonshire (VC31) had a peak number of collections in 2004 with 120 collections, coinciding with the 10th anniversary of the Fungus Group, and a smaller peak in 2013 with 71 collections, the latter a result primarily of the BMS Autumn Foray. The peak year for Cambridgeshire (VC29) collections was 2017 as a result of the efforts of Christopher Preston (**Figure 1)**. Addressing the month of collection (**Figure 2**), both VC 29 and VC 31 had the most collections in October and the least collections in December. VC29 also had a secondary peak in collections during August (again as a result of the work of Christopher Preston).

The samples were collected from wide variety of locations within Cambridgeshire. All samples provided additional details about sample location, with many samples giving an accuracy down to the house number of collection. Additionally, 321 samples had an accompanying grid reference with six having a two digit grid reference, 45 having a four digit grid reference, 72 having a six digit grid reference, and 22 having an eight digit grid reference. The most popular location sampled was the city of Cambridge, which had 228 samples ascribed to it. Of these, 31 were collected in Cambridge University Botanical Garden. Sutton was the next most popular collection spot with 44 collections from the area. Woodwalton Fen (38), Brampton Wood (36), Wimpole Estate (30), Monks Wood (27), Upwood (27), Chippenham Fen (24), Waresley Wood (21), Wisbech (20), Holme Fen (18) and Gamlingay Wood (17) were the other regions with more than 15 collections. Many of these were an area of focus for the BMS Autumn Foray in 2013 and some owe their abundance of collections to a single collector. This is seen in Wisbech, where 18 of the voucher specimens were collected by Malcolm Storey, and in the city of Cambridge, where the majority of collections are by Christopher Preston.

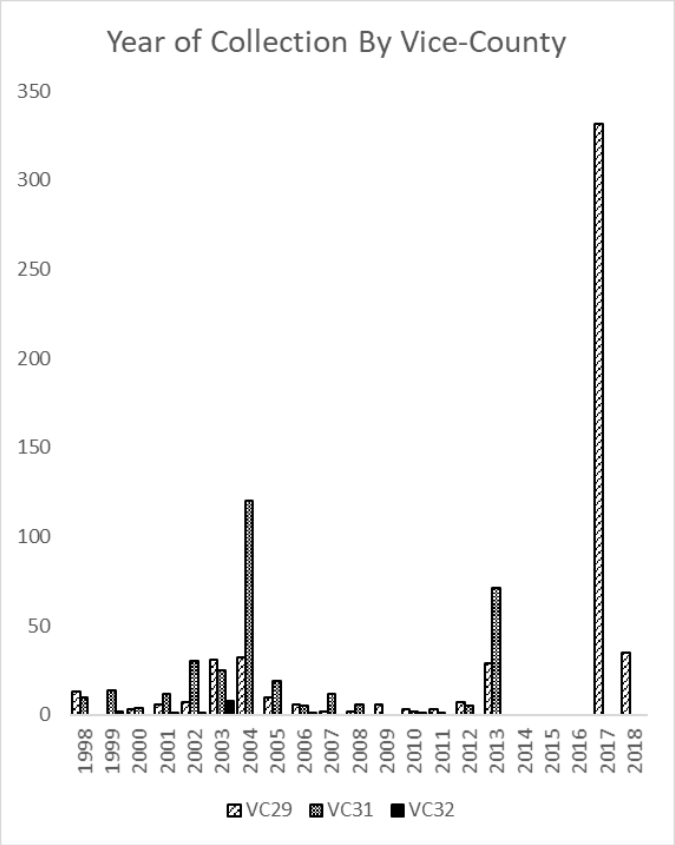

Figure 1 Collections by year, separated by vice county of collection

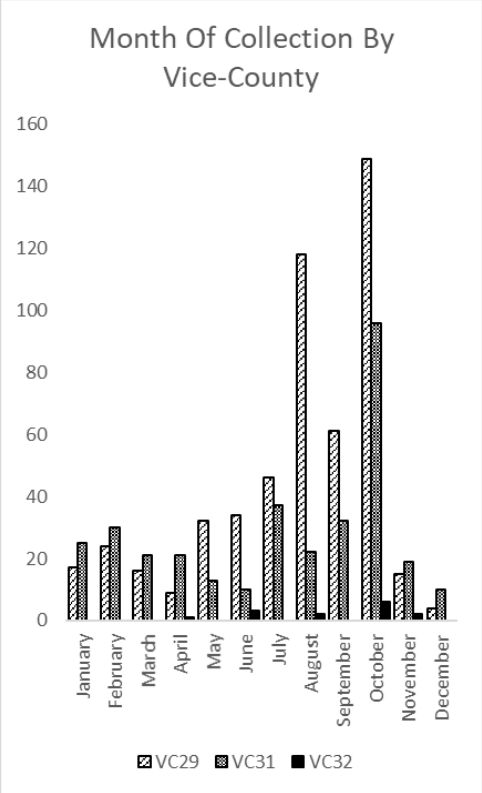

Figure 2 Collections by month, separated by vice county of collection

The Collectors and Determiners

Overall, 73 individuals have contributed voucher specimens over the past 20 years. These represent those local to the region alongside members from the UK and further afield. Members of both the Royal Botanic Gardens, Kew (RBGK) and the British Mycological Society (BMS) are present in substantial numbers. Additionally, the Cambridge Archaeological Unit is credited with collecting two samples and four samples had no collector information. A total of 14 samples were credited to multiple named collectors and one sample was databased with only the collector's initials and could not be assigned. The most active collectors within this timeframe are Christopher Preston, Mariko Parslow, and Sheila Wells, all of whom collected over 100 samples and combined were responsible for collecting 611 (70%) of the samples representing 317 species (61%) across 153 genera (59%). Christopher Preston has collected 367 samples (42%) representing 123 species (24%) within 30 genera (12%). Mariko Parslow, a former member of the Huntingdon Fungus Group and volunteer at the Royal Botanic Gardens, Kew, collected 140 samples (16%) representing 119 species (23%) spread across 85 genera (33%). She has since left the region and currently leads the Surrey Fungus Study Group. Sheila Wells, who leads the HFG, has donated 106 collections (12%) representing 92 species (18%) across 64 genera (25%). In total, 11 collectors (15%) exceeded 10 collections (**Table 1)** with 36 collectors (49%) associated with only a single collection.

Collector	Principal Herbarium	Affiliation	Number of Collections	Number of Genera Represented	Number of Species Represented
C.D. Preston	CGE	Independent	367	30	123
M. Parslow	K	HFG	140	85	119
S. Wells	K	HFG	106	64	92
T. Wells	K	HFG	30	25	28
B.M. Spooner	K	RBGK	21	19	19
A. Henrici	K	BMS	18	13	18
M.W. Storey	K	Independent	18	16	16
A.M. Ainsworth	K	RBGK	16	12	13
J. Holden	CGE	SCFG	16	14	16
K. Robinson	K	Independent/BMS	16	15	16
A. Robbins	K	HFG	14	11	13

Table 1 Individuals listed as collectors 10 or more voucher specimens.

Separated by vice-county, 45 collectors were identified as being active in VC29. Of these, Christopher Preston was the most active with all his collections coming from the vice-county. Mariko Parslow (52), Malcolm Storey (18), and John Holden (10) also had 10 or more collections from the vice-county. A total of 28 collectors active in VC29 were not active in other vice-countie. In VC31, 44 collectors were identified. Sheila Wells was the most active collector with 96 of her collections coming from the region. Mariko Parslow (81), Terry Wells (27),

Brian Spooner (15), Alan Robbins (13), Martyn Ainsworth (12), and Alec Henrici (10) also had 10 or more collections from the vice-county. A similar proportion of collectors was found to be exclusively active in VC31 as those exclusively active in VC29, with 26 collectors active only within VC31. VC32 had seven collectors with Mariko Parslow being predominant with seven collections. One collector, Anne Andrews of the Kent Field Club, collected only in this vice-county.

Forty nine determiners, confirmers, and revisers of species were identified (**Table 2**). Additionally, for 342 collections not listed with a determiner, the collector was presumed to also be the identifier. This identified two more individuals as probable determiners. A total of 25 of identified determiners (49%) determined only one collection. Separated by vice-county, VC29 has 36 determiners (with 22 unique to the region), VC31 has 25 determiners (with 12 unique to the region), and VC32 has ten determiners (with one unique to the region). The Cambridge Herbarium collection was found to associated with only six determiners (Christopher Preston, John Holden, Bruce Ing, Arthur Chater, Roger Cook, and Richard Shotbolt) four of whom are unique to the herbarium.

Determiner	**Principal Herbarium**	**Number of Determinations**	**Number of Collections where sole collector/determiner**
C. D. Preston	CGE	330	326
M. Parslow	K	169	119
S. Wells	K	109	60
B.M. Spooner	K	61	14
A.O. Chater	CGE	34	0
A.M. Ainsworth	K	24	15
A. Henrici	K	22	13
G.G. Kibby	K	18	6
M.W. Storey	K	18	18
J. Holden	CGE	14	12
K. Robinson	K	12	12

Table 2 Individuals listed as determiners, confirmers, and/or revisers for 10 or more voucher specimens.

Of the 876 collections identified to at least genus level, 32 samples (3.6%) were found to have multiple determiners, confirmers, and revisers and 624 (71%) were found to have only a single individual associated with the collections (as either both collector and determiner or with no determiner listed).

Conclusions

Only a minority of the mycological activity in the county results in the deposition of specimens in the herbaria and fungaria studied in this paper. Whilst activity in the region has remained relatively frequent, mycological collections from Cambridgeshire show a fluctuating activity across the past 20 years. Additionally, it is noted that numerous iconic species, such as *Boletus edulis* and

Amanita spp., have apparently not been deposited from the region in any herbarium (including databased samples collected before 1998), despite observations of these species existing within the Fungal Records Database of Britain and Ireland (FRDBI), a database of fungi records from forays, surveys, and publications of the British Mycological Society. Ensuring the full mycological flora of a region is represented within herbaria is essential in assessing the natural history of a region and is a key purpose of herbaria. Indeed, it suggested that herbaria databases can serve a useful tool both in the preparation and during the debrief of fungal forays, allowing groups to compare their checklists against what is currently curated and aiding in the selection of mycological finds to be made into voucher specimens.

That three collectors are responsible for 70% of the voucher specimens collected in Cambridgeshire between 1998 and 2018 shows the power of enthusiastic individuals in shaping the recorded biodiversity of a region. Whilst this has been beneficial for Cambridgeshire, resulting in the past 20 years being well represented in herbaria collections compared to neighbouring counties, it is important to note that the over-activity of individuals can result in biases in collections which favour their interests and expertise and misrepresent the both the fungal biodiversity and mycological history and activity of the region as a whole. This can be seen in that VC29 has only 50% of the generic diversity of the county collected in herbaria in the past 20 years, despite having substantially more samples collected. The solution to this is not to restrain these individuals but to encourage others to collect and prepare voucher specimens according to their interests and to facilitate a county-wide framework for the curation of mycological specimens. Here lessons can particularly be learnt from the Huntingdon Fungus Group which has enabled numerous members to prepare and submit voucher specimens to the Kew Fungarium. Furthermore, the fact that the majority of samples (71%) have only a single collector/determiner is troublesome and highlights that many samples may not be receiving the level of scrutiny expected for voucher specimens. This in turn reduces confidence in the certainty of identification. For many of these specimens, this may just be a case of improper recording on specimen packets, with many samples doubtlessly identified by multiple individuals during collection or in the process of curation. Additionally, the recent time period examined may mean that samples will be further processed at a later date. However, it will not be the case for all specimens. Once again this highlights the need to facilitate a county-wide mycological framework with which to ensure species assignment can assessed and confirmed by multiple individuals.

Finally, the lack of any new accessions (except those by Christopher Preston) since 2013 is a potentially troubling observation, suggesting a lull in formal mycological activity in the region. It also highlights that large national forays in an area do not necessarily have a positive legacy on regional mycological activity and indeed may even cause a negative effect on local efforts. Whilst small lulls are to be expected as demographics change, if this trend continues Cambridgeshire is at risk of being neglected in future fungal research which in turn could go on to have real impact on conservation decisions within the county. The move to use herbaria collections in informing research into climate change

and other matters of modern scientific interest (e.g. Wollan *et al.*, 2008) is dependent on accurate and regular observations across time and is inhibited by large gaps.

Overall, the impression from the past 20 years of Cambridge mycology is positive. Modern samples are well represented in herbaria databases with a good diversity of species and collectors, though some iconic species remain absent from herbaria, or at least from herbarium databases. Activity by Christopher Preston shows mycological collections are still occurring within Cambridgeshire and it is hoped that the next twenty years of Cambridge mycology show an increase in sample diversity and number. Whilst not all finds judged interesting in a foray may be able to be incorporated by institutions due to expense and limited resources, the presence of a modern regional herbarium within the region is a resource which should be exploited more by mycologists with samples that may be of interest.

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Cambridgeshire and Peterborough Otter Survey - 2017

Peter Pilbeam

Summary

A survey of Cambridgeshire waterways, looking for signs indicating the presence of Otters, was conducted between the beginning of December 2016 and

the end of February 2017. This was a repeat of surveys undertaken every five years from 1992. A total of approximately 285 sites was visited and surveyed using the same methodology as in previous years.

The survey showed a small decrease in positive sites from 49% of those surveyed in 2012 to 41% of those surveyed in 2017. No particular area showed a decrease in positive sites.

In February 2018 a supplementary survey of a number of unexpectedly negative sites and those nearby was undertaken to determine whether or not they remained negative since early 2017. Of the approximately 25 sites resurveyed some two-thirds were positive.

Background

The first county-wide survey for Otter signs took place in 1992 - the known local decline of Otters had not reversed. Small numbers of captive-bred Otters were introduced in or very near the county in 1994 and 1995.

The survey was repeated every five years until and including 2017. Increases in the numbers of signs were observed on every occasion until 2012 with a small decrease in 2017. The survey data cannot be directly related to the number of Otters in the county, but clearly their range and numbers have increased dramatically.

Methodology

The survey method of the previous surveys was repeated. At each of the sites the immediate area of the bridge was checked for signs (spraint and prints) as thoroughly as possible. If no signs were found then 600m of bank were walked (i.e. 150m from the bridge on each side of the watercourse in both possible directions), concentrating on likely sites for spraint and prints. Whenever signs were found the survey stopped - a positive site. Signs of other mammals were noted up to that point, so data for those species cannot be considered as complete.

Survey conditions

As in the 2011/2 survey the winter was unusually dry following a dry summer, so river flows were very low for the period of the survey. Therefore there was little danger of spraint having been washed away but low water levels may have discouraged Otters from using some areas. One set of ten sites was surveyed after rain and no Otter signs were found where they had been expected.

Results

A total of 291 sites was visited and survey forms completed. Ten new sites in the city of Cambridge had been added. Some sites had remained or become dry, one had disappeared as a result of A14 improvement work, a few remained or had become completely inaccessible, and some parts of several sites could not be accessed. Therefore some sites could not be assessed as positive or negative. A summary of the results is shown in Table 1 below.

	2017	%	2012	%	2007	%	2002	%	1997	%	1992	%
Otter	120	41	140	49	76	26	47	16	35	12	3	1
Mink	15	5	29	10	18	6	47	16	37	13	57	20
Water Vole	16	5	8	3	13	4	14	4	0	0	9	3
Brown Rat	26	9	28	10	72	24	-	-	-	-	-	-
Total sites	291		285		289		285		281		279	

Table 1 Other species coinciding with Otters

Mink signs continued to show a marked decline (given that the survey was not aimed at finding Mink signs - see above). Water Vole signs had doubled since 2012 (with the same proviso) - possibly a result of fewer Mink. Signs of Brown Rat remained much the same.

Discussion

The proportion of sites with positive signs of Otters in 2017 was 41%, slightly lower than the 49% in 2012. This was the first decrease since surveys started in 1992. There seems to have been no particular reason for the decrease (after 20 years of a marked increase).

Twelve of those sites with unexpectedly negative results were resurveyed in March 2017 by two very experienced surveyors - some were found to have changed, mainly positive to negative. As a result about 25 similar sites and those nearby were resurveyed in early 2018 - two thirds were found to be positive. It was known that quite a few of the surveyors in early 2017 were either new or very inexperienced.

Weather may have been a feature in the decrease - 21% of surveys were carried out after rain (largely because of necessity) but only 21% of those sites had signs of Otters indicating that rain may have affected results.

Overall conclusions

Until 2012 Otter activity in Cambridgeshire had increased dramatically with only a small decrease seen in 2017. There seemed to be no particular reason for the decrease but there may have been some under-recording and the weather may have been a factor. The results do not necessarily imply a reduction in the number of Otters in the county. The continuing success of Otters in the county does not relate to any further releases and instead is due to natural recolonisation. There are still only a few parts of the county with a watercourse but no Otter presence. It is not possible to say whether Otter numbers are increasing or decreasing.

Recommendations

1 - the county-wide Otter survey should be repeated in 2022 to check that this is not the start of a population decline.

2 - review the surveyor training and the survey form to make the survey easier to carry out and report on, including in a number of cases making the access details clearer.

3 – monitor particular key areas over the next few years.

4 - communicate with neighbouring counties to create a wider Otter map.

5 - as the presence of Otters in the Middle Level is continuing, maintain the artificial holts where necessary to maintain that presence.

6 - remove from the list of sites those which have become permanently inaccessible for one reason or another (including fencing off by a fishery or removal).

The survey was co-ordinated by the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire using surveyors from the Wildlife Trust and the Cambridgeshire Mammal Group with other volunteers.

Further information may be found in the previous survey report, not specifically cited in the text: **Pilbeam, P. G.** (2013). Cambridgeshire and Peterborough Otter Survey - 2012. *Nature in Cambridgeshire* **55**:44-46.

Cambridge Amphibian Survey Report 2016

Steven J. R. Allain & Mark J. Goodman

Introduction

The Cambridge Amphibian Survey 2016 was part of a long-term study in which we monitored the populations of amphibians across a small number of sites. This year was the fourth year that the project was carried out, although it was scaled back slightly compared to previous years (such as 2015). The goal of the ongoing project is to survey bodies of freshwater for signs of amphibians and gather long-term data on population trends. The main technique involves searching for adult amphibians, using night-time surveys in the breeding season between March and June (although some preliminary surveys were undertaken to check for early signs of activity). Additionally, other signs of amphibians (eggs and larvae) are also searched for as they can often be found in ponds when the adults themselves have mostly dispersed into the terrestrial environment.

Method

The project is designed to meet standardised guidance protocols (Griffiths *et al*., 1996; Sewell *et al*., 2013) and surveys were carried out weekly depending on the weather. On nights when it was extremely windy or there was heavy rain, surveying did not take place due to the effect of disturbance from surveyors, and for the safety of ourselves and our volunteers. Surveys were carried out weekly to help create a more extensive synopsis of the population sizes of native amphibians within Cambridgeshire. This was also completed to gain a better understanding of peak migration patterns towards ponds; the data from the long term study will

hopefully inform us about long-term patterns. As with previous years, amphibians within Cambridgeshire are under recorded so one aim of this study was to educate residents on the importance of recording local species.

Four sites were surveyed, mostly after nightfall by torchlight, and amphibians were recorded, along with the occurrence of fish and the size and number of Common Frog spawn clumps. Th pond's suitability to sustain Great Crested Newts was also assessed. The sites were surveyed with the help of trained volunteers who were members of the Cambridgeshire and Peterborough Amphibian and Reptile Group (CPARG). Our surveys also allow for the training of additional volunteers, who can then go off and replicate similar surveys within the county.

The species focused on in this ongoing study are the most common of the native amphibian species found in Cambridgeshire, the Common Frog (*Rana temporaria*), the Common Toad (*Bufo bufo*), the Smooth Newt (*Lissotriton vulgaris*) and the Great Crested Newt (*Triturus cristatus*).

Survey locations

Site 1: Barnwell East Local Nature Reserve (TL47935831)

Barnwell East is a Local Nature reserve (LNR) near Cambridge Airport; it has one pond. This pond has a decking platform allowing access to one area, which is where most of the surveying was concentrated. Accessible areas around the pond were also surveyed but the entire pond was not accessible due to overgrown vegetation. The rest of the site consists of a mixture of woodland, scrubland and open grassland. Due to the location of the pond it is susceptible to eutrophication which may increase the amount of algae available for amphibian larvae.

Site 2: Bramblefields Local Nature Reserve (TL47256064)

Bramblefields is a 2.1 hectare LNR in Chesterton, Cambridge. The site is in the middle of a residential area and has a mosaic of habitats including grassland, scrub and a single pond. The reserve is adjacent to some allotments and itself is the site of previous farmland and allotments that has been transformed into a nature reserve. This was the first year that we surveyed the reserve after receiving reports of abundant amphibians being present. The reserve pond was our survey focus.

Site 3: Chesterton (TL46485957)

This site consists of a man-made waterway that has been built behind a block of flats on the old Phillips/Simoco site. We were alerted by friends who had seen some dead Smooth Newts on a path nearby. After further investigation we found the man-made waterway which appeared to have a healthy population of amphibians. The site is not too far from the River Cam or Logan's Meadow LNR.

Site 4: Regatta Court (TL46685951)

Regatta Court is a small managed housing complex located by the River Cam, off Newmarket Road. The site has a single large concrete lined pond which is

home to fish as well as amphibians. (**Plate 1**, inside front cover).The site was surveyed after we received reports of large numbers of toads in the area. The pond backs onto Stourbridge Common LNR meaning dispersal for amphibians is relatively easy. The area is also a registered toad crossing site and so some of our time was spent helping toads to cross the roads to their breeding pond.

Survey Protocol

All of the sites were surveyed by shining 160 lumen torches from the bank and into the water. The torches were shone to about three metres across the pond, if it was large enough, where the light beam was used to detect amphibians at the water's surface. Closer to the bank, the light cut much more deeply into the water and so more amphibians were likely to be detected. This method was reliable for detecting newts and other amphibians within ponds that had little vegetation or those that were shallow. For deeper areas, two or more torches were used to converge the light beams to give the column of light a better chance of penetrating the water.

The perimeter of each waterbody was surveyed including a buffer zone of approximately two metres around body of water. This was designed to count any amphibians that may have left the water body on our arrival due to disturbance. Any amphibians found within the buffer zone were also included in the counts. At some sites egg-searching was undertaken if the habitats were favourable, e.g. vegetation growing close to the banks. This involved searching submerged vegetation for folded leaves indicating presence of newt eggs. A 4-in-1 multifunctional environmental tester was used, when available, to gather water and air temperature data at the sites surveyed.

Results

Adult amphibians were discovered at three of the four sites. At the three sites where amphibians were found, breeding behaviour was observed although no newt eggs were found during any of the searches.

Peak Count Data

Site	**Date**	**Species**	**Peak Count**	**Air Temperature (°C)**	**Water Temperature (°C)**
Bramblefields	20/03/2016	Smooth Newt	40	N/A	N/A
Chesterton	28/02/2016	Common Frog	3	N/A	N/A
Chesterton	21/02/2016	Common Toad	6	N/A	N/A
Chesterton	21/04/2016	Smooth Newt	5	10.7	10
Regatta Court	01/03/2016	Common Frog	5	9.3	8
Regatta Court	21/02/2016	Common Toad	139	14	11.5
Regatta Court	21/04/2016	Smooth Newt	2	11.7	12.5

Table 1. Summary of data collected at the three sites. At one of the four sites surveyed, no amphibians were recorded in 2016.

HSI Scores

The Habitat Suitability Index (HSI) is a scoring system that analyses 10 points of a habitat in order to establish whether or not that habitat is suitable for Great Crested Newts (Oldham *et al*., 2000). The scoring system works by giving the 10 points listed below a number between 0 and 1. The geometric mean of these is then calculated to give the HSI of the pond or water body being studied.

- SI1 = The pond's/water body's geographical location.
- SI2 = The surface area of the pond/water body.
- SI3 = The permanence of the pond/water body.
- SI4 = The water quality of the pond/water body.
- SI5 = The total area of shading on the pond/water body.
- SI6 = The number of waterfowl on the pond/water body.
- SI7 = The occurrence of fish in the pond/water body.
- SI8 = The density of ponds surrounding the one you are studying.
- SI9 = The proportion of newt friendly habitat surrounding the pond being studied.
- SI10 = The total macrophyte cover in the pond/water body.

The equation used to work out the HSI for a pond using these 10 points is:

$$HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$$

Location	**Score**	**Rank**
Barnwell East LNR*	0.74	Good
Bramblefields LNR	0.74	Good
Chesterton*	0.77	Good
Regatta Court*	0.70	Good

Table 2. Table showing the HSI scores and ranks of the four locations surveyed. Scores were calculated using knowledge of the ponds, their location and ecology which has been built up over the duration of the project period. Locations labelled with an asterisk indicate that the HSI scores have been taken from the 2015 Cambridge Amphibian Report (Allain & Goodman, 2017).

Discussion

Cambridge City Crematorium was not surveyed in 2016 due to extensive management work that was carried out at the beginning of the year. Due to the high levels of disturbance and removal of material, it was decided that the site would next be surveyed again in 2017 to let the ponds recover from the work undertaken.

During surveys at Bramblefields LNR, two dead Smooth Newts were found and collected for post-mortem analysis. These were sent to ZSL London Zoo and analysed as part of the Garden Wildlife Health initiative. Thankfully the newts were found to have died of natural causes. The only amphibians seen at Bramblefields LNR were Smooth Newts and with a peak count of 40, the population is relatively large for a small pond. Our only concern is that as the

pond is not permanent in future years it may dry out threatening the survival of larvae. No Common Frogs or Common Toads were seen on surveys despite there being an abundance of suitable vegetation surrounding the rest of the site.

Despite numerous surveys, no amphibians were found at Barnwell East LNR. We were surprised at this as there had been an abundance of Common Toads and Smooth Newts there in 2015, when we first started surveying the site. Their absence may have been due to the fact that the pond itself was heavily shaded and had become eutrophicated. To help combat this, some maintenance work was scheduled for the early part of 2017.

There was a reduction in frogspawn at Chesterton from the volumes we have seen in the past. This may be part of a trend but 2016 was the lowest count at just three clumps of spawn. Like most of our native amphibian species, Common Frogs may not breed every year due to the huge metabolic investment needed to produce a clump of spawn.

Frogspawn was however seen in abundance at Regatta Court but counting clumps accurately was made difficult by the density of the vegetation. For the second year in a row, toadspawn was also found during surveys at Regatta Court which is a promising sign that this population is thriving as indicated by the peak count of 139 individuals (of which the majority were males).

All of the sites had HSI scores above average (0.6 – 0.69), meaning that potentially they are all suitable for Great Crested Newts to inhabit; one of the main limiting factors will be the presence of fish (Oldham *et al*., 2000). Unfortunately it is known that sticklebacks are present at the Chesterton site which may have a negative effect on local amphibian populations including deterring Great Crested Newts from colonising the area (if a local metapopulation is ready to expand). Another factor that affects the distribution of amphibians is the permanence of ponds, as these are needed for amphibians to breed (Semlitsch, 2008). Another factor which is considered as part of the HSI score is the number of local ponds in the area, as these may be utilised by amphibians as stepping stones between breeding ponds or hibernation sites.

At the end of the project all records were submitted to the Cambridgeshire and Peterborough Environmental Records Centre (CPERC).

Acknowledgments

The continued surveying and monitoring of amphibians at the sites mentioned in this report couldn't be done without the dedicated volunteers that have supported us no matter what the weather. We would like to thank them for their continued effort and professionalism when in the field. We would also like to thank our network of friends who continually surprise us with information leading to the discovery of potential new survey sites.

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New records of Palmate Newts (*Lissotriton helveticus*) in Cambridge

Steven J. R. Allain & Mark J. Goodman

Palmate Newts (*Lissotriton helveticus*) are relatively rare in Cambridgeshire with only a few isolated populations known to exist within the county. They are the smallest of the native UK newt species (Beebee & Griffiths, 2000) and prefer acidic bodies of water that are usually associated with heathland and moorland (Inns, 2009). One reason Cambridgeshire is lacking in Palmate Newts may be a lack of suitable habitat. Nonetheless, populations do occur and new ones are being discovered. The species may be more abundant than previously thought due confusion with Smooth Newts (*L. vulgaris*). The two species are very similar in size and colouration, with the females being almost identical from a dorsal viewpoint. This confusion may lead to Palmate Newt populations erroneously being misidentified as Smooth Newts, which are far more common and widespread within Cambridgeshire.

We report on a newly discovered population of Palmate Newts (**Plate 2,** inside front cover) found in the gardens of private residences in central Cambridge. The newts were first seen on the 21st May 2017 whilst conducting a Midwife Toad (*Alytes obstetricans*) survey. Three individuals were observed in a garden pond whilst dipping in the hope of finding the larvae of the Midwife Toad. The three individuals captured were two males in full breeding condition and a female. Two days later, on the 23rd May, three more Palmate Newts were observed in a neighbouring pond. This time there was only one male, but two females. All of the Palmate Newts found were visually checked over for any signs of disease or ill health, before being photographed and returned to the ponds from which they were removed.

Surveys of the gardens where the newts were found have been made since the spring of 2015 (Allain & Goodman, 2017). These two instances are the only times in which we have found Palmate Newts within the ponds or in the gardens. Other amphibians inhabiting the area include the Common Frog (*Rana temporaria*) and the Common Toad (*Bufo bufo*) as well as the species listed above. These are the first records of Palmate Newts for central Cambridge and they were found in the

same restricted area as the Midwife Toads. It is for this reason that we wish to keep the exact location secret; however we can disclose that the properties are in the Mill Road area. The Palmate Newts too are likely to have been introduced although further analysis (via genetic methods) will be needed to confirm this. Unusually the Palmate Newts were not seen on subsequent surveys so perhaps they have been sheltering in the nearby environment and only visit the ponds to breed. This isn't surprising as the ponds are quite small, meaning that there is likely to be a high level of competition between the five amphibian species utilising them to breed.

Despite the fact that the Palmate Newts were in full breeding condition, no eggs or larvae have been observed since the surveys in May 2017. We will be making extra efforts to relocate the individuals in subsequent springs to monitor their progress. Due to the circumstances, the newts may in fact not be breeding in the ponds but instead be using them as stepping stones to get from their hibernation site or sites to their actual breeding pond or ponds. If this is true then further surveys in the surrounding area will need to be conducted to see how far the Palmate Newt population is dispersed. We are aware that there is a lot of speculation here and further investigation is needed before the full status of this population is known. but their presence has intrigued us since their discovery. Our follow up surveys will investigate whether or not the Midwife Toads are having a negative effect on the Palmate Newt's breeding success by predation of their eggs and larvae. All records have been submitted to CPERC.

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Survey of Animal Road Casualties in the rural area surrounding Cambridge

Karsten Koehler

Abstract

Recording of roadkill can provide information about the distribution of animals in a specific area and might help in reducing collisions in the future. Two road sections were monitored for animal road casualties. Firstly, a 10 km stretch north of Cambridge, between Fen Ditton and Waterbeach was surveyed for 11 months. A total of 148 dead animals was recorded here, most prominently Rabbits (37 animals found), Grey Squirrels (29), Wood Pigeons (17), Pheasants (10), Hedgehogs (9) and Blackbirds (9). Secondly, a 5 km road stretch between Cambridge and Babraham was surveyed for 15 months, with 92 animals found,

including Pheasants (24), thrushes (11), Grey Squirrels (9), Badgers (9), Wood Pigeons (7), rats (7), and Red-legged Partridges (5). In relation to their estimated nationwide population size, owls, Polecat/Ferrets and Reeve's Muntjac showed the highest casualty rate, that of the latter possibly partially due to relatively high density in the Cambridgeshire area. Some species were found in species-specific hotspots (Rabbit, Badger, Barn Owl, Muntjac), and/or during a specific time window (Fox, Barn Owl) potentially shedding light on activity patterns.

Introduction and Methods

The recording of animal road casualties can provide information about the presence and number of species, and local and seasonal activity patterns in a selected area. In addition, it could give information to better protect animals and road traffic from each other. To get an estimate of animals present in the areas north and south of Cambridge, the time and location of vertebrate casualties was monitored daily (Monday-Friday) by bicycle. The first surveyed section covered 10 km length crossing different environments (fields, woodland, wetland, residential and roads of different classification, (Plate 3 inside back cover). The southern end of the first surveyed section was in a residential area in Fen Ditton village (OS coordinates TL4834159842). The section followed the B1047 in a northerly direction, through mixed field/woodland areas, the villages of Horningsea and Waterbeach, then continuing northwards on Denny End Road and the final 2 km on the A10, a major road with about 17,000 vehicles passing per day (DFT estimate) until the entrance of Cambridge Research Park (TL4847267894). The second section started in the south of Cambridge (TL4703755028) and followed the A1307 road (18,000 vehicles per day (DFT)) for 5 km to the entrance of Babraham Campus (TL 5077151393), crossing the woodland of Wandlebury Country Park.

Roads were surveyed between June 2015-April 2016 (section 1), and December 2016-April 2018 (section 2). Animals were generally briefly inspected where found (including road verges and footpaths) to determine their species, unless stopping posed a traffic safety risk. Animal numbers per season were calculated by normalising on the number of weeks surveyed, including weeks with missing days. For the spatial/temporal analysis of roadkill distribution and identification of potential hotspots, roads were divided into sections of 0.5 km length following recommendations by Santos *et al.* (2015).

Results and Discussion

Mammals

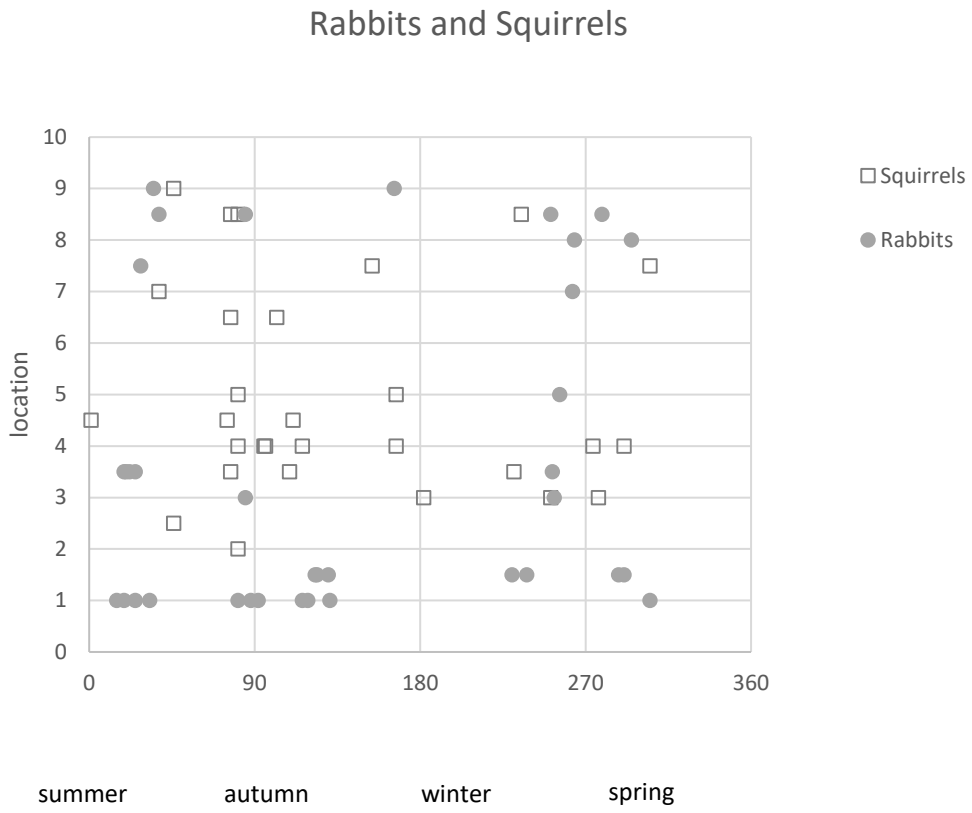
The mammals most often found as road kill were Rabbits (n=38), and Grey Squirrels (n=38), (Table1, Fig.1a). In relation to their total population numbers (Game and Wildlife Conservation Trust (GWCT) after Harris *et al.*, 1995), fatality of Rabbits was lower than that of Grey Squirrels (Fig.2), possibly explained by the higher surface activity of the latter. Squirrel casualties were evenly distributed among the both surveyed sections where trees were present, and were highest in autumn, when the number of young rodents reaches a maximum. In contrast, Rabbit casualties were found in section 1 at one large hotspot north of Fen Ditton

and two smaller areas near Horningsea and north of Waterbeach respectively (Fig. 3a), while nearly absent from section 2. The Rabbit casualties north of Fen Ditton (n=25) were found within 201 ± 93 m distance to a major warren at TL4892061168, which is consistent with previous observations that they usually move less than 200 m away from the warren. The casualties near this warren might be much higher than recorded, since the location is also close to the A14 motorway. Rabbit casualties were very rare between November and January.

Hedgehog casualties were most frequent in early autumn and absent between mid-October and mid-March when most of them would be hibernating. Hedgehogs were mostly found in the Horningsea to Waterbeach area (Fig. 1b) and were completely absent from section 2. Two Reeve's Muntjacs were found in close proximity and within a short time frame in a residential area in Fen Ditton,

Animal	Count Section 1 (North)	Count Section1 per year and km	Count Section 2 (South)	Count Section 2 per year and km	**Estimated UK Population (thousands)**	**Casualty Rate Sections Combined**
Rabbit *Oryctolagus cuniculus*	37	4.03	1	0.19	37500	**1.0**
Squirrel *Sciurus carolinensis*	29	3.16	9	1.67	2500	**15.2**
Rats	5	-	7	-	-	**-**
Mice	3	-	2	-	-	-
Polecat/Ferret *Mustela putorius*	3	0.33	2	0.37	47	**106.3**
Badger *Meles meles*	3	0.33	9	1.67	350	**25.7**
Fox *Vulpes vulpes*	2	0.21	2	0.37	240	**8.3**
Stoat *Mustela erminea*	1	0.11	-	-	462	**2.2**
Hedgehog *Erinaceus europaeus*	9	0.98	-	-	1500	**5.3**
Muntjac *Muntiacus reevesi*	2	0.21	4	0.74	40	**150.0**
Roe Deer *Capreolus capreolus*	-	-	2	0.37	500	**4**
Wood Pigeon *Columba palumbus*	17	1.85	7	1.3	3000	**8.0**
Collared Dove *Streptopelia decaocto*	2	0.21	-	-	990	**2.0**
Pheasant *Phasianus colchicus*	10	1.09	24	4.45	1900	**17.9**
Partridge *Alectoris rufa*	-	-	4	0.93	82	**48.8**
Barn Owl *Tyto alba*	2	0.21	-	-	8	**250.0**
Tawny Owl *Strix aluco*	1	0.1	1	0.18	100	**10.0**
Moorhen *Gallinula chloropus*	2	0.22	-	-	270	**7.4**
Coot *Fulica atra*	1	0.11	-	-	22	**45.4**
Robin *Erithacus rubecula*	3	0.33	-	-	5895	**0.5**
Crows and magpies	2	0.33	2	0.37	-	**-**
Blackbird *Turdus merula*	9	0.98	11	2.04	4935000	**0.8**
Other Songbirds	10	1.09	4	1.09	-	**-**
Grass Snake *Natrix helvetica*	1	0.11	-	-	320	**3.1**
Frog or toad	1	0.11	-	-	-	**-**

Table 1: General overview for all animals found (total). Mammal numbers in the UK were taken from GWCT after Harris *et al.*, 1995, except the more recent estimate for Polecats from the Mammal Society, bird numbers from the RSPB website, and reptiles from British Wildlife Centre after Swan & Oldham, 1993. The casualty rate describes the number of animals found per year and million animals.



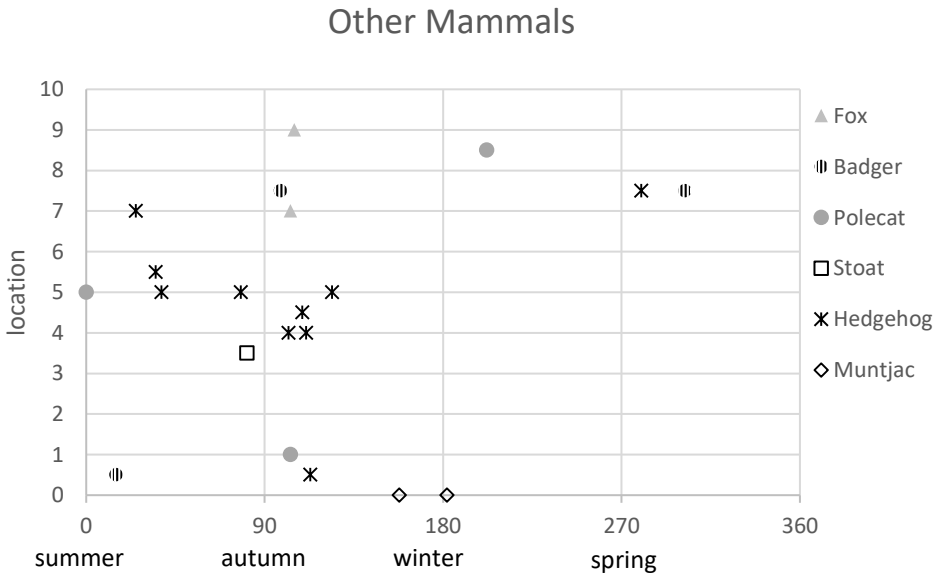


Fig.1 a and b. Time-location distribution for selected mammal species in section 1 (north of Cambridge). The x-axis describes the recorded date, starting from in June 2015 (day 0) till April 2016, the y-axis the kilometre on the road section where the animal was found, 0 being the southernmost.

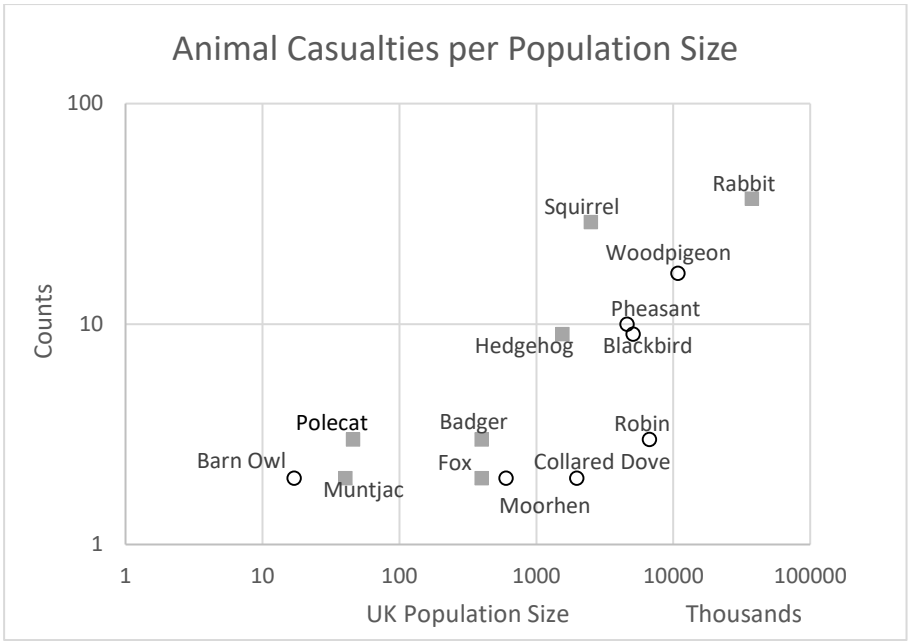


Fig.2: Roadkill counts for selected mammals and birds (y-axis) plotted against estimated animal population size in the UK (x-axis) for section 1 only. Mammal population numbers were taken from Harris *et al.*, 1995, (except Polecats, which used the more recent estimate for from the Mammal Society), and bird numbers from the RSPB.

and also commonly around Wandlebury. Per total population size in England, the Muntjac fatality rate was very high compared to other animals including Roe Deer; however, the density of Muntjac is increasing in Cambridgeshire (Cooke, 2013), and is higher than in most other UK areas.

Carnivores

The carnivores found as roadkill were Badgers, Foxes, Polecats and one Stoat (Table 1). It was not determined if the "Polecats" might actually have been Ferrets or hybrids. The two Foxes in section 1 were found only two days apart in early autumn (Fig. 1), around the same time of year when one of the two Foxes in section 2 was found. In contrast, Badger casualties were found with a wider seasonal distribution, but concentrated in three locations: one north of Waterbeach, one north of Fen Ditton, (another Badger had been found at the same spot in September 2013), and one near the south-eastern end of Wandlebury Country Park. Compared to the casualty rates of Fox, Badger and Hedgehog, all omnivores to a different extent, the rate of Polecats was much higher (Fig. 2), possibly indicating that an obligate carnivorous lifestyle makes them more susceptible to collisions, and/or that their local population density is higher than expected. Having been previously extinct in England since the late 19th century, Polecats have spread out from Wales in recent decades. Though recently present in Cambridgeshire (including Polecat/Ferret hybrids), they had not been reported previously due north of Cambridge (Croose, 2016).

Birds

Wood Pigeons and Pheasants were the birds most commonly found as roadkill (Table 1). Both were distributed throughout the whole year, including the winter months. While Wood Pigeon casualties were ubiquitous, dead Pheasants and Red-legged Partridges were found mostly near open fields. Songbirds had a lower recorded fatality rate for their population size (source: RSPB) than the larger, more terrestrial Wood Pigeons, Moorhen or Pheasant, and were generally found flung onto the road verges instead of being run over, making them possibly also less conspicuous as road kill. Songbirds, the majority of which were either thrushes (mostly male Blackbirds) or Robins, and more rarely Blackcap and Goldfinch, were mostly found in early spring (**Plate 4**, inside back cover), which corresponds to their mating and nesting season. However, the Barn Owl was by far the bird with the highest road fatality rate per population number. Two Barn Owls, at least one of them juvenile, were found north of Waterbeach, only a few metres apart. One Tawny Owl was found near Babraham, and all three owls were found in late January/early February. At least one of them has been confirmed to have been directly killed by a traffic collision, the major cause of death in Barn Owls (Ramsden, 2015), for which their foraging on road verges, possibly for roadkill, puts them at high risk.

Reptiles and Amphibians

One frog or toad of unidentified species was the only amphibian casualty found (Table 1). The low number of amphibians might be in part explained by being overlooked due to their small size and inconspicuousness. Also, amphibian numbers have been recently described as strongly declining locally, with road traffic playing a significant role (Cooke, 2011). The only dead reptile found was a Grass Snake, found on 3rd of August, one of the hottest days of the year

Conclusion

The majority of roadkill consisted of animals from introduced species (Grey Squirrel, Rabbit and Pheasant). Interestingly, the number of dead animals found per species was generally proportional to their population size, while a few species (Muntjac, Polecat and Barn Owl) showed much higher fatality rates. Casualties of some species appear to be concentrated in local, species-specific hotspots (Rabbit, Badger, Barn Owl and Muntjac), agreeing with previous observations (Teixeira *et al.*, 2013). While proximity to their burrows explains the locations for Rabbits, the correlation of casualties from the other species might be caused by habitation, territories (individual or family), migration routes or feeding locations vulnerable to road traffic. In contrast, the casualties of Foxes (Baker *et al*, 2007) and owls might indicate a seasonal activity pattern. Sampling a larger area would be necessary to validate speculations about the causes of roadkill hotspots.

Acknowledgments

Lee Walker and Elaine Potter of the Predatory Bird Monitoring Scheme, for post-mortem analysis of one of the barn owls found.

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Records of some Cambridgeshire microfungi

C.D. Preston

In April 2017, realising that I needed to find an excuse for summer fieldwork, I began to look at parasitic microfungi on vascular plants. Records on the British Mycological Society (BMS) websites suggest that these groups have received little attention in Cambridgeshire (v.c. 29) in recent years, and I hope that in the next few years it might be possible to work towards checklists for the major taxa (rusts, smuts and powdery mildews, as well as the downy mildews as these are traditionally treated with the fungi). Meanwhile, it seems worth publishing the details of some of the more interesting records. Details will be lodged on the new BMS website (The Fungal Records Database of Britain and Ireland) and voucher specimens have been deposited in **CGE**.

Bartheletia paradoxa G. Arnaud ex Scheuer *et al*. (Bartheletiaceae)

This fungus is a saprophytic rather than a parasitic species and it grows on the dead leaves of *Ginkgo biloba*. It was originally collected in France in 1932 and named, albeit invalidly, in 1954. It was neglected until Scheuer *et al*. (2008) validated the name and redescribed the fungus in detail. DNA analysis suggests that it is a primitive basidiomycete, basal to the Agaricomycotina, the large group of fungi which includes all the toadstools and puffballs. Scheuer *et al*. described *Bartheletia* as a living fossil although, unlike its host tree, one of the best known

living fossils, *Bartheletia* has not (yet?) been found as a fossil. This remarkable combination of host and saprophyte has meant that the fungus has attracted an unusual degree of attention and it is now widely recorded in western and central Europe as well as in Japan and Korea (Koukol & Lotz-Winter, 2016). It appears to be frequent in Britain, although records are inevitably still concentrated in a few areas where enthusiasts have searched for it (especially the London area and South and Mid Wales).

There are quite a few *Gingko biloba* trees in Cambridge and the species has a special association with the Department of Plant Sciences, arising initially from Professor A.C. Seward's interest in fossil plants. I have found *Bartheletia* on fallen leaves below all the stands of *Ginkgo* that I have examined, including the trees trained up the walls of the Department of Plant Sciences and of Cory Lodge in the Botanic Garden, and the stand of young trees planted *c*. 2010 outside the Sainsbury Laboratory. The only trees below which I have failed to find it are a few street trees on Mill Road in places where leaves do not accumulate. (It is present here below those trees growing in places where leaves do collect, including one freely fruiting female tree.) I saw *Bartheletia* in the following sites in January–February 2018:

Cambridge: Christ's Pieces, TL453586; Cory Lodge, TL455572, and Sainsbury Laboratory, TL455573, Botanic Garden; Hills Road, TL455577; Jesus Lane (on leaves fallen from tree in Sidney Sussex College), TL450588; Lyndewode Road, TL458575; Mill Road, TL467576, 468476; Milton Road, TL455598; Northampton Street, TL445590; Panton Street, TL453574; Plant Sciences, Downing Site, TL450581.

When they fall in autumn, the *Ginkgo* leaves become infected by the sexual spores (teliospores) from the previous year's leaves. Initially the fungus rapidly produces masses of asexual spores (conidia) before producing the next generation of teliospores in black pustules which are readily seen on the dead leaves in winter. The teliospores are thick-walled and remain dormant until the next year. When I first looked for *Bartheletia* I found only conidia (November 2017, Hills Road) but by the time that I began a more systematic search in January 2018 all populations had teliospores, and at least some still had conidia as well. As the Cambridge records show, the fungus is remarkably effective in colonising *Ginkgo* leaves. Quite how it achieves such a wide distribution is uncertain. It does not develop on leaves which are experimentally detached from the tree just before they fall, suggesting that it does not live endogenously within the tree (Scheuer *et al*., 2008).

Cercospora radiata Sacc. (Capnodiales: Mycosphaerellaceae)

I noticed this fungus on 27 August 2017 because it was causing conspicuous brown spots on the leaves of *Anthyllis vulneraria* in calcareous grassland on Newmarket Heath, TL61836191. There is only one British record on the BMS database, also from *Anthyllis*, collected by R.W.G. Dennis at Braewick, Shetland, on 1 July 1970.

***Leveillula taurica* (Lév.) G. Arnaud (Erysiphales: Erysiphaceae)**

Leveillula differs from the other genera of mildews occurring in Britain in having a mycelium which is partly external and partly internal to the leaf, rather than just external. Its species are found in the warmer and more arid areas of the world, and in Europe they have southerly distributions. Only two species are recognised in Britain, *L. taurica* and *L. verbasci*. *L. taurica* has an extensive world distribution and a correspondingly wide range of hosts; it represents a heterogeneous complex of plurivorous and more specialised genotypes which has so far defied taxonomic separation by morphological or molecular techniques (Braun & Cook, 2012). On 27 August 2017 I collected *L. taurica* growing on *Helianthemum nummularium* in short chalk grassland on the steep, south-west-facing side of the Devil's Dyke north of the A1304, TL TL61806156; the identification has been confirmed by R.T.A. Cook.

The eight records of *L. taurica* from Britain on the BMS database are from five different hosts but only three are localised, so there may be a degree of duplication. Three are from *Helianthemum* but only one of these has a host identified to species (*H. nummularium*) and is localised, and that only to county level (Devon, in 1947). I have also seen three specimens (in **E**) collected by Douglas Henderson on 9 October 1958 from cultivars of *Helianthemum* ('Chocolate Blotch', 'Ben Macdhui' and 'Amabile Plenum') growing on the rock garden of the Royal Botanic Garden, Edinburgh, and Braun (1995) also records it in Britain from a cultivar *Helianthemum*, 'Rhodanthe-carneum' (as *H. rhodanthe-carnea* hort.). In southern Europe the hosts of *L. taurica* include species of *Cistus*, *Halimium* and *Helianthemum* in Portugal and the Mediterranean countries, and it extends north on *Helianthemum* to Switzerland, Poland, former Czechoslovakia, Hungary, Romania, Bulgaria and the former Soviet Union (Braun, 1995; Klenke & Scholler, 2015). The other European hosts include species from numerous families, especially Asteraceae, Fabaceae and Lamiaceae.

***Podosphaera erodii* (Durieu & Mont.) U. Braun & S. Takam. (Erysiphales: Erysiphaceae)**

On a Cambridgeshire Flora Group meeting to Sutton on 14 October 2017 we encountered a mixed population of *Erodium cicutarium* and rather small *E. moschatum* on stony ground by a disused road. The leaves of *E. moschatum* had a fairly conspicuous powdery mildew which was absent from the more numerous plants of *E. cicutarium*. When I checked the much more luxuriant plants of *E. moschatum* on grassy roadside verges in Cambridge I found that these too had a mildew, but only visible as a thin mycelium on the older leaves. (I now think that the mildew was unusually distinct at Sutton because the *E. moschatum* plants there were poorly grown compared to those in the other sites.) In both cases the mildew was clearly a species of *Podosphaera* (as it had catenescent conidia with fibrosin bodies) and the most likely candidate described by Braun & Cook (2012) was *P. erodii*, an identification which was confirmed from specimens and fresh material by R.T.A. Cook. At the BSBI AGM the following month I saw an excellent photograph of *Erodium moschatum* taken in North Devon by Mary Breeds; this seemed to show mildew on the leaves, so I asked Mary if she could send me a

specimen. She kindly sent specimens from two populations of very luxuriant plants, both of which proved to support a very thin mycelium of *P. erodii*. Even though the leaves were collected as late as 28 November, the conidia were apparently fresh. I have not yet found chasmothecia (the sexual stage) on any of the material. Details of these records of *P. erodii*, a species which has not previously been recorded in Britain, are as follows:

North Devon: S.-facing roadside edge on shallow soil, Frog Lane, Braunton, SS48563690, M. Breeds, 28.11.2017. Near edge of S.-facing steep, sheep-grazed field, Middleborough Hill, Croyde, SS43273983, M. Breeds, 28.11.2017. Cambridgeshire: Grassy roadside verge, N. side of Mount Pleasant at junction with Albion Row, Cambridge, TL443591, C.D.P., 16.10.2017, conf. R.T.A. Cook (fresh material). Roadside verge, S. side of Chesterton Road on W. side of roundabout N. of Elizabeth Way, Cambridge, TL45885969, C.D.P., 24.10.2017. Around base of *Prunus* on roadside verge, W. side of Milton Road N. of Middleton Close, Cambridge, TL462606, C.D.P., 22.10.2017. Stony ground by old road on N. side of A142, Sutton, TL444799, C.D.P., 14.10.2017, conf. R.T.A. Cook.

At the Chesterton Road site *E. moschatum* infected by *P. erodii* grew intermixed with *Geranium molle* infected by *P. fugax*. Comparison of the two mildews (on 24 October 2017) showed that they were reassuringly distinct. The *P. fugax* infection was much more evident, with a conspicuous white mycelium on both leaves and petioles. Microscopically the foot-cells of *P. fugax* were longer and their conidia were broader and shorter in relation to their length. The other mildew I have recorded on *Geranium* in Cambridgeshire is *Neoerysiphe geranii*, but this differs from the *Podosphaera* species in its appressoria, which are frequently lobed, and in the absence of fibrosin bodies in the conidia. I have found this on the horticultural hybrids *Geranium* 'Brookside' and 'Sirak' as well as other cultivated perennials which I could not identify. (I only noticed *N. geranii* in 2017 after the host plants had finished flowering; in my own garden the mycelium became visible on 'Brookside' at the end of August.) In Cardiganshire *N. geranii* is similarly restricted to perennial garden *Geranium* taxa (A.O. Chater, *in litt*.), but elsewhere there are few British records of this species (just one from Lancashire and two from Surrey in the BMS database). It may have been recorded as *P. fugax* in error.

Erodium moschatum, formerly a rare casual in Cambridgeshire, has become well established on roadside verges in the county since 2000. It is one of several species with Subatlantic-Submediterranean ranges in Europe which have increased in frequency in Britain in recent years; others include *Catapodium rigidum*, *Crassula tillaea*, *Galium parisiense*, *Geranium lucidum*, *Medicago arabica* and *Trifolium micranthum*. *Podosphaera erodii* was initially described (as *Erysiphe erodii*) on the leaves of *E. moschatum* from Oran, Algeria, in 1849. It is now known from numerous *Erodium* species (including *E. cicutarium*) from southern Europe, Asia, the Canaries and South Africa (Braun & Cook, 2012). In Europe it is recorded north to France, Germany and Switzerland; Klenke & Scholler (2015) describe it as rare on *E. cicutarium* and *E. moschatum* in the area of central Europe that they cover (Germany, Switzerland, Austria and South Tyrol). It has also been reported growing on the Asian species *Biebersteinia multifida*, formerly placed in the Geraniaceae, but as this small genus is now not

only placed in its own family, Biebersteiniaceae, but also assigned to the order Sapindales rather than Geraniales, these records presumably need reassessment.

Acknowledgments

I am very grateful to Arthur Chater for teaching me the basics of micromycology and for constant advice and encouragement; in particular, he suggested that I look for *Bartheletia* in Cambridge and challenged me to find *Leveillula*. I also thank Mary Breeds for sending me material of *Podosphaera erodii* from Devon and Roger Cook for confirming the identity of the two mildews reported here.

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Coldham's Common
A report on the CNHS field studies for 2017

Jonathan Shanklin

The Cambridge Natural History Society field studies project for 2017 involved re-surveying the flora of Coldham's Common, Barnwell Lake and the Barnwell Local Nature Reserves and the monads that include these localities. We logged around 449 plant species or sub-species from the area during the year, and also recorded some other phyla. There has been some decline in the quality of the "green" areas, but as yet this has not resulted in significant species loss.

Introduction

Over the past few years the Cambridge Natural History Society (CNHS) field studies have begun a resurvey of the ten areas of the City that were covered between 2004 and 2014. Primarily these surveys have concentrated on the vascular plants, however other phyla have been recorded on a sporadic basis. This year's survey covered sites in and around Coldham's Common. Parts of the area are City Wildlife Sites (CityWSs), which are surveyed by the Wildlife Trust from time to time, primarily for indicator species. These surveys are usually carried out over one or two days every seven years by one or two people and do not provide a comprehensive list of what grows on the site. Information from these surveys

was incorporated into our list of species to look for, although we didn't find them all.

The Coldham's Common area was described in the report in Nature in Cambridgeshire (2008) and has broadly changed little over the last ten years. We made some changes to the recording units for the 2017 field studies, simplifying them to include the Ordnance Survey monad (grid square) TL4758, and the southern part of TL4759, but recording in more detail Barnwell East LNR, Barnwell West LNR, Barnwell Lake, Coldhams's Common LNR and the part of the Common south of the railway; these sites are described in more detail below. We did not specifically record Coldham's Brook and the northern part of the Common that is not in the LNR during 2017, though comments are made about their condition. The site boundaries were not always strictly adhered to in the 2007 survey, so some species noted then were not re-found in the strict site. As has been the case throughout the CNHS surveys, the participants tended to concentrate on recording vascular plants, with only casual records being made of other phyla. If you would like to see a change in this balance do come along on future outings and add your expertise.

Regular conservation work is undertaken at many of the CityWSs by the author and this has allowed more frequent recording in them. Following a suggestion made at the Botanical Society of Britain & Ireland Exhibition Meeting in 2016, a five year cycle of monitoring has been introduced for such sites, which allows better distinction between casuals and established species, though several more cycles will be needed to determine if there are any significant changes.

The vascular plant records are in the Botanical Society of Britain & Ireland database, those of the bryophytes in the British Bryological Society database and all the other records have been lodged with the Cambridgeshire and Peterborough Environmental Records Centre (CPERC). In this report species counts refer to counts of separate entries of taxa in the MapMate Taxa Library. A blog giving further details of the monthly visits is on the CNHS web page.

Barnwell East LNR.

Overall the site has declined somewhat since the previous studies, largely due to insufficient grazing. Volunteers do their best to keep on top of the site management, however this is no substitute for continuous grazing, particularly of young shrub and invasive species such as Michaelmas Daisy (*Aster x versicolor*) and Rosebay Willowherb (*Chamerion angustifolium*). Eyebright (*Euphrasia nemorosa*) was introduced to one of the meadows in late 2011 from plants collected in North Wales, with no expectation of any results. The following year a few good patches appeared and it has spread a little, though is not in such abundance as in the first year. A surprisingly large number of species have not been re-found, and there seems to be quite a high turnover of casuals. Interesting species that were still present include amongst others: Yellow-wort (*Blackstonia perfoliata*), Spurge Laurel (*Daphne laureola*), Ploughman's-spikenard (*Inula conyzae*), Common Twayblade (*Neottia ovata*) and Adder's-tongue (*Ophioglossum vulgatum*). Overall 347 species have been recorded from or adjacent to the Reserve.

Barnwell West LNR.

Volunteers manage the banks of Coldham's Brook adjacent to the site and also carry out some work in the reserve. A few glades have been created since the 2007 survey, and broadly these new habitats have increased the diversity of the site. The Main Drain provides a source of humidity, and its banks are covered in ferns including less common ones such as Maidenhair Spleenwort (*Asplenium trichomanes*) and the two Shield Ferns (*Polystichum* spp) with their hybrid; the high humidity also makes it a hot spot for liverworts, with 11 species being recorded from the reserve. Stinking Hellebore (*Helleborus foetidus*) was seen in 2007, but has not been recorded since then. Opposite-leaved Pondweed (*Groenlandia densa*) was recorded from the section of Coldham's Brook that is on the road verge just outside the reserve, but this has become increasingly silted up and the plant has not been seen there since 2012. Overall 253 species have been recorded from or adjacent to the Reserve.

Coldham's Brook.

The Brook has had a mixed time. Some parts have improved thanks to scrub clearance by the Council to allow more light into the water. This particularly applies to the section along Barnwell West. Unfortunately water can percolate out through the banks of the Brook to the lower Main Drain and currently no water flows further than the north part of Barnwell West. The Brook near the football ground is now clogged with New Zealand Pigmyweed (*Crassula helmsii*), though Floating Pennywort (*Hydrocotyle ranunculoides*) has been eradicated. Whorl-grass (*Catabrosa aquatica*) was not seen in 2017, though it was noted in 2016 and Opposite-leaved Pondweed has not been seen in this section since 2011. Although there is little or no flow here, some aquatic species do remain as water tends to pond in this area.

Coldham's Common LNR.

Since the previous studies a portion of the Common has been declared a Local Nature Reserve. This should have meant that a management plan, which included grazing, was followed by the City Council. Unfortunately political pressure from dog walkers has meant that the grazing has not taken place, with predictable consequences. Two of the prime areas are becoming scrubbed over, despite the hard work of volunteers. A large part of the LNR is open grassland, and this is now mown for hay before the Cambridge Folk Festival. This should slowly improve the already fairly good quality of the grassland. In addition to the open grassland the other main features in the LNR are "The Triangle" an enclosure at the south-west side of the Common adjacent to the railway, and "The Rifle Butts" near the eastern entrance. Overall 262 species have been recorded from or adjacent to the Reserve since its designation as an LNR in 2011. Hound's-tongue (*Cynoglossum officinale*) grows well on the western face of the Rifle Butts following scrub clearance. A patch of Spring-sedge (*Carex caryophyllea*e) was found at the edge of a gentle slope in the open grassland in 2011 and at a couple of additional places in 2013, but the plant is difficult to spot unless in flower, and

was not seen in 2017. Annual Beard-grass (*Polypogon monspeliensis*) appeared as a casual on disturbed ground close to the Butts in 2014. Harebell (*Campanula rotundifolia*) was found north of the Rifle Butts in 2007, but has not been reported since.

Coldham's Common North.

This is the part of the Common that was not designated as an LNR and includes the playing fields and BMX track as well as the spur leading up to Newmarket Road. Some grazing takes place in this section, but the area is generally of poorer quality than the designated area. The area closest to Newmarket Road is often poached and this provides a good habitat for several Dock (*Rumex*) species and their hybrids. Nevertheless there are better areas of grassland and generally the flora of these has remained unchanged, for example there is still Quaking-grass (*Briza media*) present. There is a good flow of water in the Main Drain and this supports aquatic species such as Horned Pondweed (*Zannichellia palustris*).

Coldham's Common South.

This part of the Common south of the railway has remained broadly steady in quality. There is grazing, however, topping of thistles and nettles could be improved. Spring-sedge was found in rabbit grazed turf near to the railway line in 2014, but not re-found in 2017, despite searches being made. The same area also supported Dwarf Thistle (*Cirsium acaule*) with Spiny Restharrow (*Ononis spinosa*) and other chalk grassland species not far away. The children's playground produced a few interesting oddities, most notably Common Purslane (*Portulaca oleracea*) growing around the edge of the basketball court, where it was already well established in 2015. Overall 164 species have been recorded from or adjacent to this part of the Common. Most of the records are from this survey, as in 2007 only additions were recorded in the database.

Barnwell Lake.

There is no clear management control on the site, and whilst the anglers have kept paths mostly open, that at the south end of the lake has become overgrown, with some of the platforms rotting. Previously open grassland near Newmarket Road is becoming scrubbed up. There are plans to develop the site. Of most interest was the car-park area, where various piles of garden waste had been dumped. A previously known area still contained Cypress Spurge (*Euphorbia cyparissias*). A more recently dumped mound had Thorn-apple (*Datura stramonium*) and Ragweed (*Ambrosia artemisiifolia*) when visited in July, but on a subsequent visit in September a scarlet-flowered Morning-glory (*Ipomoea coccinea*) was seen. This was the first record for the plant in the British Isles according to the BSBI database, so quite a find, albeit clearly of garden origin. Overall 184 species have been recorded from or adjacent to the Lake, 146 of them during 2017. The Lake used to be a clay pit, and there are some old records for the site, such as Motherwort (*Leonurus cardiaca*) seen in 1818.

Monad TL4758.

This area includes Barnwell Road, Coldham's Lane and part of Romsey Town. The City Council planted a colourful mix of plants in a bed on the wide road verge along Barnwell Road adjacent to Barnwell West LNR. As a planted bed the contents were not recorded, however it will be interesting to see if any of them escape to other locations. Halophytes continue to increase along our road verges, and four were added to the monad in 2017, including Sea Fern-grass (*Catapodium marinum*). Of the 568 species known from the monad 338 were recorded during 2017. Of the 92 species not recorded in the present decade, many are probably omissions or casuals.

Monad TL4759.

This area includes the Abbey Stadium, Newmarket Road, some industrial units and housing. Only the part south of the old railway line was visited during 2017 as the northern part will be recorded during 2018. We did not manage to visit the allotments or the Leper Chapel meadows. Of the 418 species known from the monad 253 were recorded during 2017, with 76 not seen during the present decade. Many of the missing species are likely to be present in the northern part on Stourbridge Common or Ditton Meadows and will be found during 2018.

Lichens. [Abbreviated from a detailed report written by Mark Powell]

Mark Powell was leader on our September visit, which specifically targeted lichens. We began at the Leper Chapel, where surprisingly it wasn't the old walls, which had a rather poor lichen community, but the concrete path that produced a Nationally Rare species: *Rinodina calcarea.* Normally this species is found on old limestone memorials or stonework of old churches, so the find on a concrete path was extremely unusual. Crossing the road to the northern part of Coldham's Common a manhole proved an interesting site, with 14 species growing on its old concrete. A sample taken from an Ash tree growing in the swimming pool car-park may prove to be the second known British (third world!) occurrence of *Bacidina flavoleprosa*. In common with some bryophyte species, some lichens are also moving east. One such species is the Nationally Scarce *Strigula taylorii*, which was found on the bark of a couple of mature trees in Barnwell West.

Fungi.

The October visit concentrated on fungi, but it had been a dry autumn and we found relatively few identifiable specimens, none of them particularly notable. Waxcaps would be expected on established grasslands, but we only noted Snowy Waxcap (*Hygrocybe* cf *virginia*) on the Common. Altogether 29 species of fungi and mildews were noted during the year.

Bryophytes. [Report compiled by Mark Hill.]

In March, Chris Preston found the rare epiphyte *Orthotrichum pumilum*, new to Cambridgeshire, on hawthorn by the railway line (reported in *Nature in Cambridgeshire* vol. 59, p. 80). For the November visit we concentrated on bryophytes, starting in Barnwell West LNR, which had formerly been the site of

allotments and a piggery, but which is now mostly closed scrub lying between two watercourses, the East Main Drain and Coldham's Brook. The added humidity is favourable for epiphytes, and we recorded *Metzgeria violacea*, *Cryphaea heteromalla*, *Orthotrichum lyellii* and *Ulota bruchii*. Disturbed and slightly more open ground had *Aneura pinguis*. We visited a field that had been ploughed about three years previously. Chris Preston found a single fruiting patch of *Ephemerum recurvifolium*. Various further sites on Coldham's Common produced little of note until Chris found *Hennediella macrophylla* on shaded, trampled ground by the East Main Drain near the Abbey Stadium. We explored an urban area along Whitehill Road, adding *Bryoerythrophyllum recurvirostrum* and *Microbryum davallianum*. Returning to the Rifle Butts on Coldham's Common, Chris found some more *Ephemerum recurvifolium*. In fading light we went to Barnwell East LNR. A pond had a good quantity of *Bryum pseudotriquetrum* on its banks. The chalk grassland had recently been cleared by conservation volunteers and produced *Eurhynchium striatum* and *Pseudoscleropodium purum*. *Thuidium tamariscinum* was found a few days later during conservation work at the site. We had never gone beyond the boundaries of monad TL4758 and raised its bryophyte total from 41 to 64 species, making it the third richest monad in the Cambridge area, surpassed only by the Botanic Garden (TL4557) and the city centre and Backs (TL4458).

Other phyla.

Four species of Odonata, 15 butterflies and moths, 30 other invertebrates (the three most commonly reported species were Honey Bee (*Apis mellifera*), Common Carder Bee (*Bombus pascuorum*) and Seven-sppot Ladybird (*Coccinella 7-punctata*)) and 46 species of birds were recorded during the year, with Blackbird (*Turdus merula*), Carrion Crow (*Corvus corone*), Robin (*Erithacus rubecula*) and Wood Pigeon (*Columba palumbus*) all being recorded on eight visits. Eight other vertebrates were noted, with Grey Squirrel (*Sciurus carolinensis*) seen most frequently. We recorded Rabbits (*Oryctolagus cuniculus*) on three visits, but there is a view that their numbers have declined substantially due to haemorrhagic disease. The consequent reduction in browsing may have contributed to some of the degradation at grassland sites.

Conclusion.

Our monthly walks allowed us a view of the seasonal changes in the area and introduced some beginners to natural history recording. The number of participants was quite variable, but thanks to the interests of several we recorded more species of birds and insects than we have in many of the surveys. Little new building has taken place in the area, but the future is less certain, with plans for development of the Lake and the introduction of new cycle routes across the Commons. More subtle is the slow degradation of many of the prime sites due to the lack of good grazing, combined with the nutrient enrichment that is most obvious close to the Brook. In addition, footfall is increasing, to the extent that many paths are down to bare mud by the start of spring. The Local Nature

Reserves remain good sites, but whether there is sufficient will to restrain their decline will be evident in ten year's time.

Acknowledgments

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Further Reading

The Blog giving details of the monthly visits can be read at http://www.cnhs.org.uk/coldhams.htm

For background on monads see for example http://www.bto.org/volunteer-surveys/birdatlas/methods/correct-grid-references

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Where was the Hill of Health, and what plants grew there?

C.D. Preston

Where was the Hill of Health?

The Hill of Health was well known to the early Cambridge botanists. John Ray (1660) included it amongst the places for which he listed the plants "that are not generally met with" (Oswald & Preston 2011). Further records were added by John Martyn (1729; see also T. Martyn 1763), his son Thomas Martyn (1763), Israel Lyons (1763) and Richard Relhan (1785, 1793, 1802, 1820). Thereafter there were no more published records, although a few later herbarium specimens are known. None of the botanists who documented plants at the Hill of Health found it necessary to record its whereabouts. However, by the time that Babington (1860) came to write his *Flora of Cambridgeshire* it was no longer known as a botanical site. Babington (1860, p. xxviii) described it in a section of his Flora which dealt with a number of botanical sites which had been destroyed:

Hill of Health. After this name had been in use for about two centuries it totally disappeared upon the enclosure of St Giles's Parish. It is the moderately elevated ground lying to the south of the Huntingdon Road just outside the town of Cambridge. It is now partly planted and partly occupied by a gentleman's house.

The general area in which the Hill of Health lay is clear from Babington's description, but when Philip Oswald and I were compiling a gazetteer of Ray's sites for publication (Oswald & Preston 2011) we were unable to discover its exact whereabouts. To my surprise, I could not find it on any of the maps I examined when working on the gazetteer, perhaps in part because most early Cambridge maps extend only to Castle Hill and thus stop just short of the relevant area.

Babington's description of the Hill of Health as "just outside the town" is insufficiently precise to pinpoint it. Later authors do not appear to have solved the problem: Raven's (1942, p. 94) description of it as "now built over and unrecognisable" is perhaps based on Babington; Ewen & Prime (1975 p. 129) also paraphrase Babington but add the intriguing detail that it "has now completely disappeared under new College building"; and Crompton (2001) quotes Ewen & Prime but adds the grid reference TL4359.

It is only recently that I came across the clue that was needed to identity the site with some precision. In his annotated copy of Relhan's *Flora Cantabrigiensis* (1820), Babington wrote:

Hill of Health was the rising ground a little beyond the Huntingdon Tolegate on the south side of the road, as I learn from the Rev. W. Palling, son-in-law of Relhan. 1857.

The toll gate was at the junction of the Huntingdon and Histon roads (TL442594) and a Toll House in the angle between these roads controlled gates across both roads. Both gates are shown on William Custance's *A new plan of the University and town of Cambridge to the present year 1798* (now available on-line in the University of Cambridge Digital Library) and in more detail on a plan dated 1835 in Cambridge University Library (MS Plans 442). The Hill of Health must therefore have been just beyond this. The enclosure of the area south of Huntingdon Road, in St Giles parish, was completed by 1805 (Guillebaud 2005). Later maps, such as Richard Baker's of 1830 (Cambridge Records Society 1998) and the map of St Giles parish surveyed by James Richardson in 1832 (Cambs Archives 124/P36), show that there is only one possibility in this area for the "gentleman's house" mentioned by Babington (1860), The Grove. This was built in 1812–14 on a 15-acre plot by the cartographer William Custance, himself one of the enclosure commissioners (Guillebaud 2006, Cleaver 2013). The site was later split between New Hall (now Murray Edwards) and Fitzwilliam Colleges, and The Grove survives in the grounds of the latter. The Hill of Health must therefore have been on or near the site now occupied by these colleges, perhaps extending towards Churchill College (see Discussion). The ground is relatively high, over 20 m above sea level.

The last published records from the Hill of Health, in the third edition of Relhan's Flora (1820), might date from any time after the publication of the second edition in 1802. They are therefore consistent with Babington's view that the site disappeared upon enclosure (in 1805). However, there are two later herbarium collections, of *Aira caryophyllea* (2 June 1825) and *Silaum silaus* (3 July 1827), both made by W.L.P. Garnons and now at Saffron Walden (**SWN**). I have examined these specimens and there is no doubt that they are labelled from the Hill of Health, Cambridge. In addition, a pale-flowered variant of *Anagallis arvensis* ("var. fl. alb.") was collected from "Fields, nr Hill of Health" by R.J. Bunch in September 1834 (also in the Garnons herbarium at **SWN**), the last reference to the site that I have found. It is slightly puzzling that Garnons (who was admitted to Sidney Sussex College as an undergraduate in 1810) and Bunch (admitted to St John's in 1823) knew the site but there are no known records made

by Henslow (who was certainly an active botanist by 1821, when he collected several moss specimens) and it was clearly not known to the young Babington (who attended Henslow's first botany lectures in 1827 and rapidly became his acolyte).

I have not come across a reference to the Hill of Health in anything other than a botanical context and would be interested to hear if readers of *Nature in Cambridgeshire* know of any such reference.

What plants grew there?

The plants recorded from the Hill of Health are listed below, together with the first literature record and the details of any herbarium specimens. Records I have rejected are included in square brackets. In tracing records, Gigi Crompton's Flora of Cambridgeshire website (cited as 'Crompton') has been an invaluable guide to the available sources, although I have checked the original sources for myself except one indicated by '*fide* Crompton'. In addition to the plants listed below, a few fungi and lichens were recorded from the site by Ray (1660), Lyons (1763), J. Martyn (1729), T. Martyn (1763) and Relhan (1802, 1820).

Ray's *Catalogus* (1660) is in two separately paginated parts and references to the second part, which relate to the 'Index locorum', are indicated by 'IL'. The whereabouts of annotated floras are given in the references. A number of records from the Hill of Health are attributed to J. Martyn by Babington (1860) but are not represented in any of the surviving sources of J. Martyn's records. I have disregarded these as I suspect that they represent compilation errors; all the species for which they would be first records are known to have been recorded later by T. Martyn.

Flowering plants

Agrostis capillaris Relhan (1785: 28). This common species was recorded as *Agrostis pumila*, which is actually a dwarf variant of *A. capillaris* resulting from infection by the smut fungus *Tilletia sphaerococca*.

Aira caryophyllea Relhan (1785: 32); Garnons, 2 June 1825 (**SWN**). The undated record in J. Fisher's annotated Berkenhout (1770: 20) might have preceded Relhan's (see *Persicaria bistorta*).

Aira praecox Relhan (1785: 31).

Anthyllis vulneraria Relhan (1785: 271).

Aphanes arvensis sens. lat. Ray (1660: 116, IL32).

Avenula pratensis Relhan (1802: 43).

Ballota nigra Ray (1660: IL31).

Carex disticha Relhan (1802: 364).

Centaurium erythraea Ray (1660: IL31).

Cerastium arvense Ray (1660: 19, IL31).

Cerastium semidecandrum Martyn (1763: 30).

Echium vulgare Ray (1660: IL31).

Erodium cicutarium Ray (1660: IL31).

Erophila verna Ray (1660: 113, IL31).

Geranium molle or *G. pusillum* Ray (1660: IL31); cf. Oswald & Preston (2011: 207, 482–483).

Geranium pratense T. Martyn (annotated Martyn 1727, endpapers: 9).

Koeleria macrantha Lyons (1763: 5).

[*Lamium amplexicaule* The entry on the Flora of Cambridgeshire website for *L. amplexicaule* at the Hill of Health, based on Ray (1660: IL31, *Alsine hederulae folio*), should refer to *Veronica hederifolia*. The plant in IL31 referred to *V. hederifolia* by Crompton, Ray's *Alsine Veronicae folio*, is actually *V. arvensis*. The confusion arises from inconsistencies between Ray's nomenclature in the two parts of his book.]

Lepidium coronopus Martyn (1763: 30).

Luzula campestris Martyn (1763: 30).

Marrubium vulgare Ray (1660: IL31).

[*Moenchia erecta* Relhan, 1805, "plenty" (Babington's annotated Relhan 1820: 71 and endpapers of volume 2). Babington published this record (1860: 38) but crossed it out in his annotated copy of his own Flora as a probable error. The only other records from the county are from Gamlingay.]

Montia fontana J. Martyn (Martyn 1763: 30). This was almost certainly var. *chondrosperma*, the only variety recorded from Cambridgeshire and the one occurring in drier habitats.

Persicaria bistorta J. Fisher, annotated Berkenhout (1770: 109). Fisher was admitted to Christ's College in 1766, received his BA in 1770 and was a Fellow between 1775 and his death in 1814. This is one of only two of the 27 records from the Hill of Health in Fisher's Berkenhout which do not appear in works published before 1770. It is marked HH, Fisher's abbreviation for the Hill of Health, but there is no other later record and Relhan (1785) knew it from Howe's House but not the Hill of Health so there is a possibility of confusion. The species was probably introduced to at least some of its early Cambridgeshire sites, such as the one known to Ray.

Plantago coronopus August 1759, T. Martyn (annotated Martyn 1727: 19).

Plantago lanceolata Lyons (1763: 20). This common species was initially recorded because Lyons detected a hairy-leaved variant which he called *P. succisa*. This apparently agrees in vestiture with *P. lanceolata* var. *angustifolia*, as described by Sell & Murrell (2009: 428), but Lyons' plant had subrotund rather than ovoid inflorescences.

Rumex acetosella August 1759, T. Martyn (annotated Martyn 1727: 12).

[*Sagina apetala* The 1805 record listed by Crompton is a misreading of Babington's annotated Relhan (1820: 71); the annotation refers to *Moenchia erecta*.]

Sagina procumbens August 1759, T. Martyn (annotated Martyn 1727: 83).

Salix cinerea Relhan (Babington's annotated Relhan 1820: endpapers of volume 2).

Saxifraga granulata Ray (1660: 150–1, IL32).

Saxifraga tridactylites Ray, "abundantly" (1660: 114, IL32).

Scabiosa columbaria Ray (1660: 152, IL32).

Scleranthus annuus August 1759, T. Martyn (annotated Martyn 1727: 19).

Silaum silaus Garnons, 3 July 1827 (**SWN**).

Spiranthes spiralis Relhan (1785: 337).

Trifolium arvense Ray (1660: 84, IL31).
Trifolium micranthum (Lyons 1763: 46). It is unclear to me whether Lyons is attributing this record to John Martyn, as has generally been assumed, or whether it is his own. There is a specimen at Ipswich (**IPS**) collected by the Rev. G.R. Leathes in May 1804 (*fide* Crompton).
Trifolium scabrum Relhan (1802: 288). Omitted from this locality, apparently in error, by Crompton.
Trifolium striatum Relhan (1802: 289).
Veronica arvensis Ray (1660: IL31).
Veronica hederifolia Ray (1660: IL31).
Veronica scutellata Relhan (1802: 8).
Viola arvensis Ray (1660: 177).
Vulpia myuros Relhan (1802: 37).

In addition, the following species were described as growing near the Hill of Health: *Anagallis arvensis* (Bunch, September 1834, **SWN**; see above), *Lolium temulentum* var. *arvense* (Relhan 1802: 46), *Moehringia trinervia* (Relhan in Babington's annotated Relhan 1820: 178 and endpapers of volume 2) and *Tussilago farfara* "in the ditches fast by" (Ray 1660: IL32).

Mosses
Barbula convoluta Relhan (1793: 9).
Climacium dendroides Relhan (1820: 454).
Polytrichum juniperinum Relhan (1820: 465).
Tortula lanceola Relhan (1820: 437).

Discussion

It is remarkable how much we know about the flora of this long-lost Cambridgeshire site. The species listed indicate that it was characterised by well-drained soils, perhaps sands and gravels or a mixture of sands and gravels and chalk. The presence of *Aira caryophyllea*, *A. praecox*, *Cerastium arvense*, *C. semidecandrum*, *Echium vulgare*, *Erodium cicutarium*, *Plantago coronopus*, *Rumex acetosella*, *Saxifraga tridactylites*, *Scleranthus annuus*, *Trifolium arvense*, *T. scabrum*, *T. striatum*, *Vulpia myuros* and *Polytrichum juniperinum* represent a rich assemblage of species characteristic of sandy and, in many cases, acidic soils. All have distributions in Suffolk which are concentrated in Breckland and on the coastal sandlings (Sanford & Fisk 2010); in Norfolk they follow the more complex distribution of such soils (Beckett *et al*. 1999).

As Figure 1 of West & Gibbard (2017) and the Geological Survey 1:50000 map show, the south-facing slope between Huntingdon Road/Fitzwilliam College and Madingley Road/Churchill College is very diverse geologically, with Marly Chalk (Lower Chalk) by Huntingdon Road and a small area of Fourth Terrace Deposits below leading down to Gault bedrock along Madingley Road. Coprolites were formerly dug on the ridge between the Observatory and Castle Hill (Penning & Jukes-Browne 1881: 38), confirming the presence of Cambridge Greensand between the Marly Chalk and the Gault. The south-facing slope developed in Late

Wolstonian times as the landscape suffered incision with the erosion of the Gault by Washpit Brook. The slope would have received sands, gravels and chalk from strata disturbed by solifluction, cryoturbation and slope wash. It would therefore have had a variety of soils, some calcareous, some less so. (I am very grateful to Prof. Richard West for these observations.)

Table 1. Species recorded at the Hill of Health and also in other gravelly sites N.W. of Cambridge, 1660–1860. For sources, see Gigi Crompton's Flora of Cambridgeshire website.

	Hill of Health	Gravel Hill & Observatory	Trinity Conduit Head	Howe/Howes Hill or House
Anthyllis vulneraria	●	●	●	
Carex disticha	●	●		
Cerastium arvense	●	●		●
Echium vulgare	●	●		
Erophila verna	●	●		
Geranium pratense	●			●
Montia fontana	●			●
Persicaria bistorta	●			●
Saxifraga granulata	●	●	●	●
Saxifraga tridactylites	●		●	●
Scabiosa columbaria	●		●	
Scleranthus annuus	●	●		
Silaum silaus	●	●		
Trifolium arvense	●	●	●	
Trifolium micranthum	●	●	●	
Trifolium scabrum	●	●	●	
Trifolium striatum	●	●		

The Hill of Health was one of a string of gravelly sites on this slope between the Huntingdon and Madingley Roads on the outskirts of Cambridge. Nearby to the west was Gravel Hill near the Observatory, on the Observatory Gravels, then further west were Trinity Conduit Head and How/Howes Hill or House at the western edge of St Giles parish. At the time of the enclosure of the parish, provision was made for gravel-pits on Gravel Hill (Cambs Archives Q/RDc6) and two pits are shown near the Observatory on Richardson's 1832 map. There are also botanical records from a gravel-pit at Trinity Conduit Head and more pits near Howes Hill. These sites had much in common with the Hill of Health (Table 1). The Travellers' Rest Pit in this area is now a geological SSSI and its geology has recently been re-evaluated by West & Gibbard (2017), who showed that, despite their proximity, the gravels in this area were deposited at different periods.

A few species recorded from the Hill of Health are clearly indicators of other habitats. *Carex disticha*, *Geranium pratense*, *Persicaria bistorta* (if the record is correct) and *Silaum silaus* grow on heavier or moister soils. In Suffolk *C. disticha* is found on freely draining but moist soils whereas *S. silaus* is virtually restricted to clay (Sanford & Fisk 2010). *Veronica scutellata* is a plant of wet places. These species perhaps grew on the Gault Clay. Ray's records of *Tussilago* from "the ditches fast by" the Hill of Health indicate the presence of possible habitats for species such as *C. disticha* and *V. scutellata*.

Acknowledgments

I thank Sarah Kenyon (Saffron Walden Museum) for showing me the herbarium specimens from the Hill of Health in the Garnons herbarium and to Professor Richard West for his geological comments.

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An Aggregation of Bees.

Toby Carter

"You know something about bees, don't you?" said an acquaintance as our children played together in Lode playground on a sunny day last October. "A bit." was my cautious response. As a beekeeper my knowledge was somewhat concentrated on the one species. "Well perhaps you could advise me on a problem I have with mining bees in my allotment." I was intrigued. How can you have a problem with mining bees, and at such a time of year? "You'll understand when you see it." So off we went, kids in tow, to the allotments round the corner. What I saw in his allotment completely astonished me. Almost his entire allotment area, over 100 sq metres, was covered in little holes. Bees, that looked a little bit like Honey Bees but with more pronounced rings on their abdomens, were flying everywhere, close to the ground. I'd certainly never seen anything like it. I jumped about exclaiming and managed to get some photographs.

The next day I returned to try and get a better idea on numbers, and show my eldest how to use a quadrat. We had some fun 'randomising' quadrat locations (throwing the quadrat over your shoulder, to the uninitiated), and counting holes. We also managed to catch a couple of bees for identification.

They were Ivy Bees (*Colletes hederae* Schmidt & Westrich, 1993), which of course helped to explain what on earth so many bees were feeding on at that time of year. Just about the only major nectar and pollen source in October is from Ivy (*Hedera helix*), as any British beekeeper could tell you. I knew nothing about them and certainly hadn't heard of such large numbers occurring. Well, it transpires they are relatively new to science, being first described in Southern Europe in 1993, and new to this country, with the first British record in 2001 (Bischoff *et al* 2005) from Worth Matravers in Dorset (BWARS 2010). So it's another colonising bee species, rather like the Tree Bumblebee (*Bombus hypnorum* L.), which was also first recorded in Britain in 2001, and which seems to be occupying lots of bird nesting boxes in Cambridgeshire these days. Interestingly this is only the second record for Ivy Bees in Cambridgeshire lodged with CPERC, the previous being Trumpington Meadows in 2015, and one of the most northerly sightings for the species, which has been slowly moving north over the last 17 years. However, once I started to ask around it seems they have been seen more widely in Cambridgeshire recently, just not officially recorded at

CPERC but with some records on BWARS, the first being in 2014. An aggregation was occupying the edges of the classification beds in Cambridge Botanic Garden last year (E. Turner *pers. comm.*) and they were first spotted in Huntingdonshire (V.C. 29) in 2015 (McLean, 2016) although as foraging bees and not as aggregations, and have since been seen in St Neots and Hemingford Grey (Earwaker, 2017).

Ivy Bees are known to form nesting aggregations, often numbering in the thousands. So how many nests were there in Lode? We recorded an average density of 56.5 (± 23.0, n=20) nests m^{-2} within a vegetable patch covering 35.2 m^2, which equates to 1,989 nests in that patch. The nests could also be seen over a larger area, although at lower densities, so that there may have been 3,000 or more nests in this aggregation. Allotment owners and gardeners in Cambridgeshire should keep an eye out for these interesting bees, which will probably become more common as they move north, especially where there is lots of Ivy and suitable nesting sites.

Acknowledgments

Thanks to Alex Dittrich for help with identifying the bees.

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How does your plant feel? Plant identification by touch

Monica Frisch

Toby Carter's article *How does your nature smell* in last year's Nature in Cambridgeshire reminded me of the importance of touch in plant identification. Indeed there is one plant I can identify, at least to genus, entirely by touch – though I prefer not to – and that is the Stinging Nettle (*Urtica* sp.) Some books say the Small Nettle (*Urtica urens*) has a worse sting but, for obvious reasons, my preference is to use other distinguishing characteristics. I also remember being very impressed by a Cambridge botanist who could identify Hop (*Humulus lupulus*) from the roughness of the dead square stems.

But I do consider touch is extremely helpful and sometimes can be better than sight for determining the texture of leaves. I find I can feel the hairiness of a leaf when I might need a hand lens to see the hairs. Hence you may see me touching a leaf to my lips, not to taste it, but to feel its texture.

The *Vegetative Key to the British Flora* (Poland & Clement,2009) relies heavily on texture of leaves, with a glossary listing many terms relating to hairiness, such as floccose: '*covered with tufts of soft woolly hairs which rub off readily with age*'; hispid: '*having stiff bristly hairs, often piercing to the touch*'; scabrid: '*rough, often to the touch*'; silky: '*having a covering of soft fine straight adpressed hairs*'; and spinose: '*spiny*'. I believe I can tell all these apart by feel, though I doubt if I can feel the difference between unicellular hairs, septate hairs, forked hairs and stellate hairs, all of which John Poland's book uses as identification aids. With hooked hairs the best test is whether the leaves cling to woolly clothing!

I find touch can also be more helpful than eyes for telling whether the prickles on the margins on the leaves of members of the *Galium* genus are pointing forward towards the tip (antrose) or backwards (retrose), which many books use for identification. One can also feel the directional roughness of the leaves of Tufted Hairgrass (*Deschampsia cespitosa*) which is diagnostic, though one needs to be careful not to cut one's fingers while checking this characteristic.

Touch may also help with separating Sticky Groundsel (*Senecio viscosa*) and Sticky Mouse-ear (*Cerastium glomeratum*), which have glandular hairs that make them feel sticky, from related species which do not have glandular hairs. There are of course other characteristics distinguishing these species but I find touch helpful to confirm.

Touch also aids in helping sort out the St John's-worts, where some have round stems, while one of the commonest, Perforate St John's-wort (*Hypericum perforatum*). has two opposite raised ridges on its round stems. Another, Square-stalked St John's-wort (*H. tetrapterum*) has, as the name suggests, square stems.

As with smell, the names of plants can provide clues as to how they feel. Downy Birch (*Betula pubescens*) has downy leaves that distinguish it from Silver Birch (*B. pendula*) which has hairless leaves.

But sometimes the names seem misleading. Hairy Tare (*Vicia hirsuta*) has hairless leaves and stems, but has hairy pods. However, this distinguishes it from Smooth Tare (*V. tetrasperma*) which has hairless pods.

My conclusion: touch *is* a useful aid to plant identification.

Vascular plant records 2017
Alan Leslie

In these notes in previous years I have mentioned how it can pay not to assume that well-known botanical sites have been exhaustively recorded. There may well be interesting new records to be found in these places. In some cases, such as on the Ouse Washes and on parts of Wicken Fen these may be the result of environmental or management changes, such as increasing summer wetness in the

Ouse Washes, or the result of scrub clearance and the introduction of grazing on Wicken Fen. In other cases some plants have 'good' years when they are easier to spot, but can otherwise be sparsely distributed and more easily missed, whilst birds and other vectors can bring new aliens (and natives) even into prime sites, such as on the Devil's Dyke. On occasions just looking over the apparently 'less interesting' parts of a good site can pay dividends.

This was certainly the case last year last year when I visited Chippenham Fen to check out the first recorded bluebell on the fen, which had been found by the Senior Reserve Manager, Chris Hainsworth. This was beside a woodland ride on the south margin and did indeed prove to be a genuine *Hyacinthoides non-scripta*: how it reached this site is a mystery. This was interesting enough, but I then ventured into some neighbouring, apparently unrewarding secondary woodland, which is basically sycamore and ash with a carpet of *Brachypodium sylvaticum*. However, nestled in the *Brachypodium* were three populations of *Carex strigosa*, a sedge not certainly recorded in the county for about 200 years. Having spent three years recently actively recording the flora of this reserve, it just shows what one can miss!

In recent years I have also reported on the appearance of native plants of sandy soils occurring in areas of turf around new developments, and last year a lawn around some new flats beside the guided busway, just south of Hills Road bridge in Cambridge, provided another example. This produced our first record for *Trifolium ornithopodioides* and our second for *T. glomeratum* (together with some other clovers). These may have arrived with the soil to make up the lawn. Astonishingly the second record for the first of these annual clovers came shortly after, from a camping and caravan site at Comberton, where it was accompanied by the alien *Trifolium resupinatum*. Paul Stanley, who found the plants on the camping site, has been systematically recording such areas, principally around the southern and eastern coasts of England, and has been finding a whole set of plants which until now have been missed at these sites, including species of *Cotula* and *Soliva*, as well as *Capsella rubella*. Coastal sites may be more favoured in this respect, but we may well have more to find on other Cambridgeshire caravan and camping sites. It is suggested that these species are arriving with the campers and their vehicles, especially those from abroad.

The Cambridgeshire Flora Group outings nearly always produce some interesting records wherever we go, and our visit last spring to some of the Soham Commons was no exception. A largely dried out pond on East Fen Common had some nice gravelly margins, which included a good population of *Carex oederi*, for which this was new a site. Wicken Fen is our only other regular area for this little yellow-sedge and it has recently increased there considerably on horse-grazed tracks. The same pond on East Fen Common also held a most unusual alien in *Typha minima*. These meetings are open to all and all levels of interest and expertise are welcome.

Earlier this year saw the publication of the final volume (confusingly it's volume 1) of Peter Sell and Gina Murrell's *Flora of Great Britain and Ireland*. All those who helped see the last two volumes through the press after Peter's death are much to be congratulated and we all owe them our thanks for seeing that the

publication of this unique and critical account of our Flora was completed. This Flora is not for the faint-hearted and fully reflects Peter's reputation as a 'splitter'. This last volume to be published includes a lengthy account from Peter explaining his approach to plant variation and this is well worth reading. It also includes novel studies of, amongst others, the apomictic complex of *Ranunculus auricomus* taxa (*mea culpa*!), of elms (highly relevant to Cambridgeshire) and sea lavenders (less so), as well as a rather different approach to many parts of *Rumex* and *Polygonum*. The new and other unfamiliar taxa in the Flora need to be understood and tested now by others. If you feel tempted down this road do remember that with such critical studies it pays to preserve at least a representative herbarium record of your finds, so that others may later check what you have recorded.

My own new *Flora of Cambridgeshire* is now almost completed and the last few months have been taken up with dealing with introductory chapters, including one covering many of the individuals (both the living and the dead) who have contributed to our records over the last 450 years or more, plus accounts of a broad range of key sites around the county. Expect a doorstop when it finally appears in print!

Aesculus indica Numerous bird-sown plants, growing here with many bird-sown *Corylus colurna*, in scrub north of Orwell House, Cowley Road, Cambridge, TL47066153, A.C. Leslie, 29 September 2017, **CGE**. There is a probable parent tree in the car park for Orwell House. This is our third record for bird-sown Indian Horse-chestnut, for which our previous records have come from nearby on the Cambridge Science Park and from Ely.

Allium oleraceum Grass verge, by layby on A10, just south of Ely, TL53157938, T. Inskip (conf. ACL), 2 August 2017, **CGE**. A rare plant in the county, for which our only other recent records have been from Little Abington (1998), Guilden Morden (2012), and Hardwick (2014). Perhaps overlooked elsewhere as being *A. vineale* with lots of flowers; worth looking for again on the clays between Barton and Coton, where there are old records.

Allium paniculatum Rough grass area on edge of allotments, Ely, TL54468092, T. Inskip (conf. ACL), 27 July 2017, **CGE**. First v.c. record for an alien onion, which is a widespread native of southern and central Europe, but is rarely cultivated here. It has pinkish brown flowers of no obvious horticultural merit and did not seem to be cultivated on the allotments.

Alnus cordata x *A. glutinosa* (*A.* x *elliptica*) (a) Two self-sown saplings (with a variety of other self-sown alder species and hybrids), on east margin of new lake, opposite the guided busway branch to Addenbrooke's Hospital, Great Kneighton Country Park, Cambridge, TL45475528, A.C. Leslie, 10 August 2017, **CGE**, (b) single self-sown saplings (with self-sown saplings and mature trees of both parents), in two places at north-west margin of long-disused Chesterton railway sidings, Cambridge, TL47356093, A.C. Leslie, 29 September 2017, **CGE**. First and second definite v.c. records for this hybrid, which had been tentatively recorded previously on the sidings and elsewhere in the county.

Alopecurus aequalis A patch in shallow grassy ditch, in meadow between railway and river, below Roswell Pits, Ely, TL55398044, A.C. Leslie (CFG excursion), 15 July 2017. A very local grass, which does not seem to have been noted from the Ely area since the nineteenth century.

Amaranthus blitoides Many plants, on a dump of 'grey fen' soil, at side of track, Bedingham's Farm, Sutton, TL41707949, J.D. Shanklin, 2 July 2017, **CGE**. Second v.c. record for a North American alien, last reported from a carrot field at Chippenham in 1949.

Amaranthus blitum (Syn. *A. lividus*) (a) one plant, on bare ground at margin of a bank of processed sewage sludge, west of Barrington, TL38404978, J.D. Shanklin, 16 July 2017, **CGE**, (b) at least nine plants, scattered along base of front wall of Cambridge Brew House, King Street, Cambridge, TL45125870, A.C. Leslie, 22 August 2017, **CGE**, perhaps derived from birdseed. First recent v.c. records for an alien Pigweed, native in southern Europe, which was probably last seen in the county in the early part of the twentieth century ('common during the Great War of 1914 near camping grounds', Evans, 1939).

Apera spica-venti One plant, on an area of newly sown lawn, Wandlebury, Gogmagog Hills, TL49355333, J.D. Shanklin (CNHS excursion), 5 July 2017. Much less common in the county than *A. interrupta*, although at one time regularly encountered on the eastern sands, but not seen there since 1991. Our only other recent records were at Bourn (2005) and Great Chishill (2003), and it is not known to have persisted at either site.

Asarina procumbens Several plants, self-sown on vertical face of wall beside 1 Halifax Road, Cambridge, TL43965975, A.C. Leslie, 7 October 2017. Second v.c. record for an attractive native of the Pyrenees, with large yellow, snapdragon-like flowers. The wall in Coronation Street, Cambridge that held the first record in 2004 has now been destroyed.

Bidens cernua (a) One plant, at south edge of flooded scrape, Isleham Wash, c.TL645760, J.D. Shanklin, 30 July 2017, last reported here in 2006, (b) one plant, southern end of recently cleared ditch, just north of its confluence with King's Dike, Must Farm development, west of Whittlesey, TL22089647, S. Lambert, 25 October 2017. Now a very rare plant in Cambridgeshire, never reported before from the Whittlesey area. Our only other recent record is from near Over in 2015. All our recent reports have been of single plants only, all occurring very close to a county boundary.

Calystegia sepium x *C. silvatica* (*C.* x *lucana*) A patch at base of embankment, north-west margin of Ouse Washes, north-east of Purl's Bridge, TL48998844, A.C. Leslie, 5 August 2017. A widespread hybrid in the county, but this patch was unusual in appearing to be a hybrid involving the accompanying pink-flowered *C. sepium* f. *colorata*. The hybrid had glabrous shoots, pale pink flowers, with white rays, overlapping but not swollen bracteoles and flowers of an intermediate size. Other white-flowered plants of *C.* x *lucana* were present nearby, as was the putative pink-flowered parent (the pink-flowered *C. sepium* subsp. *roseata* was not found in the vicinity).

Carex oederi Numerous plants, scattered around rather bare gravelly margins of largely dried out pond, East Fen Common, Soham, TL60227339, CFG excursion, 13 May 2017, **CGE** (coll.

ACL). A new site for a rare Cambridgeshire sedge, otherwise seen recently only at Wicken Fen (where the population has recently increased) and near Fulbourn (where its appearance is rather sporadic).

Carex strigosa Two small colonies, in damp secondary woodland, compartment 12, south margin of Chippenham Fen, TL64896891 and 64876890, A.C. Leslie, 22 April 2017, **CGE**, with a third larger patch (over 5 x 6ft) nearby, TL64936891, discovered on 4 May. A remarkable find in a well-worked locality. Our only other confirmed record is Richard Relhan's from the end of the nineteenth century, in the now cleared Hall Wood at Woodditton. These sites lie just at the north-west margin of its scattered distribution across the southern part of East Anglia.

Centaurium pulchellum Locally abundant on the floor of the East Pit, Cherry Hinton, most dense on a 'desire' path at TL48365565, but scattered as single plants over a much wider area in the west of the pit, S. Hartley, 11 July 2017. An unexpected addition to the flora of the pit, but a plant that occurs in a surprising range of often bare, dampish habitats, from clay and gravel pits, in arable fields, the edge of fen ponds and on woodland rides. Only thought to persist in the county in three sites according to Perring *et al.* (1964), but since then found in a range of new ones.

Chenopodium glaucum One plant, at edge of new road verge, between Madingley Road and the new Eddington development, Cambridge, TL42635952, A.C. Leslie, 7 October 2017, **CGE**. Always a rare goosefoot in the county, usually only a casual, but sometimes persisting for a few years.

Cotoneaster ignescens One large bush, bird-sown in dry ditch on south side of A142, just east of roundabout junction with B1381, Sutton, TL45267926, A.C. Leslie, 20 October 2017, **CGE**. First v.c. record for one of the deciduous, bullate-leaved group of cotoneasters (we already have records for *C. boisianus*, *C. bullatus* and *C. rehderi*). This one has particularly bright, orange-red fruits in dense clusters, as well as good autumn leaf colour: one really needs ripe fruit to be sure of these species. A native of Yunnan, China.

Diplotaxis erucoides Margins of grassy track adjoining leek field, Hake's Drove, West Fen, east of Turves, one at TL34949589, two at TL35039589, J.J. Graham & C.D. Preston, 22 March 2017. First v.c. record for White Wall Rocket, a southern European alien, which had been expected in the county following its recent expansion in Fenland to the north of the county.

Euonymus fortunei One plant, apparently self or bird-sown in crack between pavement and front wall of 65 Kneesworth Street, Royston, TL35434119, W. Bishop, 10 September 2017, **CGE**, det. ACL. A common evergreen garden shrub, originating in eastern Asia, which is sometime found dumped or planted, but has rarely been recorded as derived from seed.

Gnaphalium pensylvanicum One plant, in road gutter, south-west side of Park Lane, Manea, TL47908920, A.C. Leslie, conf. E.J. Clement, 5 August 2017, **CGE**. First v.c. record for a member of a rather critical group of American cudweeds; this one has more-or-less concolorous leaves, an elongated inflorescence with leafy bracts and brown-tipped perianth segments. There was no obvious source of introduction.

Guizotia scabra subsp. *schimperi* (a) one plant, on new bank beside cycle/footpath between Milton Road and Cambridge North Station, Cambridge, TL47316110, A.C. Leslie, 18 September 2017, **CGE**, (b) one plant, on disturbed bank above lake, Cambridge Science Park, TL466617, A.C. Leslie, 5 November 2017, **CGE**. First v.c. records for an annual, stickily hairy, birdseed alien, related to the much more frequent *G. abyssinica* (the Niger seed used to attract goldfinches to gardens). In neither case, despite growing to c.5ft tall, did the plants flower, whereas the scattered plants of *G. abyssinica* which accompanied it in the first site all flowered well.

Ipomoea coccinea One plant, twining up a *Datura stramonium* on a pile of soil and rubble, car park for fishing lake at the Barnwell Junction end of Coldham's Common, Cambridge, TL47175941, J.D. Shanklin (CNHS excursion), 17 September 2017, **CGE** (coll. ACL). First v.c. record for a Morning Glory which has small, but very attractive red flowers, and is native to North America. Also accompanied here by *Ambrosia artemisiifolia* and all three aliens presumably have a common origin, perhaps from bird seed.

Leersia oryzoides A large patch, in a new shallow ditch, north of the largest new lake, Great Kneighton Country Park, Cambridge, TL45465473, A.C. Leslie, 3 August 2017, **CGE**. First v.c. record for Cut Grass, very locally considered to be native in southern England, but an alien here and perhaps one of the most surprising records of the year. It seems likely to have been an unintentional introduction with other marginal aquatics which had been planted here in pure blocks along the ditch (although why it should be in any nursery is hard to explain), and in this case was threaded through part of a big colony of *Schoenoplectus tabernaemontani*. Fairly typically for this species in the British Isles, it never produced any exserted panicles, but later in the season inflorescences could be dissected out of the uppermost sheaths. Look out for a creeping grass in water or waterside sites, with rough, yellow-green foliage and hairy nodes.

Miscanthus sinensis One flowering clump, apparently self-sown amongst *Phragmites*, on level ground on the south-facing slope of West Pit, Roswell Pits, Ely, TL55058062, C.D. Preston, 18 November 2017, **CGE**. Widely grown in gardens and previously reported as a self-sown street weed in Cambridge, where it is usually a casual. This area of the pit also has apparently self-sown *Cortaderia selloana* and both may be derived from gardens above the pit.

Misopates orontium Garden weed, 99 Windsor Road, Cambridge, TL438603, S. Sinclair (comm. M. Smith), October 2016. It has persisted for seven years at this site, despite weeding. Weasel's-snout has always been a rare weed in the county and was last reported as a garden weed at Girton College in 2000.

Myosurus minimus Hundreds of plants, with *Poa annua*, in an area of cattle pens and gates, Low Wash, Nene Washes, north-east of Whittlesey, TL286994, J.J. Graham, 10 May 2007. Well-known on the Ouse Washes, and in a few other places, but not previously reported from the Nene Washes. This record has been overlooked previously and the finder suggested that seed may have arrived with the cattle from another site.

Rubus tricolor One plant, apparently bird-sown under metal steps, East Pit, Cherry Hinton, TL48395564, J.L. Sharman, March 2017, **CGE**. A widely planted, low-growing evergreen, used in landscaping, but as yet with few bird-sown records. Native of China.

Rumex conglomeratus x *R. maritimus* One plant, with both parents, on the bank of a shallow grassy ditch, in meadow between railway and river, below Roswell Pits, Ely, TL55418045, A.C. Leslie (CFG excursion), 15 July 2017, **CGE**. Last recorded (in some quantity) in a dried-up shallow lake a little further to the north in 2003, our only other record was from Barnwell, in Cambridge, in 1943.

Rumex cristatus At least 24 plants, scattered mostly along the west side of the old road between Mepal and Sutton (now used as a storage area for road building material), TL44358013-44318035, A.C. Leslie, 19 May and 22 July, 2017, **CGE**. Second v.c. record. Previously known only from a single plant on the disused Chesterton railway sidings in 2000, this new site appears to represent a naturalised and possibly expanding population of this tall alien dock, native to the Balkan peninsula, the Aegean region, Cyprus and Sicily.

Salix babylonica var. *pekinensis* 'Tortuosa' A self-sown sapling (c.7ft tall), on bank of shallow flooded pit, on former NIAB arable land, west of Histon Road, Cambridge, TL44096074, J.D. Shanklin, 18 March 2017, **CGE** (coll. ACL). Second v.c. record for a self-sown plant of this cultivated willow which has corkscrewed stems and twisted leaves. Growing here with many other self-sown willows including some red-stemmed *S.* x *fragilis* with almost erect branches and at least one plant of *S.* x *sepulcralis* with a distinctly weeping habit. Such pit and pond margins are always worth working through systematically as they can harbour a sometimes unexpected range of willow (and poplar) species and hybrids.

Salix myrsinifolia Two female bushes, on the bank of a ditch on west side of Cuckoo Lane, just north of Cuckoo Bridge, south-west of Rampton, TL42116698, A.C. Leslie, 9 April 2017, **CGE**. Best known and possibly native at Chippenham, Wicken and Fordham, and reported planted in a few other places. These bushes may be self-sown, as several other willows nearby clearly are.

Solanum nigrum x *S. physalifolium* (*S.* x *procurrens*) One plant of this sterile annual hybrid, with both parents, on new road verge near Cambridge North Station, Cambridge, TL47446099, A.C. Leslie, 18 September 2017, with another at TL47296089, 29 September 2017. In this case it is likely the hybrids, as well as their parents, arrived as seed with imported soil, rather than occurring *in situ*. Still occurs regularly where it was originally described on the greensand at Gamlingay.

Sonchus palustris About 10 stems in middle of marshy area (TL28279642) and three more at edge (TL28229642), Lattersey Pits LNR, Whittlesey, J.D. Shanklin, 29 July 2017. Another new site and yet more evidence that Marsh Sowthistle is continuing to spread across our northern Fenland.

Trifolium glomeratum Abundant in thin, dry, mown turf of lawn on east side of flats (Cyan building), above west side of guided busway, south of Hills Road bridge, Cambridge,

TL45945670, P.H. Oswald, 27 May 2017, **CGE** (coll. ACL). Second v.c. record for a native annual clover, which in company with *T. ornithopodioides*, *T. arvense* and *Ornithopus perpusillus* etc. was probably introduced here with soil used to make up the lawn. Our only previous record was of a single plant in the old Chippenham sand pits in 2004.

Trifolium ornithopodioides (a) Dozens of patches (often composed of numerous, tightly clustered individuals), in thin, dry, mown turf of lawn on east side of flats (Cyan building), above west side of guided busway, south of Hills Road bridge, Cambridge, TL45945670, A.C. Leslie, 11 May 2017, **CGE**, (b) On pitch 10, camping/caravan site, Highfields Farm, Comberton, TL390571, P.D. Stanley, August 2017. First and second v.c. records for an annual clover usually found as a native near the coast, more rarely inland. In both cases here likely to have been an accidental introduction, perhaps with soil used to make up the sites, or in the latter case perhaps arriving with visitors.

Trifolium resupinatum Probably 100-200 plants, on pitches 42, 50 and 54, camping/caravan site, Highfields Farm, Comberton, TL390571, P.D. Stanley, August 2017. Second recent v.c. record for an alien annual clover native of south-west Asia (and perhaps also southern Europe), in which the individual flowers are held 'upsidedown' with the standard below and the keel above. *T. ornithopodioides* was also present at the same site (see above).

Typha minima An extensive population, very well established on gravelly banks around the north-west end of largely dried up pond, East Fen Common, Soham, TL60217340, CFG excursion, 13 May 2017, **CGE**. First accepted v.c. record for a dwarf alien bulrush, already in flower in May, with very narrow leaves and with both the male and female sections of the inflorescence subtended by a conspicuous papery bract. It is occasionally grown in gardens, where it is an ideal emergent in water gardens made in large tubs. Found wild on river gravels in central Europe. Perring *et al*. (1964) considered that a specimen in **CGE** purportedly from Wicken Fen (collected by A.S. Shrubbs in 1893) was almost certainly from the University Botanic Garden.

Bryophyte records

M. Burton and C.D. Preston

In October 2017 the British Bryological Society's AGM was held in Cambridge, and members repaid our hospitality in the best possible way by discovering *Ephemerum cohaerens* during an excursion to Chippenham Fen led by Chris Hainsworth. This is the most remarkable of the finds reported below, but we also give details of two other notable records made on that meeting and of a varied set of species found by bryologists in both Cambridgeshire (v.c. 29) and Huntingdonshire (v.c. 31) later in the 2017/18 season.

Mark Hill and C.D.P. have continued work on a new bryophyte flora of Cambridgeshire during the year, and have been able to add two species to the Cambridgeshire list and one Huntingdonshire species on the basis of historic material in herbaria. We are grateful to Len Ellis and Fred Rumsey (BM) and Katherine Slade (NMW) for their expert help during visits to these collections.

Mosses

Brachythecium glareosum **31:** occasional along the length of a stony track at the edge of calcareous, arable farmland, Stibbington, TL0897, M. Burton, 26.2.2018, det. M.O. Hill. Martin Wigginton found *B. glareosum* in this area in 1989, suggesting that it might be well established here, unlike anywhere else known to us in either county.

Bryum bornholmense **29:** large quantity on disturbed sandy soil, Gamlingay Heath Plantation, TL223513, M.O. Hill, 10.3.2018, BBSUK, conf. T.L. Blockeel. This is the first record from the county of *B. bornholmense*, which is similar morphologically to the frequent *B. rubens* but is a marked calcifuge. The classic British locality for the species is at Rowney Warren in nearby Bedfordshire, which also on the Woburn Sands geological formation.

Bryum pallescens **31:** dilapidated greenhouse near Somersham, TL37057672, M.O. Hill, 28.01.2018. Third vice-county record.

Cinclidotus fontinaloides **29:** on concrete walls of weirs in a small river leading into the River Stour, Stour Valley Path, Kirtling Green, TL674554 (weir 9), TL673553 (weir 10) and TL672549 (weir 15), R.J. Fisk, 5.12.2017. The species grew on both the Cambridgeshire and the Suffolk sides of the stream at all three sites. The only previous Cambridgeshire records have been on the western side of the county along the River Nene, River Great Ouse and the Ouse Washes.

Ephemerum cohaerens **29:** plants with immature capsules on disturbed peat by fen ride, with *Bryum klinggraeffii* and *Dicranella varia*, Compartment 9 by Baxter West Ride, Chippenham Fen, TL64636918, E.M. Kungu, 8.10.2017, BBSUK, conf. T.L. Blockeel. This is only the fifth recent site for the species in Britain. Since 2000 it has been found in the draw-down zone of three reservoirs, two in Northamptonshire and one in Worcestershire, and the soil bank of the River Camlad in Montgomeryshire. In Europe most records are from artificial water bodies, including gravel pits and reservoirs, though there is a record from a *Schoenus nigricans* mire in France.

Leucodon sciuroides **29:** extending for about a metre on top of exposed concrete wall, 15 Long Road, Cambridge, TL462556, M.O. Hill, 14.9.2017. We have had several new records of *L. sciuroides* in recent years, but it is still surprising to find a large patch in suburban Cambridge.

Palustriella falcata **29:** bog, Senior Wrangler's Walk, Cambridge, TL4556, H.N. Dixon, 31.1.1883, BM. "Mixed sedge", Wicken Poor's Fen, TL57, P.W. Richards, 5.1929, NMW. The species has not hitherto been known from the county. Dixon's specimen (which was presumably from Empty Common) was unknown to us and Richards reported his plant as the closely related *P. commutata*, but Mark Hill has confirmed that both specimens are *P. falcata*. Re-examination of a voucher specimen of *P. commutata* from Chippenham Fen (D. Welch, 27.7.1960, CGE) shows that it is correctly identified.

Plagiomnium ellipticum **29:** side of grazed tusssock in wet part of tussocky fen grazed by water buffalo, Compartment 11, Chippenham Fen, TL65196941, R.H. Carter, 8.10.2017, conf. M.O. Hill. This is the second extant site in the county, following its discovery at Upware North Pit in 2015.

Pohlia lescuriana **29:** recently cut bank of lowest pond, Gamlingay Heath Plantation, TL22425133, C.D.P., 10.3.2018. The only previous record from the county of this calcifuge species was also from Gamlingay Heath Plantation, where it was found on a newly cut ditch side in 1988.

Pohlia wahlenbergii **29:** in plant pot in urban garden, 14 St Kilda Drive, Cambridge, TL461613, M.O. Hill, 6.9.2017. Disturbed fen ride, with *Calliergonella cuspidata* and *Campylium protensum*, Baxter West Ride, Chippenham Fen, TL64516914, C.D.P., 8.10.2017. Almost all our records of this species are from disturbed rides in ancient woods, so its occurrence on a fen ride, and as a weed in a Cambridge garden, is unexpected.

Scleropodium cespitans **31:** silted and shaded base of hawthorn close to water, Rowley's Wood near River Nene, TL078931, C.D.P., 13.1.2018. The third record from v.c. 31; the previous two were by the River Great Ouse.

Sphagnum denticulatum **29:** one 30 x 15 cm patch in flush above stream flowing from pond, Gamlingay Heath Plantation, TL22455132, S.J. Buckton, 10.3.2018, det. M.O. Hill. When we last saw *S. denticulatum* here in 2002 we found only a few stems, so it was good to see a larger patch on this visit, especially as it is now the only known *Sphagnum* in the county.

Ulota crispula **31:** apple tree in orchard near Somersham, TL369768, D.J. Scott, 28.1.2018. The taxonomy of *U. crispula* was clarified in a recent taxonomic revision. This is the second Huntingdonshire record. It almost certainly occurs in Cambridgeshire too but so far potential specimens have not had capsules in sufficiently good condition to allow certain identification.

Liverworts

Metzgeria consanguinea **29:** with *M. violacea* on willow on side of path, Roswell Pits, Ely, TL55368081, J.D. Shanklin, 18.11.2017. The second vice-county record of this epiphyte, which is rarer than *M. violacea* in eastern England but easily overlooked when growing with it.

Preissia quadrata **29:** Burwell Fen, TL56, C.E. Broome (as *Marchantia*), 28.5.1832, BTH, det. M.O.H. & D.G. Long. **31:** Whittlesey Mere, TL29, 1826, M.J. Berkeley (as *Marchantia hemispherica*), CGE, det. C.D.P. These specimens, hitherto overlooked, are the first records of *P. quadrata* from our counties. This thallose liverwort has a Boreo-arctic Montane world range and is frequent in some calcareous areas of northern and western Britain. It was recorded from a few calcareous fens in south-east England but it appears to be extinct even in those which (unlike our sites) have escaped total habitat destruction.

OBITUARIES

Hilary Belcher (1929–2017)

Hilary Belcher was born in Stoke Newington on 19 November 1929. After attending Tottenham Grammar School she worked part-time for a general degree at South West Essex Technical College, gaining a London external B.Sc. in Botany, Zoology and Chemistry in 1950. In 1953 Hilary obtained a B.Sc. (Hons) in Botany at Birkbeck College. This was followed by a Ph.D. in 1958 in the Botany Department of University College London, where she acted as a research assistant to G.E. ("Tony") Fogg. Hilary's postdoctoral research was on the planktonic alga *Botryococcus braunii*. She also published papers on the freshwater filamentous alga *Bangia atropurpurea*, in *Hydrobiologia* in 1956 and in *The New Phytologist* in 1960, with "invaluable help" from the Manchester phycologist Kathleen Mary Drew-Baker (now famous in Japan as "Mother of the Sea").

Hilary met her life-time companion Dr Erica Swale in 1955 at a scientific meeting at the Freshwater Biological Association laboratory at Ferry House. In 1960 they both started work there on the taxonomy of freshwater algae with Dr John W.G. Lund. I first met Hilary and Erica at this time, when I was responsible in the Nature Conservancy for Rostherne Mere National Nature Reserve, Cheshire, and they were among a number of scientists researching the biology of the lake. For several years I regularly collected phytoplankton samples from Rostherne Mere and later Oak Mere and posted them to Ferry House. Hilary and Joan Storey published the findings on Rostherne Mere in *The Naturalist* in 1968 and Erica those on Oak Mere in *British Phycological Bulletin* in the same year.

In 1967 Hilary and Erica spent three months at Leeds University learning electron microscopy techniques from Professor Irene Manton. This collaboration led to the production of a number of important joint papers on the fine structure of flagellates. In 1969 Hilary was awarded a D.Sc. by the University of London.

In 1970 Eric George asked Hilary and Erica to help him set up the Natural Environment Research Council's laboratory at 36 Storey's Way, Cambridge, to be known as the Culture Centre of Algae and Protozoa. Hilary was appointed a Principal Scientific Officer in charge of the cultures of marine microalgae and Deputy Director to Eric George and Erica was in charge of electron microscopy. Hilary became a Fellow of the Linnean Society in 1972 and of the Institute of Biology in 1978. Together Hilary and Erica wrote *A Beginner's Guide to Freshwater Algae*, published by HMSO in 1976 with further impressions in 1977 and 1978. This was followed by *An Illustrated Guide to River Phytoplankton* in 1979. Erica's line drawings in these guides have been described as "a remarkable blend of accuracy and artistic skill". She has told me that Hilary learned this distinctive technique from her. Over the years Hilary and Erica described 30 species new to science. (These are listed in an appendix to an obituary collated and edited by Jennifer Bryant and published in Autumn 2017 in *The Phycologist* No. 93: 20–24.) They both took early retirement in 1981 but continued their work on algae as well as giving valuable support to Lucy Cavendish College and its

gardens. Hilary also joined the Folklore Society and became a regular contributor to its newsletter, *FLS News*, and to *Plant-Lore Notes & News*; she was particularly interested in the folklore of small mammals, especially mice.

Hilary and Erica jointly contributed the remarkable total of 37 papers to *Nature in Cambridgeshire* in the 34 years from 1980 to 2013. As one might expect, 23 of these were about the algae that they found in Cambridgeshire, illustrated by their distinctive and clear drawings, which were never attributed to one or other of them. Some of these were used in *The Freshwater Algal Flora of the British Isles* (2002), which lists four of these papers in the bibliography and where some of the illustrations are described as "after Belcher & Swale". For example, in a paper about the "remarkable phytoplankton" of a pool in Histon (1999) there are four pages of drawings and the text refers to the publication "now in preparation … in which most of our drawings will reappear". An early article about water-blooms (1983) illustrates the range of Hilary and Erica's knowledge, with references to the Cam being "as red as blood" in 1640, the plagues of Egypt related in *Exodus*, Mary Webb's *Precious Bane* and Shakespeare's *The Merchant of Venice*. In it they wrote: "Recipes have been published for cooking *Enteromorpha* (Mabey, 1972), but our investigations did not extend into the culinary field."

Other papers are about freshwater red algae (1991); the algae of the western Hobson's Conduit runnel in Trumpington Street (1992); diatoms of saline puddles (1993); diatoms epiphytic on bryophytes (1997); desmids in puddles on a footbridge over the M11 (1998); desmids of the genus *Closterium* (2001); uncommon algae (1996); uncommon algal flagellates (2000); uncommon freshwater algae and sulphur bacteria (2002); algae of puddles (2004); and algae of "subaerial habitats" such as trees, tarmac and mosses (2005). An eight-page paper of 2003 included a provisional list of the phytoplankton of the Rivers Ouse and Cam with two pages of drawings.

Two articles describe *Nostoc* species – a mass occurrence of *N. commune* (1988), a species believed by alchemists and others in past times to be "wreckage of shooting stars", and *N. microscopicum* (2003), resistant to herbicides. Hilary and Erica had already published an article in the journal *Folklore* in 1984 entitled 'Catch a falling star', concerning former beliefs about *Nostoc*, resulting in local names such as "sterre slyme" (i.e. star-slime) from as early as 1440 as well as "star-jelly", "star-slutch" and "star-shot".

From 2006 to 2013 they published six fully illustrated articles in *Nature in Cambridgeshire* entitled 'Contributions to a new algal flora of Cambridgeshire (Vice-county 29)', jointly with their former colleague, the late Eric George. In the first of these they wrote "even if it has to be finished by others"; sadly they were indeed unable to complete this ambitious project. Eric George's "detailed card index" is preserved at the Herbarium of the Department of Plant Sciences, but who is there today who could complete the task?

Other joint contributions to *Nature in Cambridgeshire* again illustrate Hilary and Erica's astonishing range of interests. Four articles (1980, 1989, 1995 and 2001) describe the flora of roadsides near Girton, where they lived, especially where new roads had been built. Two other Girton contributions are about ferns growing in drains (1994) and the local black (melanistic) squirrels (1995). A paper

of 1993 describes their investigation of Moor Barns Bath, a site of early botanical records, and another of 2002 the luxuriant regrowth on glyphosate-treated set-aside. In 2000 they wrote a detailed account of Abbey Farm meadows and woods in Histon. Two illustrated papers relate to invasive alien aquatic flowering plants – *Crassula helmsii* (1982) and *Lagarosiphon major* (1990). An article in 1992 about a wall in Horningsea where solitary bees had nested for at least 50 years is uncharacteristic in that the sketch of the wall is initialled "HB". In 1995 Hilary and Erica described specimens of a crocodile and turtle on display in a chemist's shop in Trumpington Street (with a quotation from *Romeo and Juliet* about an apothecary's shop with "a tortoise hung, an alligator stuffed, and other skins …") and in 1998 their search for specimens of "Mosse growing on the skull of a man" (as described as a "singular remedie" for whooping cough and epilepsy in Gerarde's (1597) *Herball*) at Queens', St Catharine's and St John's Colleges.

Hilary died at home in Girton from cancer on 28 January 2017. Professor David M. John, principal editor of *The Freshwater Algal Flora of the British Isles* (2002, 2011), has written: "With the passing of Hilary we have lost one of the UK's most accomplished freshwater algal experts. She was not only capable of identifying species belonging to all algal groups but had also published on colourless protists. The breadth of her knowledge was apparent when she identified almost 70 microscopic forms, including many small flagellates, over 30 diatoms and several non-algal protists and cyanobacteria, in a single sample from the pond of the Natural History Museum's wildlife garden."

I am grateful to Dr Erica Swale and to Jennifer Bryant and Dr Jane M. Renfrew, both of whom have published obituaries for Hilary, for supplying much of the biographical information recorded here.

Philip H. Oswald

HENRY JAMES BERMAN (1935 – 2017)

Henry Berman was born on 4th July 1935 in the borough of Finsbury within the sound of Bow Bells, so he was a true Cockney. He was evacuated during the war to Leicestershire with his mother. On his return to London he was educated at South Hackney Central School and Hackney Down sixth form college; doing his teacher training at Newman Park College. After completing his teacher training he moved to St Ives in 1957, with his wife Joan (who predeceased him by only a few months), to take up the position of Biology Teacher at St Ivo School. Henry was interested in insects and formed the St. Ivo Entomology and Natural History Society (Entsoc). This was to become nationally and internationally famous. One of his contacts was the naturalist and author, the late Gerald Durrell, for whom he helped breed rare lizards in what became the school zoo.

Originally this "zoo" was in his laboratory and the tropical room was a very smelly cupboard, but when the school expanded, purpose built temperate and tropical rooms were made. Animals included a Cayman alligator a large snapping turtle, terrapins, boa constrictors, pythons, tarantulas, various small mammals, reptiles and insects.

Henry was a great believer in the abilities of his students and Entsoc was run by them on a team basis with the teams being for invertebrates, mammals, reptiles and amphibians. Each team had a leader and an assistant leader and team members were responsible for the upkeep and welfare of their animals (even during school holidays). Students had to pass examinations to progress, and to be awarded the coveted Entsoc Badge, perhaps with a piece of coloured wool to denote the particular team. The insect group bred locusts for the anti-locust research centre. Many of his former students went on to work in scientific areas and many specialised in work with animals.

For many years Henry and Joan used to take the Society on expeditions at home and abroad, staying in Youth Hostels, collecting and cataloguing insects and small animals; these trips are remembered with great fondness by those who took part.

Henry and a few of his students who were members of Entsoc ran a Rothamsted trap in the school grounds from April until October 1965 and again over the same period during 1968. In 1969 it was run from May to November and in 1970 May to October contributing almost 1,500 records to the county database.

He travelled annually, until he retired, to the Amateur Entomologist's Exhibition in London in a coach full of his students and part of their 'zoo'. After his retirement in the late 1990s he continued to attend the exhibition with posters and displays of Bees and Wasps. Much the same can be reported of his activities locally. He travelled regularly, with his students and 'zoo', to the Annual CNHS Conversazione. I well remember the swarms of enthusiastic and knowledgeable students ready to impart their knowledge to anyone who paused by their exhibits. When he retired he would bring his displays of Bees and Wasps, always keen to impart his knowledge and garner local records of the species.

He was involved with the Huntingdonshire Fauna and Flora Society (HFFS), probably originally in 1958 when St Ivo School joined the Society, quite likely encouraged to do so by Henry. In the 1961 annual report he had a letter published, with reference to the 'Huntingdonshire County Collection of Insects', where he states that he hopes to be able to replace the damaged specimens held in the Norris Museum, St Ives, with a collection of insects found in the county. This collection would not include Lepidoptera. No further reference to, or trace of, this collection has been found.

In 1963 he took up the position of Amphibia and Reptilia Referee for the HFFS, a position he held until 1971. From 2005 until 2015 he held the post of the Society's Hymenoptera Recorder. During this time Henry contributed many articles to the annual report on Bumble Bees and Social Wasps, occasionally including a note or two about other members of this family.

Henry died in Hinchingbrooke Hospital on 27th December 2017.

Henry R Arnold

This obituary is largely based on that written for the Huntingdonshire Fauna and Flora Society by Barry Dickerson, who acknowledged the assistance of David Chambers and Linda Phillips (Henry's daughter).

Elizabeth Anne Platts (1937-2017)

Elizabeth Platts, who was a member of the Editorial Board of *Nature in Cambridgeshire* and who was chosen by Max Walters as his successor as Chairman in 2006, died in Winchester on 18th May 2017, aged 79. Elizabeth Anne Platts was born on 16th December 1937 in London, the daughter of Paul and Doris Williams. For most of her childhood and early life she was called Lilla, the name recently given to her grand-daughter. She went to school in Putney and studied a wide range of subjects including French, Latin and Art, before focusing on science for her A-levels. Biology was always her favourite subject, which stemmed from her childhood interest in various aspects of natural history. At the University of Nottingham she developed a particular interest in marine biology and molluscs, especially nudibranch sea slugs. She became heavily involved with various activities at Nottingham, becoming Secretary and then President of the University Biological Society and Vice President of the University Mountaineering Club. She participated in biological expeditions to the Alpes Maritimes and on a pharmaceutical expedition to Spitzbergen, where she volunteered to have her normal diurnal rhythms temporarily reversed as part of a pioneering study. She had embarked on a Joint Honours BSc course in Botany and Zoology, with subsidiary Chemistry and Microbiology, but was unable to complete the degree because of an undiagnosed thyroid condition, which was finally treated in 1964.

After leaving university, she taught for several years at various schools in London. She married her husband Richard and in 1965 they had their first daughter Victoria. Richard did not share Elizabeth's intense interest in natural history but he was a gifted amateur photographer who was able to photograph many of her beloved sea slugs. In 1970, the family moved to Belfast where Richard had taken up a post in the Economics Department of Queen's University. She continued to teach Biology at different schools in Belfast until her second daughter, Sarah, was born in 1981. Once established in Belfast, Elizabeth quickly became engaged with the natural history community in Ireland. She joined the Belfast Naturalists' Field Club and became closely involved with the Botany and Zoology Department of the Ulster Museum, where she subsequently became an honorary member of staff. She produced the first checklist of marine Mollusca for Sea Area 28 (Belfast) for the Conchological Society's Marine Recording Scheme and became the Society's Marine Recorder for Sea Areas 33 and 34 (Donegal). She also produced *An Annotated Checklist of North Atlantic Opisthobranchia* as a tribute to the renowned Danish zoologist Dr Henning Lemche, who had worked in County Galway between 1971 and 1976. She also became a member of the Praeger Committee that administered small grants for fieldwork on behalf of the Royal Irish Academy. In 1976 she succeeded Pat Kertland as Editor of the *Irish Naturalists' Journal*, a position that she held with distinction until 1988, when Richard retired and the family moved back to England. The family lived in Winchester during the 1990s but in 2002 Elizabeth, now divorced, moved to Cambridge, where she formed new friendships and became involved with local societies. During her final few years, as her health worsened, she stepped down from the Editorial Board and returned to Winchester to be close to her daughters.

Despite being essentially a marine biologist, it is ironic that perhaps her best known work relates to two terrestrial species. The first concerns her work with Martin Speight that sought to clarify the taxonomic status and geographical distribution of the Kerry slug *Geomalacus maculosus* throughout its European range. The second, and perhaps her best known work, relates to her discovery in 1976 of a thriving population of the land winkle *Pomatias elegans* at a site on the Burren in County Clare. She co-authored several papers about the significance of this discovery and subsequently wrote an MPhil thesis (University of Southampton) about this colony, which remains the only living population of this species known in Ireland. The period that the Platts family lived in Northern Ireland coincided with one of the most troubled episodes of that region's history. She was very matter-of-fact about the difficulties arising from the political turmoil but she loved her time there and the people whom she met, and looked back on it with great affection.

Elizabeth belonged to several learned societies and played an active role in their work. She was a long-standing member of the Conchological Society of Great Britain and Ireland and the Malacological Society of London, for which she served two terms as Vice President (1990-1993 and 1996-2000), and was Treasurer for nearly 10 years (2000-2009). She was recently made an Honorary Life Member of that Society. Since 1980 she had been a member of Unitas Malacologia, and helped that organisation to produce a marine molluscan database for the North Atlantic and Mediterranean (CLEMAM). Her membership of other societies and associations not yet mentioned included the Linnean Society (from 1975), the Society for the History of Natural History (from 1976), Jeffrey's Association (1977-1982) and the Ray Society (from 1993). She served on the Council of the Ray Society and during the period 2010-2013 was elected its first female President, another accolade that gave her particular delight.

Her main influence, however, was not through her research or written work but as the result of the way that she actively encouraged others. Through her membership of all these societies (the list is certainly not comprehensive) she had formed a useful network of contacts and she was always keen to introduce people from these different spheres. It is no coincidence that several of these societies have now held joint meetings, nor that members of the Malacological Society and Board Members of *Nature in Cambridgeshire* have recently published Ray Society monographs. She was also instrumental in championing the exquisite botanical artwork of the late Raymond Piper, a family friend from Ireland, who was eventually persuaded to exhibit at the Botanical Society of the British Isles, the Linnean Society and the Royal Horticultural Society, where in recognition of the quality of his work he was awarded the Linley Medal in 1975. Elizabeth was a great facilitator and problem-solver and an inspirational person with a wonderful sense of fun. Throughout her life, Elizabeth suffered from a whole series of auto-immune problems and she never really enjoyed 'good health'. However, for most of her life her health problems seemed to have been more of a spur than an impediment and she never let them interfere with her plans to travel (for example, to Hong Kong, Thailand, Burma and Sri Lanka) or undertake other activities. She

was always smiling and keen to become involved with whatever activity was at hand.

Richard Preece

BOOK REVIEW

The Anglo-Saxon Fenland. Susan Oosthuizen (Windgather Press, ISBN 978-1911188087) 160 pages

As a naturalist and conservationist with a scientific background, my interest and starting-point knowledge of landscape history was very significantly formed by the writings of the late Oliver Rackham. With this non-specialist background I set myself the challenge of reading and reviewing this publication by a local historian/archaeologist. I was expecting to be completely out of my depth for a good part of the time, but hoped to get a feel for an area of history I felt I needed to know more about, and which clearly shaped our local landscape.

Well, I read the whole book, and at a fair pace. I didn't get too lost too often, as someone with only a basic knowledge of the history of the period and the possible influences on Cambridgeshire and surrounds. I think this is a credit to the author – it is an accessible book, despite apparently being quite a niche subject. A lot of the writing is a critical re-appraisal of evidence available for several decades, but without any of the bias or pre-conceptions which may have gone before.

The book explores who actually lived in fenland, from the evidence of artefacts and previous writings, and of the names of places which still exist on the map for you to look up, and examines whether or not the fens in the 'Dark Ages' were actually an uninhabited, inhospitable wasteland as we were all lead to believe in school history, or that there was thriving, diverse society. There is also some natural history in there, too, as this was intrinsically linked to land use and water management, aspects of the Anglo-Saxon habitation of the wetter parts of Cambridgeshire. One gets a feel for a significant biodiversity being present in the wetlands, even though they were a managed landscape centuries ago – reeds and sedges were cut 1500 years ago just as they were 150 years ago.

It is proposed that Fenland was not a barely inhabited and barely habitable wasteland, but was a well-organised, populated part of the country, with agriculture and an established network of settlements. Livestock was kept, and making a livelihood was set up around the varying water levels on different parts of the fens. Active water-level management was carried out by the settled populations, unsurprising if they needed to have a viable livelihood rather than eking out a peripheral existence.

I learned a lot from reading this book, although there were a few natural history anomalies – the author states clearly that Eels are amphibious, but they are not, despite being unusual for fish by being able to cross short terrestrial distances.

This does not make them amphibious. I am sure there were a couple of other minor nature inaccuracies which I have now forgotten, so they could not have been major faux-pas, but in general this was a very readable book. One major historical quibble from my point of view was that, although the author defined the temporal period of Anglo-Saxon, many of her examples and sources were more recent, often mediaeval or Tudor examples. For a reader not in that field of research these were interesting in a broader sense, but a little irritating when being used as a cited source for something Anglo Saxon.

In summary, a readable book for any reader with a broad interest in land use and history of this area, despite a few minor annoying points. A hard-core naturalist would struggle to find it an stimulating read if they did not have an interest in history and land use in the evidence-base of our local area, but that sort of interest in the past is one that should be encouraged in the wider naturalist/academic community as it enables a much wider understanding of what we have and what has changed over the past centuries. Borrow a copy and read it.

Louise Bacon

A natural history of Cambridge (NatHistCam)

Mark Hill

Introduction

Last year we reported at the beginning of our project, for which the main period of collecting data is 2017-2019. Now in our second year, we are continuing with our observations on fauna and flora. Our website is ably maintained by Monica Frisch and displays monthly blogs and reports of wildlife seen. Records made for our surveys are collated by the Cambridgeshire and Peterborough Environmental Records Centre (CPERC). Our study area is an 8 km square comprising 64 monads (1-km squares) centred on the intersection of Mill Road and Covent Garden. A detailed map, complete with street names and grid lines, was prepared by Duncan Mackay, and can be viewed on our website.

Progress

Ongoing surveys of birds, mammals, reptiles, amphibians, vascular plants, mosses, liverworts and lichens are made through local specialist groups. Several moth traps are being run and operators are sending their records to the county moth recorder Bill Mansfield. The Cambridgeshire Bird Club is particularly active, with regular reports on our website by Bob Jarman, on Blackcaps, Little Egrets, Rooks, Grey Partridges, Peregrines and many others. Jonathan Shanklin is assiduously recording vascular plants in Cambridge. The hectad TL45, which includes most of our study area, had 792 species in 2016 and 739 in 2017. In those years, no other hectads recorded by the Botanical Society of Britain and Ireland (BSBI) surpassed it. Cambridge is a notably rich botanical site. In our study area there are currently eight species of orchid, *Anacamptis pyramidalis*, *Cephalanthera damasonium*, *Dactylorhiza fuchsii*, *D. praetermissa* (and their

hybrid *D.* × *grandis*), *D. incarnata*, *Epipactis phyllanthes*, *Neottia ovata* and *Ophrys apifera*.

In addition to ongoing surveys we are studying plants in Cambridge gardens. By the end of 2017, we had recorded vascular plants in 21 gardens, on target for about 60 possible gardens in our study area, one per monad. Some peripheral monads are uninhabited. Thirteen plant species were found in at least 75% of gardens. The most numerous are lawn grasses *Agrostis stolonifera*, *Festuca rubra*, *Lolium perenne* and *Poa annua*, and lawn weeds *Plantago major*, *Taraxacum officinale* and *Trifolium repens*. Other species are shade-tolerant herbs *Euphorbia peplus*, *Geum urbanum*, *Lapsana communis* and *Myosotis sylvatica*, and twiners *Calystegia silvatica* and *Hedera helix*. *M. sylvatica* is a good example of a species that hovers between being a cultivated plant and a weed. The grasses *Festuca rubra* and *Lolium perenne* are mainly not weeds, being regularly sown into lawns as grass seed.

Cambridge is a real wildlife hotspot. We welcome contributions from all Cambridge naturalists. If you have ideas for a project, please get in touch. Some of our surveys are more or less complete. We have confirmed that there is very little Mistletoe in Cherry Hinton and Trumpington. Our Rook survey has shown that numbers have dropped in the City by 90% since the 1960s; rookeries along the Backs and in college gardens in west Cambridge have gone. Rooks are birds of open farmland and our local rookeries are now on the northern and eastern edges of our project area adjacent to neighbouring farmland.

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or send us an e-mail NatHistCam@gmail.com.

Weather notes from Cambridge, 2017

Chris Preston

The weather notes for the first nine months of the year have been kindly provided from Cambridge University Botanic Garden, our usual source of weather records, by Katie Martyr. However, a full run of temperature data is not available this year from the Botanic Garden, so the figures in the table are taken from the NIAB weather station in Cambridge and we thank Sue Mann for providing these.

January had 15 air frosts during the month with the sharpest on the 22nd (-5°C being the coldest for the year). There were large amounts of rainfall during the first half. On the 2nd 7.5 mm was recorded, but as the month went on the frequency of rainfall decreased. **February** was a wet and windy month, the garden closed for high winds all day on the 23rd. On average it rained every other day, with a heavy downpour on the 23rd at 21.9 mm. The night of 22nd was exceptionally mild and the temperature only fell to 10.4°C. There was very little noteworthy snowfall with just a handful of traces during the winter. As the ground rarely froze, the

snow did not settle for long. **March** was consistently warm throughout, the highest being 25.4°C on the 31st. It was quite a dry month, the highest rainfall being 7.4 mm on the 20th.

April was the driest month, the maximum was generally cooler than March. The highest daily rainfall being 1.9 mm on the 27th, the month's total was only 6.4 mm. There were a couple of cold nights at the end of the month, with -1.8°C in the air and -6°C on the ground. This caused damage on several of the garden's herbaceous plants, for instance leaf damage on *Aralia cachemirica* and scorch on *Reum* plants. **May** endured a high temperature of 29.1°C. The last couple of ground frosts occurred on the 1st and 11th. The month on the whole was quite dry with the exception of a few days. For example 16.6 mm of rain fell on the 18th. **June** was consistently pleasant with a few hot days, the highest temperature was 35.5°C. A higher amount of rainfall fell, boosted on the 27th by 42.7 mm.

July started promisingly with 31.3°C. It frequently rained in the second half with 19.6 mm on the 29th. It was the wettest month with a total of 79.2 mm. in the Botanic Garden. **August** was a cooler month and much more unsettled after the 11th, producing 24.6 mm on the 9th, making it the second wettest 24 hours for the year. **September** went back to an average rainfall after the second half of the summer, with the majority falling in the first half of the month, the heaviest fall on the 27th at 9.1 mm. The highest temperatures were recorded in the first five days of the month.

October was a warm and very dry month; the maximum monthly temperature at NIAB, 22.3°C on 16th, was higher than the September maximum. **November** returned to average temperatures, with the first air frost on 6th, but it remained dry. **December** temperatures were very variable, with cold spells between 9th and 13th and again between 16th and 19th, but the year ended with warm weather, the maximum monthly temperature being 13.1°C on 30th. Boxing Day was the wettest day of the month, with 24 mm.

Temperature and rainfall figures from the NIAB weather station

Month 2017	Mean max temp °C		Mean min temp °C		Highest temp °C	Lowest temp °C	Rainfall (mm)	
	month	*diff*	month	*diff*			month	*diff*
January	6.7	-0.6	0.5	+1.1	10.5	-4.5	48.0	+1.4
February	9.3	+1.6	3.8	+2.5	17.2	-1.1	43.4	+8.9
March	13.4	+2.8	5.2	+2.1	21.7	-0.2	29.8	-8.5
April	14.5	+1.2	4.8	+0.5	25.5	-1.2	16.0	-25.2
May	18.6	+1.7	8.8	+1.7	26.1	0.9	64.8	+18.8
June	21.9	+2.0	12.6	+2.4	30.8	7.8	53.2	+1.7
July	22.1	-0.7	13.2	+0.8	26.4	8.4	94.8	+47.3
August	21.5	-1.1	11.9	-0.5	27.7	6.3	64.2	+13.4
September	18.3	-1.0	9.8	-0.6	22.1	4.6	58.6	+5.1
October	16.3	+1.4	9.1	+1.5	22.3	0.3	22.4	-36.6
November	10.2	-0.1	3.6	-0.6	15.2	-1.9	36.6	-16.2
December	7.5	0.0	1.9	0.0	13.1	-4.3	70.8	+24.4
Total rainfall for year							602.6	+34.5

The *diff* column indicates the difference between the monthly NIAB values and the 1981–2010 mean value for the NIAB station.

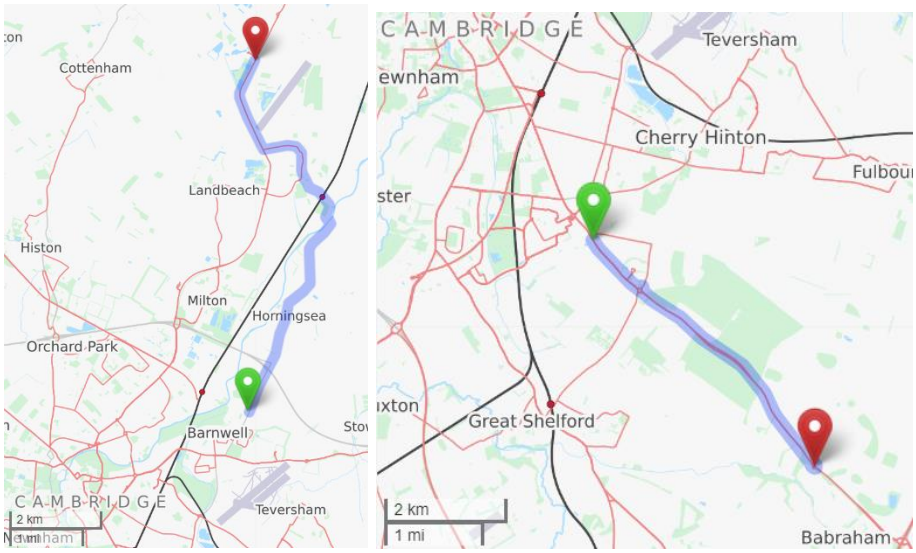

Plate 3: Map of surveyed areas, generated using OpenStreetMap data. Left: Section 1, Area north of Cambridge towards Waterbeach, Right: Section 2, Area southeast of Cambridge towards Babraham (see article on page 37)

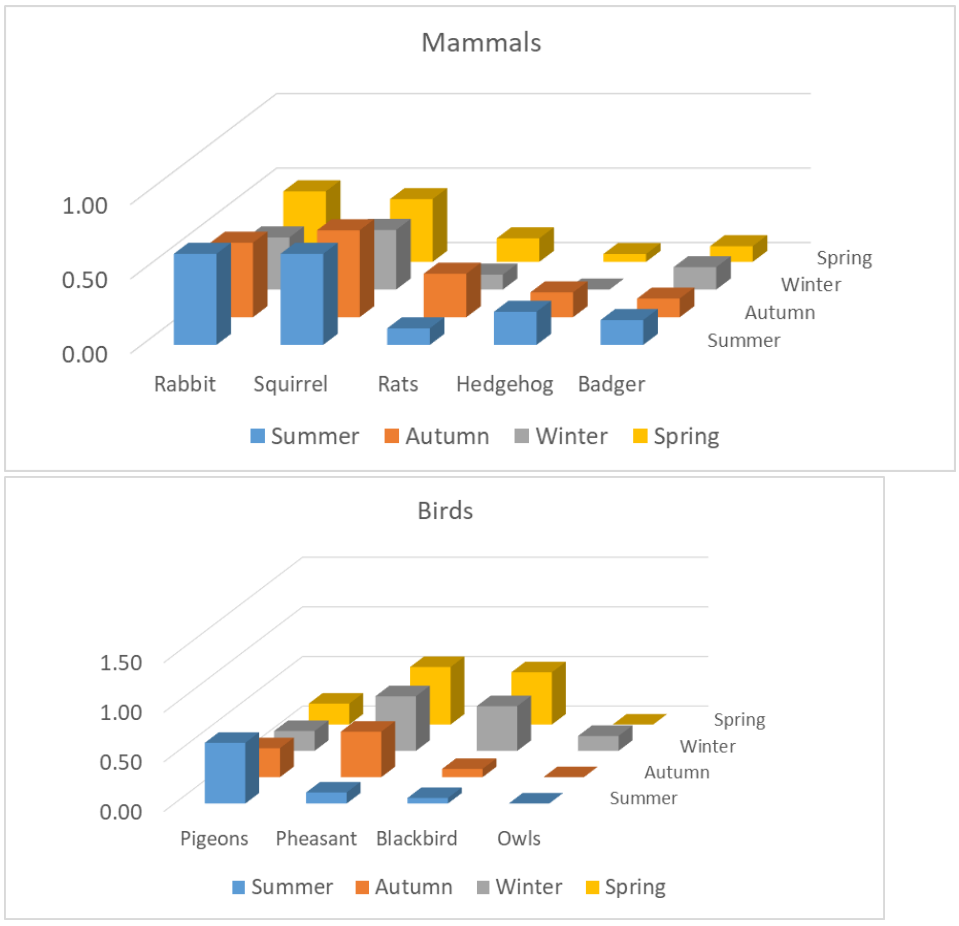

Plate 4: Bar-graphs for individual seasons for most prominent species (both sections combined). Numbers on the vertical axis represent the number of animals found per week. (see article on page 37)

Plate 5. Lizard Orchid (*Himantoglossum hircinum*) See article on page 3. (Photograph: Henry Arnold)