

Brooklands Museum

Wildlife Survey

Elmbridge Natural History Society

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Annex 1 Brooklands Museum Site Plan

1. Introduction

1.1 Purpose of this report

In 2007, the General Manager of the Brooklands Museum in Weybridge, Surrey asked the Elmbridge Natural History Society (ENHS) to carry out a survey of the wildlife on the site. The purpose of the survey, which was carried out between October 2007 and January 2011 and the results of which are reported here, was to provide an up-to-date record of the wildlife habitats and many of the species present, and in particular any rarer species which may be of conservation importance or even legally protected under UK wildlife legislation. A number of recommendations for maintaining and enhancing the wildlife interest on the site are also provided.

This information can, it is hoped, be used to benefit the museum and its wildlife in a number of ways. For example:

- To enable management to retain and enhance the green and pleasant ambience of the site, which provides a delightful setting for the exhibits and is likely to play a major part in the museum's attractiveness to visitors;
- To facilitate planning of future development of the site in such a way as to satisfy national and local government policy requirements for the retention and improvement of wildlife biodiversity within the planning process, as well as avoiding contravention of legislation protecting certain species;
- To improve the standing of the museum with both the local community and visitors from farther afield, by highlighting its support for wildlife conservation.

1.2 Survey input

Altogether 11 ENHS members, led by Dick Alder, took some part in the work, for the duration of which they were enrolled as museum volunteers. A group of five experienced birdwatchers maintained a programme of monthly bird surveys. Others with expertise in plants, fungi, galls, trees, mammals (especially bats), and some invertebrates carried out surveys for species within these groups as appropriate, and as often as possible, although as volunteers with many other commitments a thorough survey for most of these taxonomic groups was not possible. However, this report represents a reasonably comprehensive survey of the birds, higher plants and macrofungi on the site. The ENHS surveyors and their principal interests were:

- Dick Alder (RAA) – invertebrates, fungi, vascular plants, notable trees
- Ross Baker (RDB) – mammals, reptiles, vascular plants
- Chris Brading (CB) – birds
- Kath Brading (KB) – birds
- Peter Hambrook (PH) – birds

- Mariko Parslow (MP) – fungi, vascular plants
- Sandra Rickwood (SR) – general
- Brian Spooner (BMS) – fungi, gall causers, vascular plants
- Lynn Whitfield (LWh) – mammals, reptiles, vascular plants
- Lynn Wilson (LWi) – birds
- Ray Wilson (RW) – birds.

In addition, a book was lodged in the volunteers' signing-in corner, in which anybody could record any wildlife sighting. This proved helpful, as did personal contact with interested members of museum staff and volunteers, especially Martin Strick (MS).

A brief survey of the museum site at its inception was carried out in 1985 by the ENHS under its former name of Weybridge Natural History and Aquarists' Society. Some of the results of that survey have also been incorporated into the present one, where appropriate. Mention is also made in places of some records gathered between 1978 and 1988 by Dick Alder (RAA) whilst employed by British Aerospace, which formerly occupied the Brooklands site, from the current area of the museum site and around 100m to the south of it. The museum's general manager also provided records of birds collected from the site between 1989 and 1992, which are referred to here but not provided in full.

1.3 Report layout

The main groups of organisms reported on are:

- Mammals
- Birds
- Reptiles and amphibians
- Invertebrates
- Vascular plants
- Fungi.

There are also separate sections on trees and gall-causing organisms, reflecting certain ENHS members' special interest in these groups.

The report was compiled by LWh and RAA based on inputs from other members. Opinions and recommendations included in this report are not necessarily those of the other members of the ENHS.

1.4 The Brooklands Museum Site

1.4.1 Introduction

For the purposes of this survey, the site divides naturally into five areas:

- 1) Members' Hill
- 2) Banking
- 3) Riverside
- 4) Aircraft Park
- 5) Museum Buildings and adjacent areas.

These are shown on the plan in Appendix H. (Note that areas of the site referred to in the report are referenced using the grid on this plan.)

1.4.2 Members' Hill

Members' Hill rises steeply from the base level of the site at approximately 15m above sea level to a plateau at 35m. Prior to the building of the Brooklands Motor Circuit here, the hill was within the area of Cane's Wood. The 1811 historic inclosure map for the area indicates that this was probably ancient woodland, from which old trees, wood ants and native bluebells survive. The racing circuit cuts through the hillside at the north-east boundary of the site, and the old finishing straight cuts away at the western slope of the hill. This leaves an isolated, steep-sided knoll shared now by the museum and the neighbouring headquarters of Japan Tobacco. The museum's section of the plateau is largely occupied by the old restaurant buildings, much decayed but now under restoration. The southern slope of the hill is more gentle and nearer the original, and accommodates 'Test Hill' of motor racing history, alongside which is a large area of short grass, edged with trees.

1.4.3 Banking

The banked concrete section of racetrack within the museum grounds is necessarily kept clear of vegetation, and so is of limited wildlife interest, although some animals use it as a basking site. However, the tunnels which run under the track, the air raid shelters alongside it, and the finishing straight have been found to harbour invertebrates and bats, especially during the winter.

1.4.4 Riverside

The banks of the River Wey form the western boundary of the site, and have a rich flora and invertebrate fauna.

1.4.5 Aircraft park

Most of the museum's larger aircraft are parked on an area of flattened rubble, the fringes of which provide a dry, basic environment which has hosted some interesting plants and fungi. Some aircraft have been used as nest sites by birds.

1.4.6 Museum buildings

The museum buildings have attracted several species of mammal, bird, and insect, most of them unwelcome! The environs, which include lawns and flowerbeds, have produced some records, particularly of insects and fungi. The largest area of lawn during the survey was the helipad, which was created fairly recently on top of landfill, and was popular with birds and foxes. The deep hollow between the helipad and the former acoustics building was once planted up as a 'sunken garden', and was also frequented by birds during the survey. Both helipad and sunken garden were removed at the end of 2010 to make way for a bus museum, relocated from its former site in Cobham.

2. Mammals

2.1 Badger (*Meles meles*)

[In order to avoid deliberate persecution of badgers, it is usual practice not to release details of badger sett locations into the public domain. These have therefore been removed from the online version of this report.]

2.2 Bats

Only a limited amount of bat survey work has been possible, comprising:

- Inspections of the interiors of the tunnels and air raid shelters for hibernating bats and evidence of bats, using powerful focused-beam lamps and close-focusing binoculars, on 12 January 2008, 10 January 2010 and 29 January 2011;
- Inspections of the interiors of these and the other built structures on the site at intervals during the survey period;
- Trapping of bats using two harp traps, one set up on the riverside (ref. E4) and one at the top of Members' Hill (ref. E13), between sunset and approximately 2 hours after sunset on 12 August 2008.

Two brown long-eared bats (*Plecotus auritus*) were found hibernating in the former spectators entrance tunnel (ref. D13) in January 2010, and the discovery of small accumulations of moth wings and bat droppings along the edges of the tunnel during each year of the survey indicate that it is also used as a summer feeding roost by small numbers of this species. A few old bat droppings were also found at the western end of the long, narrow building lying north-east of the old restaurant building on Members' Hill (ref. E12).

A total of 12 soprano pipistrelles (*Pipistrellus pygmaeus*) and one common pipistrelle (*P. pipistrellus*) were caught by the river, and another three soprano pipistrelles in the trap on Members' Hill.

Examination of records from the Surrey Bat Group shows that in addition to the above, the following species have been recorded within approximately 2km of the site:

- Daubenton's bat (*Myotis daubentonii*);
- Natterer's bat (*Myotis nattereri*);
- Whiskered bat (*Myotis mystacinus*);
- Nathusius' pipistrelle (*Pipistrellus nathusii*);
- Noctule (*Nyctalus noctula*);
- Serotine (*Eptesicus serotinus*).

The woodland, grassland and especially the river and riverside areas provide good foraging habitat for bats and may be used by any of these species for hunting invertebrate prey. Although the *Myotis* species are averse to high light levels and thus are less likely to occur in the more open areas which are lit at night, darker areas under the tree canopy may be utilised, and Daubenton's bats, which specialise in feeding closely over water, are almost certainly present on the river, having been recorded by RDB and LWh regularly on stretches of the river just north-east of the site.

A number of mature trees, especially those on Members' Hill, have crevices and cavities that could be used by roosting bats, and all of the above species except serotine use trees for roosting. The buildings on the site do not appear to be suitable as roost sites for serotine bats, and noctules roost almost exclusively in trees. However, the possibility of crevices existing in the roofs of some of the buildings that could be used as roosts by the other species (especially pipistrelles) cannot be ruled out without evening emergence/dawn re-entry surveys.

Finally, winter inspection of the disused concrete air raid shelter just north of the large hangar (ref. E10), along with measurements made of temperature and humidity, showed that although no signs of bats were present, the conditions within it were very suitable for hibernating bats. This was borne out by the number of insects, of species often associated with bat hibernacula, overwintering in it (see section 5.3). The shelter is also adjacent to woodland where bats are likely to forage. It is likely that bats are currently deterred from using the structure by the lack of suitable crevices within the structure (the walls being rather smooth) and the fact that it is open at both ends, causing draughts and therefore an unstable temperature regime (hibernating bats require low stable temperatures and high humidity).

2.3 Fox (*Vulpes vulpes*)

In common with most suburban areas of the UK, the site hosts a population of foxes, with staff and surveyors reporting frequent sightings. This includes young animals which indicate that foxes breed on or close to the site, and signs of dens, including a freshly dug den noted by RAA on the southern slope of Members' Hill (ref. G12) on 27 November 2010.

2.4 Small mammals

No systematic survey for small mammals has been carried out, but anecdotal sightings recorded in the volunteers' book include wood mouse (*Apodemus sylvaticus*), vole (unknown species) and brown rat (*Rattus norvegicus*). A dead pygmy shrew (*Sorex minutus*) was found by RAA in the riverside area on 14 April 2010. Finally, barn owl pellets collected from the old restaurant building (ref. F12) at the end of 2007 and analysed by LWh and Derek Smith (a local specialist in mammalian and avian skull morphology) contained bones from water shrew (*Neomys fodiens*), wood mouse, field vole (*Microtus agrestis*) and bank vole (*Clethrionomys glareolus*).

2.5 Other mammal species

Again in common with many areas of woodland/grassland in the UK, the site contains populations of frequently sighted grey squirrel (*Sciurus carolinensis*) and rabbit (*Oryctolagus cuniculus*). Roe deer (*Capreolus capreolus*) have been sighted occasionally (volunteers' book reports 2009-10), and there is one report of mink (*Mustela vison*), sighted in the river by MS.

Molehills across the site, notably by the river, indicate the presence of mole (*Talpa europaea*). No hedgehogs (*Erinaceus europaeus*) have been reported from the site, although as these are small and nocturnal their presence cannot be ruled out.

3. Birds

Thirty-seven visits to record birds were made at monthly intervals between December 2007 and December 2010. The full species lists are provided in Appendix A, along with records from the 1985 ENHS survey. The number of species observed increased from 42 in 2008, including two species of owl for which there was direct evidence of their presence, to 61 in December 2010. This compares with 70 seen between 1989 and 1992 and a further three seen in 1985. Individual counts were at times a little disappointing, not only in terms of species seen but also in the numbers of common species actually seen. Some species were seen only once.

Bird habitat on the site is quite varied, with mature woodland, open short grassland, scrub and unmown grassy areas, large buildings, gravel, concrete hard standings and banking, and the banks and woodland along the river. Magpies, carrion crows, jackdaws, and woodpigeons, are abundant particularly in the wooded area adjacent to the old restaurant. Jays, nuthatches, and both green and great-spotted woodpeckers are also frequently seen in this area. Both pied and grey wagtails were usually present, often on the aircraft park and on buildings. The grey wagtail could sometimes be seen under the vehicle bridge leading into the site from the back of the Mercedes Benz site to the west. There were relatively few warblers, finches, and tits and most of these were in the woodland along the river. Siskin was seen on only four occasions, blackcap six, whitethroat three, and willow warbler and coal tit only once. The relatively rare and elusive lesser-spotted woodpecker was seen three times but is believed to be resident just off site on Wey Meadows. The alder trees along the river are especially attractive to goldfinch and siskin, particularly in winter. Rook has only been seen on two occasions, which is surprising as they can be seen almost every day on either side of Wellington Way. Mallard and moorhen were occasionally seen on the river and on one occasion a mute swan. In March 2009 two buzzards were recorded circling over the site.

Seventeen species recorded between 1989 and 1992 were seen during the present survey. Some, such as treecreeper, would be expected to be still present, as they are known to be in the wider area but others, notably skylark, tree sparrow, corn bunting, spotted flycatcher and yellowhammer are almost certainly no longer present, mainly due to their recent national decline, but also due partly to the degraded nature of the habitat on and around the Brooklands site.

A number of interesting bird sightings were recorded in the volunteers' book. In 2006 Alan Winn saw and photographed a hoopoe. In May 2009 a red kite flew over and was harassed by two crows. These large raptors are spreading out from the Chilterns and together with buzzards may be seen more often in future. Feral pigeons used to frequent the stratospheric chamber but have now been evicted and are fewer in number. A sparrowhawk regularly preyed on them but, with the pigeons gone, it was only seen on four occasions.

Many of the species recorded probably breed in the area. No specific survey for nesting birds was carried out, but there are many dead trees providing nesting sites for woodpeckers. Immature wagtails (both species) and magpies were seen. A blue tit was seen with grubs in its mouth and another nested in the rudder of the Viking aircraft. Starlings were seen nesting in the tail plane of the VC10 and a robin was recorded nesting in the Wellington. It was reported by staff that in previous years swallows had nested in the undercarriage bays of the parked aircraft

but we saw no sign of them breeding. We did not even see a swallow during survey visits but two were seen by RAA near the old restaurant in May 2008.

RAA worked at the Brooklands site between 1978 and 1988 and recalled seeing large numbers of linnets and goldfinches feeding on thistle and weed seeds. Skylarks were singing all day and the runway area was reportedly alive with them. He also recorded spotted flycatcher and reed warbler. Green woodpeckers frequented the lawns and on one occasion wheatears. He also recalled swans with cygnets, moorhens on the river, and a pair of pheasants in 1988.

Most of the common resident and migratory species that can be expected to be seen in this area have probably been recorded during the present survey. Winter thrushes are common in adjacent areas but the Museum site does not have many trees and shrubs with berries to attract them so the ones recorded were probably flying through to richer harvests.

Clearing areas for museum expansion, particularly the work carried out in November 2010 to make way for the bus museum, will have some impact on the bird population. The woodland on top and to the sides of Members' Hill provides a good mixture of mature trees and a fairly dense understorey. This provides a habitat for many species including corvids, nuthatches, woodpeckers and tits and wrens. The trees along the river were the best place to record warblers and finches and winter visitors. The pile of old wood and tree trunks, some of which has been cleared, was frequented by wrens and dunnocks. The light woodland and scrub around the edge of the helipad was good for finches and tits but this has now been removed. Corvids also make use of the grassed areas and banking to feed. The dense line of low vegetation between the banking and the aircraft park also provided food for small birds but this too has been removed.

4. Reptiles and Amphibians

4.1 Reptiles

On 13 April 2009 a total of 14 artificial refugia (0.5m x 1m pieces of roofing felt) were placed in areas of the site most likely to be used by reptiles, namely at the edges of the long grass and scrub along the riverside, by the compost heap in the riverside walk (approx. ref. E3), at the foot of an embankment along the southern edge of the race track covered in rough vegetation and debris, and along the edges of woodland on Test Hill. The refugia were checked for reptiles by RDB and LWh on 25 April, 2 May and 10 May. The only reptile found was a juvenile grass snake (*Natrix natrix*), under the felt by the compost heap on 2 May. Note, however, that the standard methodology for a presence/absence survey requires at least seven visits; unfortunately the weather early in 2009 was unusually warm, with temperatures becoming too high for reptiles to need to bask very early in the morning, making conditions unsuitable for surveying. In addition, many of the refugia were disturbed or removed by museum staff while mowing adjacent grassland etc.

There are also reports from the volunteers' book of grass snake sighted on 6 August and 11 October 2008, and a grass snake was reportedly found in the clubhouse in spring 2008.

There are verbal reports from staff of adders (*Vipera berus*) on the site, but these have not been substantiated, and as this species is particularly sensitive to disturbance from noise and vibration, it is less likely than other common reptile species to occur on this busy site. Viviparous lizard (*Zootoca vivipara*) was recorded during the 1985 survey; there appear to be no records of slow worm (*Anguis fragilis*), but this has been recorded close to the site (RDB/LWh pers. comm.) and may well occur here without being sighted, as this species rarely basks in the open. The site does not provide suitable habitat for the rarer UK reptile species.

4.2 Amphibians

There is no suitable aquatic habitat on the site for amphibian breeding, but similar terrestrial habitat to that used by reptiles (rough vegetation, scrub and woodland edges, dead wood) provides cover, foraging habitat and hibernacula for amphibians. No amphibians were formally recorded during the present survey, but there were single reports in the volunteers' book of common toad (*Bufo bufo*; 18 February 2009) and common frog (*Rana temporaria*; RAA, 14 May 2008). RAA reports that smooth newts (*Lissotriton vulgaris*) were present on the site during the 1980s.

5. Invertebrates

No formal surveys for invertebrates were carried out during the present survey, but species that could be identified were recorded during survey visits. Full species lists are presented in Appendix B.

A major survey of the invertebrates of Brooklands Airfield was undertaken by Jonty Denton and David Baldock in 2003-2004, with a few additional species recorded by DB in 2010: their records are provided in a separate report. They recorded 19 species that are rare, nationally scarce or regionally important, including the rare weevil-hunting wasp *Cerceris quinquefasciata*, a UK Biodiversity Action Plan (BAP) species not previously seen in Surrey for 100 years.

5.1 Coleoptera (beetles)

Six species of ladybird were recorded during the survey. The harlequin ladybird (*Harmonia axyrides*), a recent introduction which is rapidly spreading throughout the UK and outcompeting many of our native species, was by far the greatest in number, with its larvae swarming over willows and riverside plants. It was encouraging to see that good numbers of 7-spot ladybird (*Coccinella 7-punctata*) were able to survive alongside them, as well as some 2-spot (*Adalia bipunctata*). In 1985 three other species were seen.

Stag beetle (*Lucanus cervus*) was recorded during the survey, both adults and larvae, indicating that it is breeding on the site, as are probably many other species that rely on dead wood, given the good quantities of this resource remaining on the site.

The large longhorn musk beetle (*Aromia moschata*) was recorded on the BAe site twice in the 1980s.

5.2 Hymenoptera (bees, wasps, ants etc.)

Seven species of bee and four species of wasp were identified during the present survey. Mining bees were also recorded nesting in the banks of Test Hill in 2008 and 2009: the species were difficult to pinpoint without specialist knowledge, but there seemed to be at least four species present. David Baldock, Surrey bee and wasp expert, hopes to visit the site to investigate these. In the meantime he has identified a number of species from dead specimens passed to him, including *Andrena flavipes*, which has become common only in the last 20 years, now often occurring in great numbers; *Nomada marshamellia*, a cleptoparasite on another species of *Andrena* which has not been recorded on the Brooklands site before; *Nomada fucata*, the cuckoo bee of *Andrena flavipes*; and *Sphecodes ephippius*, a common cleptoparasite of some *Lasioglossum* species;

Of the three species of ant recorded, the most notable is the southern wood ant (*Formica rufa*), a large species classified as Near Threatened globally but with strongholds in the southern counties of England. A large colony was noted on Members' Hill, with at least seven separate nests. Material for the above-ground part of some of these nests seems to be dead needles from

a large cedar tree. Nests seem to persist in the same places, and the above ground part is rebuilt in spring after woodpecker damage during the winter, when the ants are dormant. One nest is inside the trunk of a dead oak, others are by a step on Test Hill, by the cedar, by an isolated dead tree, by the 'Brooklands Oak', and under the gun emplacement. There are two at the bottom of the hill above the Finishing Straight. This colony may have been isolated since the building of the track, in the remains of Cane's Wood. Dr John Pontin, Surrey's ant expert, was not aware of it until informed recently, and he hopes to visit it.

5.3 Lepidoptera (butterflies and moths)

The site provides several good overwintering sites for a range of lepidoptera, namely the herald moth (*Scoliopteryx libatrix*), buttoned snout moth (*Hypena rostralis*), peacock butterfly (*Inachis io*), and small tortoiseshell butterfly (*Aglais urticae*). These overwinter in the spectators' entrance tunnel (ref. D13), the single tunnel (ref A7), air raid shelters (ref. E10 and also three brick shelters on the race track banking, ref. C11-12), and the underground bunker on Members' Hill. Although the other three species are relatively common, the buttoned snout is nationally scarce (Nb), although once familiar in hop (*Humulus lupulus*) fields, where its larva was known as the 'hop dog'. There are enough hops on the site to support a population, but only a few of the moths were found in the winter; however, they are small and black and can be difficult to spot.

There are usually large numbers of herald moth in early autumn, but many seem to move off by the end of the year, particularly from the three shelters on the banking. The greatest number of wintering herald moths recorded here in one day was 61, on 29 October 2008. This moth is associated with poplar (*Populus* spp.), aspen (*Populus tremula*), and willows (*Salix* spp.).

The number of peacock butterflies seems to stay fairly constant throughout the winter period, at around ten. Peacock larvae feed on nettles, which are plentiful on the riverbank, although none has been seen recently. A few small tortoiseshell butterflies were recorded over the winter of 2007-8, but none since. There has been a collapse of the population nationally in recent years, possibly due to a migrant predator. The earliest date recorded for the start of overwintering was 3 September 2008, and the latest emergence 16 April 2008.

The severed wings of some large moths have been found in the spectators' entrance tunnel and the shelter north of the hangar. Those in the tunnel are mostly of old lady moth (*Mormo maura*), plus a few red underwing (*Catocala nupta*) and large yellow underwing (*Noctua pronuba*). This is likely to be the work of brown long-eared bats (see section 2.2). During 2009 the floor of the hangar shelter became littered with the wings of large yellow underwing and lesser yellow underwing (*Noctua comes*).

Several species of butterfly were seen during the two summers of the survey. The decreasing common blue (*Polyommatus icarus*) was recorded on its food plant, birdsfoot trefoil (*Lotus corniculatus*), on the edge of the aircraft park. Gatekeeper (*Pyronia tithonus*) and comma (*Polygonia c-album*) patrolled the riverside, and speckled wood (*Pararge aegeria*) are now seen for many months wherever there are a few shading trees. A major invasion of painted lady (*Cynthia cardui*) in 2009 was seen here, as elsewhere in Britain and beyond.

Few butterfly or moth larvae were noticed, but those of the mullein shark moth (*Cucullia verbasci*) were hard to miss, being large and colourful and devastating the mullein plants on the

edge of the banking and aircraft park. This species, although fairly common in Surrey on the chalk of the North Downs, is rare further north in the county.

No moth trapping was carried out during the survey, but an indication of the other moths likely to be found here might be gained from records for the BAe factory site during the 1980s (see Appendix B).

5.4 Odonata (dragonflies and relatives)

Seven species of Odonata were recorded during the present survey: the river is alive with dragonflies at times during the summer, particularly with the banded demoiselle, and some wander to far corners of the museum site. The downy emerald was recorded here in 1985.

5.5 Ephemeroptera (mayflies)

Two mayfly species were recorded, with a large emergence of an *Ephemera* sp. observed on 6 May 2009.

5.6 Neuroptera (lacewings and relatives)

No neuroptera were recorded between 2007 and 2010; two species were recorded in 1985.

5.7 Diptera (flies)

Lack of specialist knowledge restricted the recording of flies. Among the seven species recorded were the very large hornet-mimic *Volucella zonaria*, which has only recently arrived in Surrey, and can be seen at flowers. Bee-fly (*Bombylius major*), a parasite of bees, was seen in large numbers at the mining- bee colony on Test Hill. *Culiseta annulata* is the largest British mosquito and has a vicious bite; this was found in quantity in the air raid shelter north of the hangar. Also found here was the drone-fly *Eristalis tenax*, a honey-bee mimic which overwinters in cool damp places such as this. A further three species were recorded in 1985.

5.8 Hemiptera (true bugs)

Only a single incidental record was collected during the present survey: forest bug (*Pentatomes rufipes*).

5.9 Dictyoptera (cockroaches and relatives)

Dusky cockroach (*Ectobius lapponicus*), a small, native species, was the only member of this group recorded.

5.10 Arachnida (spiders and relatives)

Only one species was recorded during the present survey, namely the daddy longlegs (*Pholcus phalangioides*). Nine species were recorded in 1985.

5.11 Mollusca (molluscs)

Five species of slug and snail were recorded during the present survey, compared with six in 1985.

5.12 Crustacea (crustaceans)

No crustaceans were recorded in the present survey; five species of woodlouse were recorded in 1985.

5.13 Chilopoda (centipedes)

No Chilopoda were recorded during the present survey, but three species were recorded in 1985.

6. Galls

A gall is an abnormal development of a plant or other host organism induced by another, usually parasitic, species, and provides both shelter and nutrients to the causer. Some galls, such as the common oak marble, induced by the gall wasp *Andricus kollari*, are familiar and well known, but there are many others to be found on shrubs and trees as well as numerous herbaceous plants and some fungi. They are caused by a wide range of organisms, including various insect groups, mites, nematodes, fungi, bacteria and even some viruses. Many represent highly evolved relationships and they are hence strictly host limited, their existence entirely dependent on the presence of the host plant. Many other organisms occur in association with galls or their causers, as inquilines and parasitoids, so that galls are of considerable ecological importance. In most cases galls are distinctive and unique structures, so that the causer can be identified by the gall it induces. However, their associated organisms require specialist study and have not yet been investigated at Brooklands.

As with other groups, only a few of the species which will be present at Brooklands have been recorded so far. All those listed are frequent. Notable is the gall wasp *Andricus aries*, which induces the distinctive ramshorn gall of oak buds. It is a recent colonist in Britain, first found in Berkshire in 1997, fairly common now at least in the south-east, and probably still spreading. Two others, *A. lignicola* and *A. quercuscalicis* are also introductions to Britain, though have been here for a much longer period of time. These and most other cynipids, including the common *Neuroterus* species listed, are of interest in exhibiting an alternation of generations, involving separate agamic and sexual stages. Each of these stages induces different galls, although in *A. aries* only the agamic generation is known. In some cases, these generations occur on different oak species. In *A. kollari*, *A. lignicola* and *A. quercuscalicis* the sexual generation occurs on *Q. cerris* (turkey oak), forming small bud galls in the first two species and catkin galls in *A. quercuscalicis* though these are much less often recorded. There are several other recent gall-wasp colonisers in Britain and these, as well as the many other oak-associated species known here should be searched for on the site.

A list of the gall-causing organisms identified on the site is provided in Appendix C.

7. Vascular Plants

The variety of habitats on the site supports a range of vascular plant species, with over 200 species recorded (listed in Appendix D). Although the majority of these are common and widespread, two nationally notable species occur. One is greater dodder (*Cuscuta europaea*), a nationally scarce parasitic plant most commonly growing on common nettle (*Urtica dioica*), but on the Brooklands site growing also on hops and tansy along the riverbank. The other is yellow vetchling (*Lathyrus aphaca*), classed as nationally vulnerable. These and other species relatively little recorded in Surrey are listed in Table 1.

Table 1 – Notable species of vascular plant recorded

Scientific name	Common name	National status*	No. of Surrey (Vice County 17) tetrads†	Location on Brooklands site
<i>Carex vesicaria</i>	Bladder-sedge	LC	28‡ (Scarce)	G4, H4
<i>Cuscuta europaea</i>	Greater dodder	Scarce	35 (Scarce)	C3,D3, H4, I4
<i>Echium vulgare</i>	Viper's bugloss	LC	32‡	E6, F6
<i>Geranium rotundifolium</i>	Round-leaved crane's-bill	LC	54	E6, F6
<i>Hyacinthoides non-scripta</i>	Native bluebell	LC§	Widespread	D12, E13
<i>Lathyrus aphaca</i>	Yellow vetchling	Vulnerable	17	C4, C5
<i>Lepidium heterophyllum</i>	Smith's pepperwort	LC	14 (approx.)	C5
<i>Malva neglecta</i>	Dwarf mallow	LC	53	E6, F6
<i>Onopordum acanthium</i>	Cotton thistle	LC	11‡	D6, E5, E6
<i>Polypodium vulgare</i>	Polypody	LC	102 (but less common in N. Surrey)	D13 (on wall above spectators' tunnel entrance)
<i>Sagina apetala</i>	Annual pearlwort	LC	17	D5, E5
<i>Salvia verbenaca</i>	Wild clary	LC	18 (Scarce)	E6
<i>Valerianella locusta</i>	Common cornsalad	LC	25	C3, H4

* Cheffings, C. & Farrell, L., Eds (2005). *The Vascular Plant Red Data List for Great Britain*. JNCC, Peterborough. LC = least concern.

† 2km x 2km squares.

‡ Brooklands Museum record = first record for hectad (10km x 10km square).

§ But legally protected under the Wildlife & Countryside Act (1981).

Three invasive introduced species were found growing by the riverside, namely giant hogweed (*Heracleum mantegazzianum*), Japanese knotweed (*Fallopia japonica*) and Indian (or Himalayan) balsam (*Impatiens glandulifera*).

8. Trees

The tree species recorded on the site are listed along with other vascular plant species in Appendix D, but further details of the trees are also provided in Appendix E.

Trees, especially native species, are of immense ecological importance through all stages of their life cycle, forming essential partnerships with large numbers of fungi and many invertebrates, and providing food and shelter to huge numbers of organisms. They provide a direct food source for numerous invertebrates which in turn provide food for birds, bats and other species. Dead wood is also invaluable, either standing or fallen, trunks, branches and twigs, and many good examples were found on the site. Native trees generally support more species of insect, but even evergreen exotics provide roosting and nesting sites for birds and roosting sites for bats, and the needle litter from the cedar proved useful for various fungi and insects. Hence, all the trees on the museum site might be considered to have some value for wildlife, as a source of food, shelter, or both.

Trees are represented at Brooklands by a good range of species as detailed below, including an ancient oak and others which are remnants of ancient woodland. As in Britain generally, they can be divided into three categories;

- Native species, capable of self- propagation,
- Naturalised species, historically introduced but proving able to reproduce here,
- Exotic species, usually reliant on being planted.

On the museum site, the following species were recorded during the survey period:

Native:

Acer campestre (field maple), one planted example here.

Alnus glutinosa (common alder), in damp situations, often coppiced.

Betula pendula (silver birch), seeding very freely in sandy places.

Corylus avellana (common hazel), usually a shrub, or coppice stool.

Fraxinus excelsior (common ash), not so common in dry sandy situations.

Populus tremula (aspen), short-lived, suckers freely, creating thickets.

Quercus robur (English oak), seeding freely.

Salix cinerea (grey willow), in damp situations, bushy.

Salix fragilis (crack willow), in damp situations, often pollarded, or splitting.

Naturalised:

Ulmus procera (English elm), a very early introduction, but only reproduces by suckering, hence its vulnerability to disease through lack of genetic variation.

Rhododendron ponticum, usually a shrub, *R. ponticum* was often used in Victorian times as a rootstock for cultivars, but is now colonising large areas in its natural form, and is often the subject of eradication programmes.

Castanea sativa (sweet chestnut), probably a Roman introduction, setting seed in warmer areas.

Acer pseudoplatanus (sycamore), possibly a Roman introduction, very freely seeding.

Quercus cerris (turkey oak), introduced in 1735, now rampant on sandy soils, sometimes the subject of eradication programmes on Surrey heaths.

Exotic:

Cedrus libani (Cedar of Lebanon), introduced in the 17th century, but nearly all existing British trees date from after a severe frost in 1740.

Populus x canadensis (hybrid black poplar), a cross between European and American poplar species, bred since 1750.

Araucaria araucana (monkey puzzle), introduced from Chile in 1792, produces suckers, and very occasionally seeding.

Thuja plicata (western red cedar), introduced from NW America in 1853, a huge forest tree, there. Said to be sometimes capable of self-seeding.

Most of the older trees are on Members' Hill. Many are remnants of Cane's Wood, probably ancient woodland, which covered the hillside prior to the building of Brooklands Motor Racing Circuit at the beginning of the 20th century. They include several English oaks and sweet chestnuts, including one of the largest oaks in Surrey, an ancient tree with centuries of history as detailed in Appendix E. Some of these trees may have lined the former driveway from Brooklands Road to the present Brooklands House. The large cedar tree by the footbridge is a remnant of the garden of the first Brooklands House, late 18th century, and survives miraculously in its precarious position. The willows and alders beside the River Wey are also likely to have been present before the track was built, and been subject to management.

Some trees were probably planted during the period when motor racing took place, 1907-1939. A monkey puzzle survives on the south-east side of Members Hill, but another at the top of Test Hill has gone. Two western red cedars remain on Members Hill; there are also two short rows of them near the river, probably planted for shelter or screening.

During and after World War 2 the site was within the bounds of an aircraft factory, when little effort was made to control scrub growth in places where it did not interfere with the running of the business. The legacy of this is an assortment of slender native trees.

It is understood that the whole site is covered by a Tree Preservation Order. This restricts the unauthorised removal of live trees with a diameter of less than 75cm, as measured at 1.5m high on the trunk.

9. Fungi

Fungi are amongst the most diverse and numerous of all organisms, ubiquitous in occurrence, and key components of ecosystems. They are the main agents of decay and nutrient recycling and, in forming mycorrhizal associations with plant roots, are essential to plant health and development. They play many other essential roles, notably as endophytes, and as a food source for a wide range of organisms. They also include lichens, which represent an intimate association between a fungus and an alga or cyanobacterium to form distinctive thalli. Fungi outnumber plants nationally and worldwide by at least 6:1, a ratio which in limited areas such as at Brooklands rises to at least 8:1. It is likely, therefore, that at least 2000 species occur at Brooklands. Many of these require specialist study, so that a full survey of the site would take many years.

During the survey, approximately 230 species of fungus were recorded on the museum site (see Appendix F for full list; common names used in this chapter follow Holden *et al.* (n.d.). *Recommended English names for fungi in the UK*. Plantlife.) These are mainly macrofungi, those with larger fruitbodies, which are the normal focus in a limited survey but represent only a fraction of the total fungal species present. Most of those which occur will be microfungi, present in immense numbers and often requiring specialist study. Many species of lichenised fungi also occur on the site. The present survey has not attempted to include these but a few of the common and distinctive species have been noted.

An initial survey for fungi was carried out by RAA on 28 October 2007 when 43 species were recorded. This was followed by a more thorough search by BMS, MP, and RAA on 4 November 2007, when a further 127 species were added. BMS and MP added another 18 species during a visit on 20 May 2008. A further 46 species were recorded by RAA in the course of regular visits throughout 2008 and 2009, plus 9 more in 2010, and one added in January 2011. Seventeen species had been recorded during the 1985 survey; only five of these were not recorded again, none of them uncommon, and possibly overlooked this time. There appear to be no earlier records confirmed from the site, but five collections from 'Brooklands' or 'Brooklands Wood' are preserved in the collections at Kew. They include two species, the milk-caps *Lactarius rufus* and *L. turpis*, not found in the present survey. Fourteen of the fungi so far recorded are considered uncommon, scarce, or little known (see Table 2 for details).

The greater part of our records is from Members' Hill, where many of the fungi are mycorrhizal partners with trees, especially the oaks. These include some boletes, notably *Boletus radicans* (rooting bolete), *Boletus edulis* (cep), and *Boletus rubellus*. *Leccinum duriusculum* (slate bolete) was found in 2009 beneath a small group of aspens. The polypore *Gloeoporus dichrous*, only recently recorded in Britain, was found on fallen oak wood. Three interesting fungi fruited beneath the old cedar; the spring-fruited *Geopora sumneriana* (cedar cup), the uncommon *Amanita gemmata* (jewelled Amanita), and *Lepiota ochraceofulva*. Another uncommon fungus, *Rhodocybe gemina*, was found in 2009 in composting leaf litter behind the old restaurant.

The grass slopes beside Test Hill hosted a number of interesting species. Several species of *Russula* (brittle caps) occur in mycorrhizal association with the trees in this area, but most of those recorded were grassland fungi. These included the wax-caps *Hygrocybe miniata* (vermillion waxcap) and *Hygrocybe virginea* (snowy waxcap), *Calocybe gambosa* (St George's mushroom), *Clitocybe geotropa* (trooping funnel), *Cystoderma amianthinum* (earthy

Table 2 – Notable species of fungus recorded

Species	National status*	No. of records†	Surrey	Location on Brooklands site
<i>Agaricus comtulus</i>	O	4		D4
<i>Amanita gemmata</i>	!	10		C12
<i>Caducirostrum foliicola</i>	-	-		H8
<i>Dermoloma cuneifolium</i>	O	26		H11
<i>Gloeoporus dichrous</i>	!	14		D11
<i>Hebeloma fragilipes</i>	!	3		D10
<i>Leccinum duriusculum</i>	O	16		F11
<i>Lepiota ochraceofulva</i>	!	5		C12
<i>Melanoleuca phaeopodia</i>	-	-		D6
<i>Mycena citrinomarginata</i>	!	2		E13
<i>Phloeosporella</i> sp.	-	-		B6
<i>Pluteus hispidulus</i>	O	27		E13
<i>Pseudomassaria</i> sp.	-	-		C10
<i>Rhodocybe gemina</i>	!	25		E13

* Checklist of the British & Irish Basidiomycota (Kew). C = common, O = occasional, R = rare, ! = present but frequency unknown, ? = reported but doubtful or uncertain.

† From FRDBI (Fungus Records Database of Britain & Ireland).

powdercap), *Entoloma sericeum* (silky pinkgill), *Stropharia inuncta* (smoky roundhead), and *Dermoloma cuneifolium* (crazed cap). The latter is notable, an uncommon species indicative of unimproved grassland, one of a suite of species of such habitat which include the *Hygrocybe* and *Entoloma* species. The mildly poisonous *Agaricus xanthoderma* (yellow-staining mushroom) occurred in profusion in 2009, and was also recorded in the same location during the 1980s. The grass areas around the buildings, the aircraft park, and beside the river have produced most of the other macrofungi records.

Several species of *Agaricus* ('true mushrooms') have been found. *Agaricus campestris* (field mushroom) was abundant in October 2009, and was also recorded here in the 1980s. Note that the poisonous white *Clitocybe rivulosa* (fool's funnel) also occurs in groups in the short grass beside the aircraft park! The uncommon *Agaricus comtulus* was found in the riverside grass in 2009. A single *Stropharia coronilla* (garland roundhead) and a few *Hygrocybe conica* (blackening waxcap) have been recorded from the lawns south of the clubhouse.

One of the most obvious displays of fungus during the period of the survey has been that of *Armillaria* species, the 'honey fungus' dreaded by gardeners. Great numbers of fruit bodies have been visible on the narrow stretch of grass and trees beside the Wellington Hangar, and on the east side of the aircraft park. These must be associated with roots of trees or shrubs that have been lost. (Perhaps disposal of any soil from these sites should be done with care!). On the eastern edge of the aircraft park several specimens of a large brown fungus appeared in 2008 amongst the *Armillaria*. These proved to be a species of *Melanoleuca*, similar to dark forms of

M. polioleuca sometimes referred to '*M. phaeopodia*', and in need of further study. Some fungi managed to emerge through the rubble of the aircraft park, from wood buried beneath it. Large clumps of *Coprinopsis atramentaria* (common inkcap) were visible in 2009, along with the more familiar *Coprinus comatus* (shaggy inkcap).

Amongst the microfungi recorded during the survey, most, as would be expected, are common saprotrophs occurring widely on plant litter, although some plant parasitic species have been noted. These include formers of leaf spots which are mainly strictly host limited. Amongst those most of interest are a species of *Pseudomassaria* on *Gaultheria* leaves known from only one or two other localities and apparently an undescribed species. A leaf parasite of *Oenothera*, *Phloeosporrella* sp., is similarly unknown and would repay further study.

10. Recommendations

It is recommended that wildlife conservation management is included within the aims and mandate of the Brooklands Museum, or at least in the official work plan for the site endorsed by the board of trustees, although recognising that measures to protect the cultural heritage of the site must in general take precedence over wildlife conservation.

With this in mind, provided in the following sections are some specific suggestions for targeted wildlife conservation measures to be included in a Biodiversity Action Plan for the Brooklands Museum site.

10.1 Important areas for conservation

The following areas of semi-natural habitat should be retained and managed for their wildlife value if at all possible (and see Tables 1 and 2 for precise locations of notable plants and fungi).

10.1.1 Remnant of old woodland on the south slope of Members' Hill

The woodland, with the ancient oak at its heart and its characteristic ground flora, and especially mature trees should be retained. Wherever possible, dead and dying wood should not be removed from trees in order to provide cavities for use by bats, birds and other fauna. Where wood needs to be removed for health and safety reasons, it should be retained as log- and brush-piles, with stumps retained in situ and some larger logs buried to provide habitat for the larvae of stag beetles and other invertebrates.

10.1.2 Dry acidic to neutral grassland on the slope of Test Hill and near the hangars

The grassland on Test Hill should be retained, and if possible cut less frequently and to a greater cutting height to provide a taller sward in which more plant species can flower, and which provides cover for fauna including nesting birds and reptiles. Also to encourage reptiles, a graded edge to the woodland could be provided by scrub planting interspersed with brush and log piles, to provide cover from which animals could come out to bask on the hillside. The sandy banks lining the track on Test Hill provide valuable habitat for invertebrates and should be preserved if possible.

10.1.3 Remnant of scrubland behind the hangars and towards the race track

This transient and unstable habitat is becoming very rare in southern England, so even small areas should be retained as far as possible.

10.1.4 Riverside area

Riparian vegetation should be allowed to grow freely as it does at present, and in order to encourage wildlife, including reptiles, it is recommended that adjacent areas of short grass are mown less frequently and the sward cut to no less than 10cm high.

10.2 Important species for conservation

Targeting of the following species for conservation is recommended, with priority given to the first four (asterisked). These four are legally protected (see section 10.3 and Appendix G), and some additional suggestions for conservation measures are provided for them in addition to those in section 10.1.

10.2.1 Bats*

The spectators' entrance tunnel should be left as undisturbed as possible, especially during the winter months (November-March) when bats use the site for hibernation. Night-time illumination of the site should be avoided – in particular in areas of water, woodland and rough or flower-rich grassland likely to be used by nocturnal fauna such as bats, and around structures that are or may potentially be used by roosting bats. Where lighting is required for safety or security purposes, adaptations such as motion-activated lighting should be considered.

The following additional measures could be considered to enhance the site for bats if resources allowed, and if the measures did not compromise the cultural heritage of the site:

Features such as bat bricks could be provided high up on the internal walls of the spectators' entrance tunnel, to provide additional roost crevices for hibernating bats.

The northern air raid shelter could be made suitable for hibernating bats by sealing off one entrance, and again providing crevices for roosting within. Measures would also need to be taken to prevent human disturbance, for example by fitting a lockable grille. (RDB and LWh can provide detailed guidance on these measures if required.)

10.2.2 Grass snake*

Compost heaps should not be disturbed between June and September, when grass snake eggs may be present, and log and brash piles should be left undisturbed during the winter (late October to early April) as these may be used by hibernating reptiles and amphibians among other fauna. It is recommended that additional compost heaps, and brash and log piles are created for this purpose, in particular along the riverside and at the edge of the adjacent grassland, but also along other woodland edges.

10.2.3 Stag beetle*

As an alternative to burying whole logs to provide decomposing wood habitats for the larvae of this species, a drum or a deep wooden box filled with untreated deciduous wood chips can be buried in the ground (see <http://www.ptes.org/> for details).

10.2.4 English bluebell*

Areas of native bluebell within the woodland should be maintained through selective clearing of bramble and bracken in the more open areas, although some scrub is beneficial for wildlife and should be retained.

It is also advisable that any hybrid or Spanish bluebells removed from the woodland on the site are disposed of carefully so that they cannot be propagated elsewhere (see <http://www.plantlife.org.uk/uploads/documents/Blubells-for-Britain-report.pdf>), as native

bluebell populations are increasingly under threat from hybridisation with the non-native species.

10.2.5 Greater dodder

Retain scrubland habitat, especially along the river.

10.2.6 Yellow vetchling

Retain grassland edge towards the river.

10.2.7 Bladder sedge

Retain grassland towards the river.

10.2.8 Wild clary¹

Retain dry grassland.

10.3 Additional suggestions

The following measures may be considered if resources for siting, capital outlay and management permit:

- 1) A small wildlife pond;
- 2) A small area of wildflower meadow (maximum size about 140 square metres);
- 3) Planting of native nectar-rich and berry-bearing shrubs;
- 4) Erection of information boards for visitors and volunteers, describing the wildlife features of the site, and the measures carried out by the museum to conserve wildlife.

Items 1-3 above would generate insects and fruit, providing additional food resources for birds, bats and other fauna.

¹ However, it is understood that the area in which this plant was found may have had to be removed to make way for development.

11. Specific legal considerations

11.1 Protected fauna

Bats, reptiles, nesting birds and badgers are all legally protected (see Appendix G for details). The following measures should be taken to ensure that this legislation is not contravened during site management/development:

- Removal or illumination of, or works to, any structures which support or have potential to support roosting bats, including buildings and mature trees with holes, cracks, splits, flaking bark or dense ivy, should be preceded by a survey for roosts by a suitably qualified person. Where bat roosts would be disturbed or destroyed by the work, a derogation licence may be needed from Natural England.
- Works to trees, scrub and other structures where birds could nest should be avoided during the nesting season (generally March to August inclusive). If such work has to be carried out during this period, a survey for active nests should be carried out by a suitably qualified ornithologist: if an active nest is found it must be left undisturbed until the young have fledged.
- Advice should be sought from a suitably qualified ecologist if works are planned which could affect the badger setts on the site: again, a derogation licence may be needed from Natural England.

11.2 Invasive species

Japanese knotweed, Himalayan balsam and giant hogweed are controlled, and it is illegal to cause them to spread (see <http://www.environment-agency.gov.uk/business/sectors/31364.aspx> for details). If any work is to be carried out which could cause this, such as attempted removal of the plants, advice should be sought from a suitably qualified contractor, who can provide a management plan to ensure that the plants are removed efficiently and plant material that could act as propagules is disposed of legally.

Appendix A

Birds recorded by ENHS members at Brooklands Museum 1985-2010

1985

10.3.85
Goldcrest
Goldfinch
Great tit pair
Green woodpecker
Kestrel (nesting pair)
Robin
Skylarks on field
Wood pigeon
Wren
28.4.85
Redstart
Great spotted woodpecker
Willow warbler
Long-tailed tit
Great tit
Nightingale
2.6.85
Long-tailed tit
Nightingale

2007

Species	5.12.07	19.12.07
Barn owl	1	1
Black Headed Gull		
Blackbird	1	9
Blackcap		
Blue Tit	1	20
Carrion Crow	1	11
Chaffinch	1	3
Chiffchaff		
Collared Dove		1
Common Gull		
Cormorant		1
Dunnock		1
Feral Pigeon		1
Fieldfare		
Goldfinch		3
Great Tit		15
Greenfinch		1
Green-woodpecker		
Grey Wagtail		2
Great Spotted Woodpecker		3
Herring Gull		
Jackdaw	1	3
Jay	1	3
Lesser Black Backed Gull		
Long tailed tit		
Magpie	1	32
Mallard		2
Mistle Thrush	1	
Moorhen		
Nuthatch		2
Pied Wagtail	1	1
Redwing		
Ring-necked Parakeet		7
Robin	1	6
Song Thrush		1
Sparrowhawk		
Starling		42
Swift		
Tawny Owl (note)		
Willow warbler		
Woodpigeon	1	20
Wren		

2007-8

Species	5.12.07	19.12.7	12.18	6.2.8	9.4.8	16.5.8	18.6.8	23.7.8	22.8.8	26.9.8	19.11.8	22.11.8
Barn Owl*	1	1										
Black Headed Gull				1				31			6	2
Blackbird	1	9		3	7	14	2	9	1		3	
Blackcap								1				
Blue Tit	1	20		9	8	6	5	16	1	5	3	3
Carrion Crow	1	11		7	7	11	8	5	10	3	16	14
Chaffinch	1	3		1	3	7	1					
Chiffchaff					1		1					
Collared Dove		1				5		5	3			
Common Gull						2	1	4	3			
Cormorant		1		1			1					
Dunnock		1			2							
Feral Pigeon		1		5	2			2	1		1	
Fieldfare											1	2
Goldfinch		3		6		4	2	5				
Great Tit		15		5	8		1	4	1	1		
Greenfinch		1				1	2					1
Green Woodpecker					1			4	1	3		
Grey Wagtail		2	1	1				2		3		
Great Spotted Woodpecker		3		1	2	5	1	4				1
Herring Gull							1			4		
Jackdaw	1	3		4	11	1	3	5	1	5	6	7
Jay	1	3				1	2	7		8		2
Lesser Black Backed Gull				1								
Long-tailed Tit					2							
Magpie	1	32		12	8	7	14	13	13	15	12	12
Mallard		2			2	2	1					

Species	5.12.07	19.12.7	12.18	6.2.8	9.4.8	16.5.8	18.6.8	23.7.8	22.8.8	26.9.8	19.11.8	22.11.8
Mistle Thrush	1		1	3							1	
Moorhen												1
Nuthatch		2		1								
Pied Wagtail	1	1			1	3	3		4	2		
Redwing				2								
Ring-necked Parakeet		7		1		2			3	4	2	1
Robin	1	6		4	6	6		4	5	4	1	1
Song Thrush		1			1	2						
Sparrowhawk				1								
Starling		42		5	2	13	10		3		9	1
Swift						1	14					
Tawny Owl*												
Willow warbler					2							
Woodpigeon	1	20		4	7	13	8	9	9	6		7
Wren				1	5	10	5	2		1	1	

*Fresh pellets found in the old restaurant were from a barn owl. A night security guard has reported hearing a tawny owl on most nights.

2008-9

Species	15.12.8	15.1.9	16.2.9	16.3.9	20.4.9	29.5.9	22.6.9	23.7.9	18.8.9	17.9.9	12.10.9	16.11.9	17.12.9
Barn Owl*													
Black Headed Gull	5	2			4								3
Blackbird	10		1	2	7	10	10	7	3	1	1	5	4
Blackcap					2	3	2						
Blue Tit	11	3	10	8	16	18	21		9	21	7	11	17
Buzzard				2									
Canada Goose				2									
Carrion Crow	16	18	19	21	11	12	11	14	13	14	38	30	49
Chaffinch	4		7	1	2	4			1	2			6
Chiffchaff				1	1	1	2		1				
Collared Dove	1	1				2	2		2				1
Cormorant				1	1	1	1	1	1		1		
Dunnock			2		2		1				2		2
Feral Pigeon	1	1	9	3	14	8	1	3	1	5	4		1
Fieldfare	2												
Goldcrest	2		1										2
Goldfinch		11	5	2	15	1	2	5	1		4		28
Great Tit	7	7	10	7	4	8	1	2	3	6	3	6	10
Greenfinch		3	4		1	2	3	5					2
Green Woodpecker				2	4	3	1	2	5		2		2
Grey Heron					1	1					1		1
Grey Wagtail					1	3		1					
Great Spotted Woodpecker	2	3	3	3	1	3	5	4	1	1	1	1	3
Herring Gull											2		
House Martin										15			
House Sparrow			2										
Jackdaw	3	16	2	6	7	2	15	2	8	25	22	16	26

Species	15.12.8	15.1.9	16.2	16.3	20	29.5	22.6	23.7	18	17	12.10.	16.11	17.12.9
Jay	1	1	1	1	1	8	6	5	6	3	6	6	1
Kestrel												1	1
Lesser Spotted Woodpecker										1			1
Lesser Black Backed Gull									1				
Linnet													3
Long-tailed Tit		5	10	5	3	1			12	4		5	8
Magpie	18	22	13	19	12	14	14	9	10	19	15	14	19
Mallard				2	4						5	6	2
Mistle Thrush		2								4			
Moorhen	1	1						1			1		1
Nuthatch	2			1	5		2	1	5	3		1	
Parakeet sp.										1			
Parrot sp.								1					
Pied Wagtail		1	1	3	2	3	4				1	6	
Redwing	2		1	6								2	5
Ring-necked Parakeet	4	4	3	4	3	1	2	9	2	19	11	8	6
Robin	3	3	6	5	9	5	5	3	5	7	6	3	6
Rook				2							1		
Siskin	7				2								13
Song Thrush						3	2	1					
Sparrowhawk			1		1					1			
Starling		1	4	6	7	16	27			1	1	8	1
Swallow													
Swift							6						
Tawny Owl*			1										
Whitethroat						3	2						
Willow warbler													
Woodpigeon	20	4	16	13	19	13	21	15	9	24	18	17	26
Wren	2		2	4	10	7	10	3	1		1	1	

Species	23.1.10	23.2.10	16.3.10	12.4.10	18.5.10	23.6.10	14.7.10	27.8.10	17.9.10	14.10.10	15.11.10	15.12.10
Whitethroat					3							
Willow warbler												
Woodpigeon	23	25	12	25	20	6	19	22	15	12	11	14
Wren		1	2	12	13	8	5	1		2	1	1

Appendix B

Invertebrates Recorded by ENHS Members at Brooklands Museum 1985-2010

(See also Appendix C: Gall Causers)

Coleoptera

2007-2010

Adalia bipunctata (Two-spot Ladybird) 11/6/08, 6/5/09, 19/6/09, 21/6/09, 10/7/09, & 1985
Adalia 10-punctata (Ten-spot Ladybird) 4/11/07
Athous haemorrhoidalis (Click Beetle) 20/5/08
Calvia 14-guttata (Cream-spot Ladybird) 13/4/09 riverside (photo L. Whitfield)
Coccinella 7-punctata (Seven-spot Ladybird) 4/11/07, 11/6/08, 5/7/08, 13/4/09, 6/5/09,
 19/6/09, 21/6/09, 10/7/09, 11/9/09, 31/1/10, 14/4/10.
Halyzia 16-guttata (Orange Ladybird) 11/6/08 Test Hill
Harmonia axyridis (Harlequin Ladybird) 4/11/07, 11/6/08, 5/7/08, 6/5/09, 19/6/09,
 21/6/09, 10/7/09
Lucanus cervus (Stag Beetle) 11/6/08 with abdomen removed. 15/10/08 probable larvae in
 logs, riverside (M. Strick). 21/6/09 wing cases by triple-tunnel entrance.
Phyllopertha horticola (Garden Chafer) 19/6/09 helipad
Rhagonycha fulva (Soldier Beetle) 5/7/08
Strangalia maculata 21/6/09 riverside

1985

Cantharis fusca
Cantharis rustica
Cionus scrophulariae
Cychrus caraboides var. *rostratus*
Exochomus quadripustulatus (Pine ladybird)
Harmonia 4-punctata var. *16-punctata* (Cream-streaked ladybird) on oak
Malachius bipustulatus
Phyllobius pomaceus
Propylea 14-punctata (14-spot ladybird)
Pterostichus niger
Aromia moschata This large longhorn Musk Beetle was recorded on the BAe site by RAA twice
 in the 1980s., on 27/8/84, and 15/7/86.

Hymenoptera

2007-2010

Bees

Apis mellifera (Honey Bee) 11/6/08, 5/7/08, 30/5/09

Bombus lapidarius (Red-tailed Bumblebee) 10/7/09 19/6/09 & 1985

Bombus lucorum (White-tailed Bumblebee) queens, 25/9/08, 13/4/09

Bombus pascuorum (Common Carder -bee) 20/5/08, 11/6/08, 5/7/08, 6/5/09, 19/6/09,
10/7/09, 7/8/09

Bombus pratorum (Early Bumble-bee) nest disturbed on banking edge 26/5/10

Bombus terrestris (Buff-tailed Bumblebee) queen, 4/11/07, 20/5/08, 3/4/09, 13/4/09, dead queen
11/6/09, 19/6/09. 20 dead workers, 10/7/09 beneath chestnut on Test Hill².

Bombus vestalis (Vestal Cuckoo-bee) 4/4/09 Test Hill, at bee burrows

Mining bees

At least four species, and at least one parasitic species of *Nomada*: first record 26/4/08, large numbers. 11/6/08 only one large bee. On 4/4/09 about 200 bees, with many *Nomada* in attendance. Fewer on 13/4/09, but more species. only a few on 6/5/09, only two on 30/5/09. On 21/6/09 a great swarm again, of three or more species. David Baldock has identified the following species from dead specimens passed to him:

Andrena cineraria

Andrena flavipes (male and female) from 13/4/09.

Andrena fulva

Anthrophora plumipes

Sphecodes ephippius

Nomada fucata

Nomada marshamellia (female)

Wasps

Chrysis ignata (Ruby-tailed Wasp) 6/5/09 Test Hill, at bee burrows

Dolchivespula media (Tree Wasp) Nest in shrub in Memorial Garden, 2008, persisting 2009-10

Vespula crabro (Hornet) 6/5/09, probable queen, flying from stacked equipment on banking. Nest reported in Shell Pagoda in 2007 (C.Moore). Large one seen feeding on an abandoned plate of food outside the cafeteria, (RAA 22/9/10)

Vespula vulgaris (Common Wasp) Nest in McEvoy shed, 2008 (photo). Other nests, presumably of this species, found at various points on site in abandoned equipment boxes (RAA 2009, 2010). Also one in the dead oak on Members Hill, (22/9/10, RAA)

² The dead *B. terrestris* workers found on 10/7/09 were beneath a chestnut tree in full flower, which was being attended by these bees. It appears that they had been stupefied by the flowers, and had fallen to the ground. Their bodies were being removed by wood ants.

Ants

Formica rufa (Wood Ant) (also 1985)

Lasius niger (Black Garden Ant), throughout site.

Myrmica rubra (red ant 11/6/08, in remains of Stag Beetle. (also 1985)

Lepidoptera

Butterflies

(H) = overwintering; see text for details.

2007-2010

Aglais urticae (Small Tortoiseshell) 12/1/08 (H), 26/4/08, 19/6/09

Anthocharis cardamines (Orange-tip) 26/4/08, 4/4/09, 13/4/09, 6/5/09, 12/5/10, 21/5/10

Cynthia cardui (Painted Lady) 30/5/09, 19/6/09, 21/6/09, 7/8/09, 8/8/09

Gonepteryx rhamni (Brimstone) 4/4/09

Inachis io (Peacock) (H- 2007-8, 2008-9, 2009-10, 2010-11), 10/7/09

Maniola jurtina (Meadow Brown) 5/7/08, 7/8/09, 10/7/09, 26/7/10

Pararge aegeria (Speckled Wood) 14/5/08, 20/5/08, 6/8/08, 25/9/08, 13/4/09, 30/5/09, 19/6/09, 10/7/09, 7/8/09

Pieris brassicae (Large White) 6/4/08, 18/3/09, 30/5/09, 21/6/09, 10/7/09, 7/8/09

Pieris napi (Green-veined White) 4/4/09, 7/8/09

Pieris rapae (Small White) 7/8/09

Polygonia c-album (Comma) 5/7/08, 25/9/08, 6/5/09, 19/6/09, 10/7/09, 11/9/09

Polyommatus icarus (Common Blue) 11/6/08, 30/5/09, 23/7/09

Pyronia tithonus (Gatekeeper) 5/7/08, 6/8/08, 19/6/09, 10/7/09, 23/7/09, 26/7/10

Thymelicus sylvestris (Small Skipper) 7/8/09

Vanessa atalanta (Red Admiral) 18/3/09, 22/9/10

1980s

Lasiommata megera (Wall) 7/8/1983

Lycaena phlaeas (Small Copper) 7/8/1983

Larvae of Peacock & Small Tortoiseshell on nettles

Moths

(H) = Overwintering; see text for details

2007-2010

Alucita hexadactyla (Many-plumed) (H- 22/11/08)

Amphipyra pyramidea (Copper Underwing) 12/8/08 in bat trap

Catocala nupta (Red Underwing) severed wings found in tunnel 12/1/08

Cuculla verbasci (Mullein Shark) Larvae 11/6/08, 30/5/09

Eurrhyncha hortulata (Small Magpie) 19/6/09 Members Hill

Hypena proboscidalis (Snout) 21/6/09 riverside, at nettles

Hypena rostralis (Buttoned Snout) (H- 2007-8, 2008-9, 2009-10, 2010-11)

Lithocolletis messaniella (Quercus ilex leaf miner) 20/5/08

Mormo maura (Old Lady) severed wings in tunnel, 2007, 2008, 2010

Nemophora deegerella (Longhorn) 30/5/09 riverside
Noctua comes (Lesser Yellow Underwing) severed wings in shelter, 2009, 2010
Noctua pronuba (Large Yellow Underwing) severed wings in shelter 2009, 2010, live one flying 22/9/10.
Phyllonorycter maestingella (Fagus leaf miner) 4/11/07
Scoliopteryx libatrix (Herald) (H- 2007-8, 2008-9, 2009-10, 2010-11)
Tortrix viridiana (Green Oak Tortrix) 19/6/09, Members Hill

1985

Fumea casta on *Urtica*
Tyria jacobaeae (Cinnabar)
Xanthorhoe montanata (Silver-ground Carpet)

British Aerospace site 1979-1988

Acrionicta aceris (Sycamore)
Acrionicta rumicis (Knotgrass)
Alsophila aescularia (March Moth)
Amphipyra pyramidea (Copper Underwing)
Apamea monoglypha (Dark Arches)
Aporophyla nigra (Black Rustic)
Autogramma gamma (Silver-Y)
Biston betularia (Peppered Moth)
Catocala nupta (Red Underwing)
Chiasmia clathrata (Latticed Heath)
Conistra ligula (Dark Chestnut)
Cryphia domestica (Marbled Beauty)
Cucullia verbasci (Mullein Shark)
Drepana fulctaria (Pebble Hook-tip)
Depressaria pastinacella (Parsnip webworm)
Ennomos erosaria (?*alniaria*) (Canary-shouldered Thorn) *erosaria* = september thorn
Epione repandaria (Bordered Beauty)
Erannis defoliaria (Mottled Umber)
Euproctis similis (Yellow-tail)
Eupsilia transversa (Satellite)
Euthrix potatoria (Drinker)
Geometra papilionaria (Large Emerald)
Habrosyne pyritoides (Buff Arches)
Hada plebeja (Shears)
Hemithea aestivaria (Common Emerald)
Hepialis humuli (Ghost Moth)
Hydriomana furcata (July Highflyer)
Hylaea fasciaria (Barred Red)
Hyloicus pinastri (Pine Hawk)
Hypena proboscidalis (Snout)
Hypomecis punctinalis (Pale Oak Beauty)
Lomaspilis marginata (Clouded Border)
Mythimna pallens (Common Wainscot)
Noctua fimbriata (Broad-bordered Yellow Underwing)

Noctua janthe (Lesser Broad-bordered Yellow Underwing)
Noctua pronuba (Yellow Underwing)
Notodonta dromedarius (Iron Prominent)
Notodonta ziczac (Pebble Prominent)
Odontoptera bidentata (Scalloped Hazel)
Omphaloscelis lunosa (Lunar Underwing)
Operophtera brumata (Winter)
Ourapteryx sambucaria (Swallow-tailed Moth)
Peribatodes rhomboidaria (Willow Beauty)
Peridea anceps (Great Prominent)
Phalera bucephala (Buff-tip)
Pheosia tremula (Swallow Prominent)
Phlogophora meticulosa (Angle Shades)
Ptilodon capucina (Coxcomb Prominent)
Rivula sericealis (Straw Dot)
Spilosoma luteum (Buff Ermine)
Thalpophila matura (Straw Underwing)
Tortrix viridana (Green Oak Tortrix)
Triphosa dubitata (Tissue)
Tyria jacobaeae (Cinnabar)
Xanthia icteritia (Sallow)
Xanthorhoe montanata (Silver-ground Carpet)
Xestia c-nigrum (Setaceous Hebrew Character)
Xestia xanthographa (Square-spot Rustic)
Zygaena filipendulae (6-Spot Burnet)

Odonata

2007-2010

Aeshna cyanea (Southern Hawker) 6/8/08, 10/9/09
Aeshna grandis (Brown Hawker) 6/8/08
Calopteryx splendens (Banded Demoiselle) 14/5/08, 20/5/08, 11/6/08, 6/5/09, 30/5/09,
 19/6/09, 7/8/09, 21/5/10, 26/7/10.
Coenagrion puella (Azure Damselfly) 11/6/08 & 1985
Ischnura elegans (Blue-tailed Damselfly) 6/8/08
Pyrrhosoma nymphula (Large Red Damselfly) 20/5/08, 11/6/08, 6/5/09, 30/5/09
Sympetrum striolatum (Common Darter) 25/9/08

1985

Cordulia aenea (Downy Emerald)

Ephemeroptera

2007-2010

Cloeon dipterum 20/5/08
Ephemera sp. 6/5/09, 19/6/09

Neuroptera

2007-2010

None recorded

1985

Chrysopa perla (green lacewing)
Panorpa communis (scorpion fly)

Diptera

2007-2010

Bombylius major (Bee-fly) 4/4/09 Test Hill
Culiseta annulata (mosquito) shelter 5/12/07, 6/2/08, 22/10/08, 4/4/09
Episyrphus balteatus (Marmalade-fly) 26/4/08, 6/8/08, 7/8/09, 26/7/10
Eristalis tenax (Drone-fly) 6/2/08, 30/9/09
Pegomya genupunctata (Burdock leaf miner) 20/5/08
Pegomya nigratarsis (Dock leaf miner) 20/5/08
Phytomyza ilicis (Holly leaf miner) 20/5/08
Volucella pellucens (hoverfly) 6/8/08
Volucella zonaria (hoverfly) 5/7/08, 6/8/08

1985

Agromyza reptans (nettle leaf miner)
Empis tessellata
Eristalis tenax (Drone-fly)
Syrphus ribesii (hover fly)

Hemiptera

2007-2010

Pentatoma rufipes (Forest Bug) 19/6/09

1985

Coreus marginatus
Kleidocerys resedae

Homoptera

(all 1985)

Lachnus roboris
Drepanosiphon platanoides
Pulvinaria regalis
Cercopis vulnerata

Dictyoptera

Ectobius lapponicus (Dusky Cockroach) 20/5/08 Test Hill

Arachnida

2007-2010

Pholcus phalangioides (daddy longlegs) 2007, 2008, 2009, in shelters.

1985

Amaurobius ferox

Amaurobius similis under oak bark

Araneus curcubitanus on aspen

Dictyna arundinacea

Dioctria sp.

Misumena vatia on *Crataegus*

Pardosa lugubris

Pisaura mirabilis

Theridion zizyphium on *Rosa*

Crustacea

2007-2010

None recorded.

1985

Armadillium vulgare ('Pill-bug')

Oniscus asellus

Philoscia muscorum

Platyarthrus hoffmanseggi (with ants, *Lasius*)

Porcellio scaber

Chilopoda

2007-2010

None recorded.

1985

Haplophilus subterraneus

Lithobius forficatus

Lithobius variegatus

Mollusca

2007-2010

Arion ater (Large Red Slug) 20/5/08 Members Hill

Arion subfuscus (Dusky Slug) 20/5/08 Members Hill

Cepaea hortensis (White-lipped Snail) 20/5/08 Track bank & 1985

Helix aspera (Garden Snail) 20/5/08 Test Hill & 1985

Limax maximus (Great Grey Slug) 20/5/08 Members Hill

1985

Agriolimax reticulatus (Netted Slug)

Arion hortensis (Garden Slug)

Discus rotundatus

Oxychilus alliarus (Garlic Glass Snail)

Annelida

Eisenia foetida under old carpet, 1985

Appendix C

Gall Causers Recorded at Brooklands Museum 1985-2010

ARACHNIDA

Eriophyidae (gall mites)

<i>Acalitus (Eriophyes) brevitarsus</i>	alder leaves	20/5/08
<i>Aceria (Eriophyes) macrorhynchus</i>	sycamore leaves	20/5/08 & 1985
<i>Aceria pseudoplatani</i>	sycamore leaves	4/11/07
<i>Aceria ulmicola (Eriophyes ulmi)</i>	elm leaves	4/11/07, 20/5/08, 1985

INSECTA

DIPTERA

Cecidomyiidae (gall midges)

<i>Hartigiola annulipes</i>	beech leaves	4/11/07
<i>Iteomyia major</i>	sallow leaves	21/6/09
<i>Jaapiella veronicae</i>	speedwell shoot tip	4/11/07
<i>Macrodiplosis pustulans (dryobia)</i>	oak leaves	4/11/07, 20/5/08
<i>Macrodiplosis roboris (volvens)</i>	oak leaves	20/5/08

HOMOPTERA (aphids)

<i>Eriosoma ulmi</i>	elm leaf	20/5/08
<i>Phyllaphis fagi</i>	beech leaf	20/5/08
<i>Tetraneura ulmi</i>	elm leaf	5/7/08

HYMENOPTERA

Cynipidae (gall wasps)

<i>Andricus aries</i> (ramshorn gall)	oak buds	6/8/08
<i>Andricus kollari</i> (marble gall)	oak buds	4/11/07, 20/5/08, 6/8/08, 1985
<i>Andricus lignicola</i> (cola-nut gall)	oak buds	4/11/07, 20/5/08, 1985
<i>Andricus quercuscalicis</i> (knopper gall)	oak cupules	4/11/07, 6/8/08
<i>Liposthenes glechomae</i>	ground ivy	1985
<i>Neuroterus anthracinus</i> (oyster gall)	oak leaves	4/11/07
<i>Neuroterus numismalis</i> (silk-button spangle)	oak leaves	4/11/07
<i>Neuroterus quercusbaccarum</i> (common spangle)	oak leaves	4/11/07

Tenthredinidae (Sawflies)

<i>Blennocampa pusilla</i>	rose leaflet roll gall	2/6/85
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PHYTOPLASMA/VIRUS

'Witches' broom' galls	<i>Salix cinerea</i> agg.	28/4/85
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Appendix D

Vascular Plants Recorded at Brooklands Museum 1985-2010

Note: full records are held on the Surrey Botanical Society database.

Scientific name	Common name	First recorded	Last recorded
<i>Acer pseudoplatanus</i>	Sycamore	1985	2008
<i>Achillea millefolium</i>	Yarrow	2005	2008
<i>Aegopodium podagraria</i>	Ground-elder	2008	2008
<i>Agrimonia eupatoria</i>	Agrimony	2008	2008
<i>Ajuga reptans</i>	Bugle	2005	2005
<i>Alliaria petiolata</i>	Garlic Mustard	1985	2008
<i>Alnus glutinosa</i>	Alder	1985	2008
<i>Anagallis arvensis</i>	Scarlet Pimpernel	2008	2008
<i>Anchusa arvensis</i>	Bugloss	1985	2005
<i>Anisantha sterilis</i>	Barren Brome	1985	2008
<i>Anthriscus sylvestris</i>	Cow Parsley	1985	2009
<i>Arabidopsis thaliana</i>	Thale Cress	1985	2008
<i>Arctium lappa</i>	Greater Burdock	2008	2008
<i>Arctium minus</i>	Lesser Burdock	1985	2008
<i>Arenaria serpyllifolia</i> subsp. <i>leptoclados</i>	Slender Sandwort	1985	1985
<i>Artemisia verlotiorum</i>	Chinese Mugwort	1985	1985
<i>Artemisia vulgaris</i>	Mugwort	2008	2008
<i>Arum maculatum</i>	Lords-and-Ladies	1985	2008
<i>Asplenium ruta-muraria</i>	Wall-rue	2007	2009
<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	2007	2007
<i>Ballota nigra</i>	Black Horehound	2005	2009
<i>Barbarea vulgaris</i>	Winter-cress	1985	2008
<i>Bellis perennis</i>	Daisy	2008	2008
<i>Betula pendula</i>	Silver Birch	1985	2008
<i>Bromopsis ramosa</i>	Hairy-brome	2008	2008
<i>Bryonia dioica</i>	White Bryony	1985	2008
<i>Buddleja davidii</i>	Butterfly-bush	1985	2008
<i>Calystegia silvatica</i>	Large Bindweed	2005	2009
<i>Cardamine hirsuta</i>	Hairy Bitter-cress	1985	1985

Scientific name	Common name	First recorded	Last recorded
<i>Cardamine pratensis</i>	Cuckooflower	1985	2008
<i>Carduus crispus</i>	Wetted Thistle	2008	2008
<i>Carex hirta</i>	Hairy Sedge	2008	2008
<i>Carex pendula</i>	Pendulous Sedge	2009	2009
<i>Carex spicata</i>	Spiked Sedge	2008	2008
<i>Carex vesicaria</i>	Bladder-sedge	2008	2008
<i>Castanea sativa</i>	Sweet Chestnut	2008	2008
<i>Centaurium erythraea</i>	Common Centaury	2007	2009
<i>Cerastium arvense</i>	Field Mouse-ear	2008	2008
<i>Cerastium fontanum</i>	Common Mouse-ear	1985	2008
<i>Cerastium glomeratum</i>	Sticky Mouse-ear	2008	2008
<i>Chamerion angustifolium</i>	Rosebay Willowherb	1985	2008
<i>Chelidonium majus</i>	Greater Celandine	2008	2009
<i>Cirsium arvense</i>	Creeping Thistle	1985	2008
<i>Cirsium palustre</i>	Marsh Thistle	1985	1985
<i>Cirsium vulgare</i>	Spear Thistle	2008	2009
<i>Claytonia perfoliata</i>	Springbeauty	1985	1985
<i>Conium maculatum</i>	Hemlock	1985	2008
<i>Convolvulus arvensis</i>	Field Bindweed	2008	2008
<i>Coronopus didymus</i>	Lesser Swine-cress	2008	2008
<i>Corylus avellana</i>	Hazel	2008	2008
<i>Crataegus monogyna</i>	Hawthorn	1985	2009
<i>Cuscuta europaea</i>	Greater Dodder	1986	2009
<i>Cytisus scoparius</i>	Broom	1985	2008
<i>Dactylis glomerata</i>	Cock's-foot	2008	2008
<i>Digitalis purpurea</i>	Foxglove	2008	2008
<i>Dipsacus fullonum</i>	Wild Teasel	1985	2008
<i>Dryopteris dilatata</i>	Broad Buckler-fern	1985	1985
<i>Dryopteris filix-mas</i>	Male-fern	1985	2008
<i>Echium vulgare</i>	Viper's-bugloss	2009	2009
<i>Epilobium hirsutum</i>	Great Willowherb	2008	2009
<i>Equisetum arvense</i>	Field Horsetail	1985	2008
<i>Erodium cicutarium</i>	Common Stork's-bill	1985	2008
<i>Erophila verna</i>	Common Whitlowgrass	1985	1985
<i>Eupatorium cannabinum</i>	Hemp-agrimony	1985	2009
<i>Euphorbia peplus</i>	Petty Spurge	2008	2008
<i>Fagus sylvatica</i>	Beech	2008	2008

Scientific name	Common name	First recorded	Last recorded
<i>Fallopia japonica</i>	Japanese Knotweed	2008	2008
<i>Foeniculum vulgare</i>	Fennel	1985	1985
<i>Fragaria vesca</i>	Wild Strawberry	2008	2009
<i>Fraxinus excelsior</i>	Ash	1985	2008
<i>Galanthus nivalis</i>	Snowdrop	1985	1985
<i>Galium aparine</i>	Cleavers	1985	2008
<i>Galium mollugo</i>	Hedge Bedstraw	1985	1985
<i>Gaultheria shallon</i>	Shallon	2007	2008
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill	2008	2008
<i>Geranium lucidum</i>	Shining Crane's-bill	2008	2008
<i>Geranium molle</i>	Dove's-foot Crane's-bill	1985	2009
<i>Geranium phaeum</i>	Dusky Crane's-bill	2009	2009
<i>Geranium pusillum</i>	Small-flowered Crane's-bill	2008	2009
<i>Geranium robertianum</i>	Herb-Robert	2008	2009
<i>Geranium rotundifolium</i>	Round-leaved Crane's-bill	2009	2009
<i>Geranium versicolor</i>	Pencilled Crane's-bill	2009	2009
<i>Geum urbanum</i>	Wood Avens	2008	2008
<i>Glechoma hederacea</i>	Ground-ivy	1985	2008
<i>Hedera helix</i>	Common Ivy	1985	2008
<i>Heracleum mantegazzianum</i>	Giant Hogweed	2008	2008
<i>Heracleum sphondylium</i>	Hogweed	2008	2008
<i>Holcus lanatus</i>	Yorkshire-fog	2005	2008
<i>Humulus lupulus</i>	Hop	1985	2008
<i>Hyacinthoides non-scripta</i>	Bluebell	1985	2008
<i>Hyacinthoides x massartiana</i>	Hybrid Bluebell (<i>H. non-scripta</i> x <i>hispanica</i>)	1985	2008
<i>Hypericum humifusum</i>	Trailing St John's-wort	1985	1985
<i>Hypericum perforatum</i>	Perforate St John's-wort	1985	2008
<i>Hypochaeris radicata</i>	Cat's-ear	2005	2008
<i>Ilex aquifolium</i>	Holly	2008	2008
<i>Impatiens glandulifera</i>	Indian Balsam	2008	2008
<i>Lactuca serriola</i>	Prickly Lettuce	1985	2008
<i>Lactuca virosa</i>	Great Lettuce	2008	2008
<i>Lamiastrum galeobdolon</i> subsp. <i>argentatum</i>	Garden Yellow-archangel	2005	2005
<i>Lamium album</i>	White Dead-nettle	1985	2008
<i>Lamium purpureum</i>	Red Dead-nettle	1985	2008
<i>Lapsana communis</i>	Nipplewort	2008	2008

Scientific name	Common name	First recorded	Last recorded
<i>Lathyrus aphaca</i>	Yellow Vetchling	2009	2009
<i>Lepidium heterophyllum</i>	Smith's Pepperwort	1998	1998
<i>Leucanthemum vulgare</i>	Oxeye Daisy	2008	2009
<i>Ligustrum ovalifolium</i>	Garden Privet	1985	1985
<i>Lolium perenne</i>	Perennial Rye-grass	2008	2008
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	2005	2009
<i>Lunaria annua</i>	Honesty	2008	2008
<i>Luzula campestris</i>	Field Wood-rush	1985	2008
<i>Lycopus europaeus</i>	Gypsywort	1985	1985
<i>Lythrum salicaria</i>	Purple-loosestrife	2008	2009
<i>Mahonia aquifolium</i>	Oregon-grape	1985	2008
<i>Malva neglecta</i>	Dwarf Mallow	2009	2009
<i>Malva sylvestris</i>	Common Mallow	1985	2009
<i>Matricaria discoidea</i>	Pineappleweed	2008	2009
<i>Medicago arabica</i>	Spotted Medick	2008	2008
<i>Mentha aquatica</i>	Water Mint	2009	2009
<i>Mercurialis perennis</i>	Dog's Mercury	2009	2009
<i>Milium effusum</i>	Wood Millet	2008	2008
<i>Moehringia trinervia</i>	Three-nerved Sandwort	2008	2008
<i>Myosotis arvensis</i>	Field Forget-me-not	1985	1985
<i>Myosotis discolor</i>	Changing Forget-me-not	1985	2008
<i>Myosotis ramosissima</i>	Early Forget-me-not	1985	2008
<i>Myosotis sylvatica</i>	Wood Forget-me-not	2008	2008
<i>Oenanthe crocata</i>	Hemlock Water-dropwort	2008	2008
<i>Oenothera biennis</i>	Common Evening-primrose	2009	2009
<i>Onopordum acanthium</i>	Cotton Thistle	2005	2009
<i>Ornithogalum umbellatum</i>	Garden Star-of-Bethlehem	1985	1985
<i>Papaver rhoeas</i>	Common Poppy	2009	2009
<i>Papaver somniferum</i>	Opium Poppy	2008	2009
<i>Pentaglottis sempervirens</i>	Green Alkanet	2008	2009
<i>Phyllitis scolopendrium</i>	Hart's-tongue	2007	2008
<i>Picris echioides</i>	Bristly Oxtongue	2008	2009
<i>Pilosella officinarum</i>	Mouse-ear-hawkweed	1985	2008
<i>Plantago coronopus</i>	Buck's-horn Plantain	1985	2008
<i>Plantago lanceolata</i>	Ribwort Plantain	2005	2008
<i>Plantago major</i>	Greater Plantain	2008	2008
<i>Poa annua</i>	Annual Meadow-grass	2008	2008

Scientific name	Common name	First recorded	Last recorded
<i>Polypodium vulgare</i>	Polypody	2009	2009
<i>Populus tremula</i>	Aspen	1985	2008
<i>Populus x canadensis</i>	Hybrid Black-poplar	2008	2008
<i>Potentilla anserina</i>	Silverweed	1985	2008
<i>Potentilla reptans</i>	Creeping Cinquefoil	2008	2008
<i>Prunella vulgaris</i>	Selfheal	1985	2009
<i>Prunus avium</i>	Wild Cherry	2008	2008
<i>Prunus padus</i>	Bird Cherry	2008	2008
<i>Prunus spinosa</i>	Blackthorn	1985	1985
<i>Pteridium aquilinum</i>	Bracken	1985	2008
<i>Pulicaria dysenterica</i>	Common Fleabane	2009	2009
<i>Quercus cerris</i>	Turkey Oak	2008	2008
<i>Quercus ilex</i>	Evergreen Oak	2008	2008
<i>Quercus robur</i>	Pedunculate Oak	1985	2008
<i>Ranunculus acris</i>	Meadow Buttercup	2008	2008
<i>Ranunculus bulbosus</i>	Bulbous Buttercup	1985	2008
<i>Ranunculus ficaria</i>	Lesser Celandine	2008	2008
<i>Ranunculus repens</i>	Creeping Buttercup	1985	2008
<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup	2009	2009
<i>Reseda luteola</i>	Weld	2005	2008
<i>Rhododendron ponticum</i>	Rhododendron	1985	2008
<i>Rosa canina</i>	Dog-rose	1985	1985
<i>Rubus fruticosus agg.</i>	Bramble	1985	2009
<i>Rumex acetosa</i>	Common Sorrel	2008	2008
<i>Rumex acetosella</i>	Sheep's Sorrel	2008	2008
<i>Rumex obtusifolius</i>	Broad-leaved Dock	2008	2008
<i>Sagina apetala</i>	Annual Pearlwort	2008	2008
<i>Salix caprea</i>	Goat Willow	1985	2008
<i>Salix cinerea</i>	Grey Willow	2008	2008
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	Rusty Willow	1985	1985
<i>Salix viminalis</i>	Osier	1985	1985
<i>Salvia verbenaca</i>	Wild Clary	2009	2009
<i>Sambucus nigra</i>	Elder	1985	1985
<i>Scrophularia auriculata</i>	Water Figwort	1985	1985
<i>Scrophularia nodosa</i>	Common Figwort	1985	2008
<i>Sedum acre</i>	Biting Stonecrop	1985	2009
<i>Sedum album</i>	White Stonecrop	2008	2008

Scientific name	Common name	First recorded	Last recorded
<i>Senecio jacobaea</i>	Common Ragwort	1985	2008
<i>Senecio squalidus</i>	Oxford Ragwort	1985	2008
<i>Senecio vulgaris</i>	Groundsel	1985	1985
<i>Silene dioica</i>	Red Campion	1985	2009
<i>Silene latifolia</i>	White Campion	2008	2008
<i>Sisymbrium officinale</i>	Hedge Mustard	2009	2009
<i>Solanum dulcamara</i>	Bittersweet	2005	2008
<i>Sonchus asper</i>	Prickly Sow-thistle	2009	2009
<i>Sonchus oleraceus</i>	Smooth Sow-thistle	1985	2008
<i>Sorbus aucuparia</i>	Rowan	2008	2008
<i>Stachys palustris</i>	Marsh Woundwort	2008	2009
<i>Stellaria graminea</i>	Lesser Stitchwort	1985	1985
<i>Stellaria holostea</i>	Greater Stitchwort	1985	2008
<i>Stellaria media</i>	Common Chickweed	1985	2008
<i>Tanacetum vulgare</i>	Tansy	1985	2008
<i>Taraxacum agg.</i>	Dandelion	1985	2008
<i>Tellima grandiflora</i>	Fringecups	2008	2008
<i>Teucrium scorodonia</i>	Wood Sage	2008	2008
<i>Trifolium arvense</i>	Hare's-foot Clover	2007	2008
<i>Trifolium campestre</i>	Hop Trefoil	2008	2009
<i>Trifolium dubium</i>	Lesser Trefoil	2008	2008
<i>Trifolium micranthum</i>	Slender Trefoil	2008	2008
<i>Trifolium repens</i>	White Clover	2005	2009
<i>Tussilago farfara</i>	Colt's-foot	1985	2008
<i>Ulex europaeus</i>	Gorse	1985	2008
<i>Ulmus glabra</i>	Wych Elm	2008	2008
<i>Ulmus procera</i>	English Elm	2008	2008
<i>Urtica dioica</i>	Common Nettle	1985	2008
<i>Valerianella locusta</i>	Common Cornsalad	2008	2008
<i>Verbascum densiflorum</i>	Dense-flowered Mullein	2009	2009
<i>Verbascum thapsus</i>	Great Mullein	1985	2008
<i>Veronica arvensis</i>	Wall Speedwell	1985	2008
<i>Veronica chamaedrys</i>	Germander Speedwell	1985	2008
<i>Veronica hederifolia</i>	Ivy-leaved Speedwell	1985	1985
<i>Veronica montana</i>	Wood Speedwell	2008	2008
<i>Veronica serpyllifolia</i>	Thyme-leaved Speedwell	2008	2008
<i>Vicia hirsuta</i>	Hairy Tare	1985	1985

Scientific name	Common name	First recorded	Last recorded
<i>Vicia sepium</i>	Bush Vetch	2005	2008
<i>Viola odorata</i>	Sweet Violet	2008	2008
<i>Viola riviniana</i>	Common Dog-violet	2008	2008

Appendix E

Further Details of Trees on the Brooklands Museum Site

Most of the significant old trees on the museum site stand on the plateau of Members' Hill, around the old restaurant buildings, or on the southern slope below it.

A few others remain on the bank of the River Wey. All other trees are believed to have been planted or self-sown after the building of the Brooklands circuit.

Members' Hill

Pedunculate oak (*Quercus robur*), TQ 0723 6294

This tree, 'The Brooklands Oak', is the most obvious starting point for a survey of the museum's trees. The name we have given it demonstrates its importance as one of the largest oaks in Surrey. It stands just to the east of the museum buildings, at present surrounded by brambles.

This tree was the subject of an article by John Pulford in the Brooklands publication *The Spirit*, entitled 'Silent Witness', in which events are charted that have happened around the tree during its long life. It may have started life in or on the edge of the ancient Cane's Wood, and spent a short while in or on the edge of the garden of the first Brooklands House. The 1811 inclosure map shows the position of the old house in relation to Cane's Wood. The tree narrowly survived the building of the motor track, and the 1930s aerial photographs show it hemmed in by buildings, with cars parked beneath it.

John Pulford suggests that this tree deserves "the support and respect of every new owner of the land on which it stands". He quotes specialists, including one from the Ancient Tree Forum, as giving the age of the tree as around 500 years. This may be true, but we note that its oval shape suggests that it may once have had two trunks from fairly low down, that are now bridged by a 'saddle' at around 12 feet. We also note that there seems to be little evidence of hollowing. Its bark is rugged, and since the beginning of the survey this has started to peel away on the south side, below a cut low limb. However, the only fungi recorded on the tree during the survey were *Fistulina hepatica* and *Mycena inclinata*, neither of which is a pathogen.

One of the two trunks remains intact, dividing at two points above a height of 18 feet, and forming a thin crown. The other trunk, to the south, is broken off at 12 feet. A large limb on the north side has been cut at 17 feet.

It is not possible to measure the tree meaningfully at standard height, 1.5 metres, because of the low limb on the south side, but a satisfactory minimum girth of trunk was measurable horizontally at approximately 3 feet on the west side, equating to 5 feet on the lower, east, side. This was 25 feet 9 inches on 4 November 2007. The height was 72 feet.

Cedar of Lebanon (*Cedrus libani*), TQ 0719 6302

This is located close to the edge of the steep concrete wall of the track, by the footbridge. It has a long straight bole with a limited crown, possibly with the top cut out at some time. Bark has been lost at the base on the west side, probably from accidental damage, but the wound has healed leaving only a little hollowing. No pathogenic fungi were recorded during the survey, but three interesting species were noted in the needle litter, which is also utilised by wood ants.

It seems that this tree was once in the gardens of the first Brooklands House, which was occupied from 1767 to 1803. When the racetrack was built, it miraculously survived in its remarkable situation. It is clearly visible in a postcard photograph celebrating the opening of the track in 1907, at which time it looks to have been at least half its present girth. It had a girth of 206 inches at 1.5m on 4 November 2007, height about 40 feet.

Pedunculate oak, TQ 0724 6295

This stands just northwest of the 'Brooklands Oak' and is a maiden tree (i.e. not pollarded), on the same low bank as the former. The trunk divides at c. 15 feet. Its girth is 130 inches at 1.5m from the higher side, and it is 69 feet tall. Its age not easy to judge, but it certainly post-dates Brooklands House, and so was possibly on a subsequent wood/field boundary.

Pedunculate oak, TQ 0723 6288

To the south of the 'Brooklands Oak' stands this maiden tree of girth 154 inches at 1.5m. As with the previous tree, it post-dates Brooklands House, maybe also on a boundary line.

Pedunculate oak, TQ 0720 6291

This tree stands west of the previous entry, south of the roadway in front of the old restaurant. It has been pollarded at c. 12 feet and has scraps of horizontal limbs above this point, plus one major upright limb, dead at the top. This tree is clearly hollow, and has a distinctive large hole near the top of the trunk. Fruit bodies of *Armillaria* sp. ('honey fungus') were recorded at the base, where the bark is lifting. Its girth at 1.5m was 169 inches, height 35 feet to the dead top. It easily pre-dates the track, and would have been in Cane's Wood.

Pedunculate oak, TQ 0718 6293

This is one of a line of trees beside the roadway in front of the restaurant. These may mark the line of a drive to the present Brooklands House, from a lodge on Brooklands Road. They appear in the 1930s aerial photographs, as rather slender trees and seem unlikely to have planted later than 1900. This is the first tree in line from the top of Test Hill. Its trunk is heavily burred, so it was measured at the base, at 1 foot, as 127 inches on 4 November 2007. Its height was 33 feet.

Pedunculate oak

This is next in line southeastwards beside the roadway, a tree of 116 inches girth, measured at 1.5m from the higher side. It is also visible on the old photographs, as a slender tree.

Sweet chestnut (*Castanea sativa*)

This tree is next in line south-eastwards, next to the roadway, and about 20 feet north of the 'oak with the hole'. The trunk is very burry at base, where possibly a low limb was lost and some heartwood is exposed. Measured at c.6 feet above the burrs, it had a girth of 108 inches on 19 November 2010.

Pedunculate oak, TQ 0716 6299

On the west side of the restaurant, the remains of an old tree, pollarded at 8 feet, near the fence above the steep cliff down to the Finishing Straight. Three limbs remain above the pollarding point, but only a scrap of life remains in one. Bark is missing from the south side. The girth was measured on 4 November 2007 as 150 inches at 1.5m. It undoubtedly pre-dates the track, must have been in Cane's Wood.

Also inside the fence are two much younger oaks, either side of this old tree: the one to the south has a girth of 90 inches, that to the north a girth of 64 inches. Another is situated on the scrub edge before the cedar, of girth 70 inches and with a wood ant nest at its base. Close to the footbridge are two more good-sized oaks, one of 90 ins, the other similar but too close to the embankment edge to be measured safely.

Pedunculate oak

Over the fence, on edge of the cliff, stands this dead pollard, similar to the previous tree and probably with same history. It was pollarded at 8 feet, is ivy-clad, and harbours a nest of wood ants in the trunk.

More or less in line with this tree, behind the fence, are four much younger oaks, the largest of girth 100 inches; these were just possibly present when the track opened, but they would have been very small.

The 1933 aerial photograph seems to suggest that the present fence is nearer the cliff edge than the old one. About ten trees are visible behind the old fence, most of which have survived, including the two old pollards.

Sycamores (*Acer pseudoplatanus*)

Two sycamore trees stand just north of the restaurant. The one nearest to it has a double trunk, half-hidden by ivy. The other, about 20 feet away, has a single trunk of 90 inches girth at 1.5m. Both are probably of the same age, and much the same age as the circuit, and they seem to be on the old photographs.

Another two, both of 73 inches girth, stand to the west of them, near the fence. One wonders why they were allowed to survive, as they were not likely to have been planted.

Cedar of Lebanon?

This is a tall, completely dead and decaying trunk with scorching. It shed a large section during 2010. The species is not confirmed, but old photographs do indicate a second cedar behind the present healthy one, pretty much where this stump stands. It is clearly much valued by wildlife, and worth preserving if possible

Western red cedar (*Thuja plicata*)

This mature conifer stands at the north end of the restaurant. It must have been planted for ornamental effect during the lifetime of the racecourse. Its current girth, measured on 19 November 2010 is 76 inches. This might make its planting date any time before about 1950, but in fact it looks quite large in the old photographs mentioned (if indeed it is the same tree and not a replacement, which seems unlikely).

Another *Thuja*, of girth 73 inches, stands on the slope just east of the 'Brooklands Oak'.

Aspen

A small group of this species stands at the top of Test Hill on the west side (by a concrete block). These are young trees, but support an uncommon fungus, *Leccinum duriusculum*.

Slope South of Members' Hill (Test Hill)

The old photographs show that this slope had a number of trees on it while the race circuit was in operation. One wonders why they were not removed for the benefit of spectators, unless they provided useful shade. Those clearly visible in the photo seem to be slender, 'drawn-up' trees such as might be found in woodland. It seems likely that they are survivors of Cane's Wood, although not of very great age. They are mostly chestnuts, perhaps originally planted for timber. Note that this remnant of old woodland continues over the fence into the grounds of Japan Tobacco. Native bluebells survive here, as another indicator of old woodland.

Sweet chestnut, TQ 0716 6290

The largest of the chestnuts here is the one closest to the top of Test Hill. Its girth, measured on 19 November 2010, was 160 inches at 1.5m, allowing for ivy, and it was about 50 feet tall. If in woodland for part of its life, this tree could be approaching 200 years old.

Sweet chestnut

This stands at the eastern end of a concrete structure. Measured at 4 feet from upper side of slope, below a burr, it was 140 inches in girth and about 50 feet tall.

Sweet chestnut

On the far eastern edge by the fence stands another chestnut of 108 inches. girth and about 50 feet tall.

Sweet chestnut

This is below the line of the previous three trees, and had a similar height and a girth of 122 inches, allowing for ivy.

Pedunculate oak

This is just above a shallow ditch on the edge of the grass area and has a girth of 118 inches. Another, younger oak is on the same line, to its east. In between them is a re-grown chestnut coppice stool.

Monkey puzzle (*Araucaria araucana*)

This oddity, probably planted in the early days of the racetrack, stands on the east side, near the fence. When planted it would have been an attractive feature. Now it is a bare trunk of 66 inches girth, 40 feet tall with a scrap of life at the top, and lost amongst the other trees.

Trees of lesser interest on Members' Hill

North-eastern edge, down to the spectators' entrance tunnel: Scrubby tree growth, post-dating the racing circuit, consisting of young pedunculate oak, silver birch (*Betula pendula*), English elm (*Ulmus procera*), aspen, sycamore, goat willow (*Salix caprea*) and sweet chestnut, with

rhododendron (*Rhododendron ponticum*), sheltering a badger sett (see section 2.1). Two larger oaks, one of c. 90 inches, the other of c.70 inches girth, stand below the 'Brooklands Oak', along with a *Thuja* mentioned above. A sycamore has invaded one end of the tunnel's parapet.

Test Hill, western edge: Trees would probably not have been welcome here during the lifetime of the racing circuit, and none is visible in the photographs. Those that have grown up since are a mixture of turkey oak (*Quercus cerris*) and sweet chestnut. The former is sometimes regarded as an alien pest.

Bottom of Test Hill, above entrance on Campbell circuit: A line of young sweet chestnut and pedunculate oak.

Sand cliff above the finishing straight: This has also been colonised since the demise of the racetrack, mostly by turkey oak, pedunculate oak and silver birch. The hollow stump of a small hybrid black poplar (*Populus x canadensis*) protrudes from the bottom north corner. A stool of ash (*Fraxinus excelsior*) is hidden behind the hangar.

Riverside trees

The eastern bank of the Wey, through the British Aerospace site, was almost cleared of trees during 1982 (RAA, pers. comm.). Some trees were pollarded, and a few larger ones were left in place. Some significant trees remain within the museum area.

Alder (*Alnus glutinosa*), TQ 0694 6280

This is a fine coppice stool with seven trunks, which were not cut in 1982. These now (2010) have girths at 1.5m of 47, 45, 44, 44, 43, 42, and 37 inches.

Alder, TQ 0695 6278

A single-trunked tree of girth 62 inches.

Crack willow (*Salix fragilis*), TQ 0695 6278

One of three at the south end, this the most northerly. It has lost much of the north side of its trunk, which is pollarded at c. 6 feet. Its minimum girth, measured at 3 feet from the upper side of the bank, was 123 inches, but the basal measurement was 136 inches. It has new growth to about 30 feet.

Crack willow, TQ 0695 6276

This is the middle tree, also pollarded at 6 feet. The girth is 107 inches, measured at base from upper side of bank, which was also below a large bracket of *Ganoderma* fungus. It has new growth to 30 feet. On a visit in November 2010, it was found that half of the tree had split away at the base and fallen across the river.

Crack willow, TQ 0695 6276

This is the southernmost tree. A single new trunk rises from above 5 feet on the remains of the old one, which has 104 inches of its original trunk left as measured at base.

Aspen, TQ 0691 6295

One of two good-sized trees towards the northern end, below the VC10. This one is on the bank, and has a girth 46 inches.

Grey willows (*Salix cinerea*) of bushy aspect now occupy much of the river bank. Two small alder stools are growing just north of the aircraft bridge. There are a few young oaks and birches towards the northern end, and the stump of a willow that died prior to 2010 and fell in that year.

Other trees on the museum site

At the eastern edge of the aircraft park is a small group of young aspen, but also an oak of 70 inches girth which probably dates from around 1940.

North of the helipad is a sycamore stool with five trunks, all of about 50 inches girth. Another, smaller tree stands a little to the west.

Two lines of western red cedars (*Thuja plicata*) run at right angles to the river, one line along the north side of the offices (I5), the other south of the Jackson Shed (K5). They may once have been a close hedge but are now grown into trees. The northern line has seven remaining trees, the southern only five.

Near the tyre change depot is a small group of young trees, including a field maple (*Acer campestre*), ash, and sycamore, and a lime (*Tilia* sp.) just east of them.

There is a group of silver birch and a sycamore by the offices. Another birch manages to survive beside the clubhouse, hosting a magpies' nest in 2010.

A misshapen oak with a girth of about 60 inches. stands beside the Shell Pagoda. An ornamental cherry next to it was dead by 2010.

There are remnant aspen and silver birch trees in the grass strip beside the hangar, the rest probably the victims of 'honey fungus'.

There were other young trees in the area north of the acoustics building. However, by the end of 2010, most of these had been cleared for the building of the new bus museum.

Appendix F

Fungi Recorded at Brooklands Museum 1985-2009

Species marked * are uncommon, scarce or little-known; those marked (K) are preserved in Kew herbarium.

Names of basidiomycetes follow Checklist of the British and Irish Basidiomycota (online: <http://www.basidiochecklist.info/>)

Agarics and Boletes

- Agaricus arvensis* 4.11.07
Agaricus campestris Front lawn & riverside, grass, RAA, 15.10.09
 **Agaricus comtulus* Riverside, in grass, RAA, 30.9.09
Agaricus silvaticus Bank opp. tunnel, on soil, RAA, 15.10.09, many, persisting.
Agaricus silvicola Members Hill, grass, RAA, 17.11.09
Agaricus ?urinascens under 1-11 wing, grass, RAA, 29.10.08
Agaricus xanthoderma 4.11.07
Agrocybe cylindracea Test Hill bank, wood, RAA, 25.9.08
Agrocybe erebia 4.11.07
 **Amanita gemmata* Members Hill, under Cedrus, RAA, 12.11.08, 3.10.10
Amanita muscaria 4.11.07
Amanita phalloides Test Hill bank, oak, RAA, 25.9.08
Amanita rubescens 4.11.07
Armillaria gallica Hangar verge & aircraft park, grass, RAA, 4.11.09
Armillaria mellea agg. 1985; Quercus, 4.11.07
Bolbitius vitellinus RAA 28.10.07
Boletus chrysenteron 4.11.07
Boletus cisalpinus Test Hill, under Quercus, RAA, 4.11.09
Boletus edulis under Quercus, 4.11.07
Boletus porosporus Test Hill, grass/Quercus, RAA, 25.9.08
Boletus radicans Members Hill, under Quercus, RAA, 7.8.09
Boletus rubellus Members Hill, oak, 26.9.08
Calocybe gambosa Test Hill, grass, RAA, 26.4.08
Chalciporus piperatus Test Hill, soil, RAA, 12.11.08
Chlorophyllum rhacodes 4.11.07
Clitocybe geotropa Test Hill, grass, RAA, 12.11.08
Clitocybe nebularis 4.11.07
Clitocybe phaeophthalma RAA, 28.10.07
Clitocybe rivulosa Aircraft Park, in grass, RAA, 4.11.09
Clitocybe vibecina 4.11.07
Clitopilus prunulus 4.11.07
Collybia butyracea 4.11.07
Collybia dryophila RAA, 28.10.07
Conocybe arrhenii 4.11.07
Conocybe lactea Riverside, in grass, RAA, 7.8.09

Conocybe subovalis 4.11.07
Coprinellus disseminatus Hangar verge, birch, RAA, 15.10.08
Coprinellus micaceus 4.11.07
Coprinopsis atramentaria Aircraft Park, soil, RAA, 4.11.09
Coprinopsis jonesii Bonfire site, RAA, 30.10.10
Coprinus comatus RAA, 28.10.07
Cortinarius anomalus 4.11.07
Cortinarius hemitrichus under *Betula*, 4.11.07
Cortinarius torvus 4.11.07
Cystoderma amianthinum Test Hill, grass, RAA, 15.10.08
**Dermoloma cuneifolium* 4.11.07
Entoloma sericeum Test Hill, grass, RAA, 4.11.09
Galerina vittaeformis 4.11.07
**Hebeloma fragilipes* 4.11.07
Hebeloma mesophaeum 4.11.07
Hebeloma sacchariolens RAA, 28.10.07
Hemimycena lactea 4.11.07
Hygrocybe miniata Test Hill, grass, RAA, 15.10.08
Hygrocybe nigrescens 4.11.07
Hygrocybe virginea 4.11.07
Hypholoma fasciculare 4.11.07
Inocybe flocculosa Hangar verge, grass, RAA (i/d Ron Davis), 4.11.09
Inocybe geophylla RAA, 28.10.07
Inocybe rimosa Test Hill bank, 4.11.07
Inocybe sindonia 4.11.07
Laccaria amethystina 4.11.07
Laccaria laccata 4.11.07
Lacrymaria velutina 4.11.07
Lactarius pubescens under *Betula*, 4.11.07
Lactarius quietus under *Quercus*, 4.11.07
Lactarius torminosus under *Betula*, 4.11.07
**Leccinum duriusculum* Members Hill, under aspen, RAA, 7.8.09
Leccinum scabrum under *Betula*, 4.11.07
Lepiota cristata 4.11.07
**Lepiota ochraceofulva* Members Hill, RAA, 30.10.10
Lepista nuda 4.11.07
Leucoagaricus leucothites Bonfire site edge, RAA, 15.10.09
Lyophyllum decastes 4.11.07
Macrolepiota procera Finishing Straight edge, soil, RAA, 15.10.08
Marasmius epiphyllus 4.11.07
Marasmius oreades Helipad, grass, RAA, 15.10.08
**Melanoleuca phaeopodia* (cf) Aircraft area edge, soil, RAA, 15.10.08 (K)
Melanoleuca polioleuca Single tunnel, near, grass RAA, 4.11.09
Mycena adscendens 4.11.07
Mycena aetites 4.11.07
Mycena arcangeliana 4.11.07
**Mycena citrinomarginata* 4.11.07
Mycena filopes 4.11.07
Mycena galericulata ancient oak log 4.11.07
Mycena galopus 4.11.07

Mycena inclinata *Quercus* log 4.11.07
Mycena leptcephala RAA, 28.10.07
Mycena polygramma 4.11.07
Mycena pura 4.11.07
Mycena vitilis RAA, 28.10.07
Panaeolina foenisecii RAA, 28.10.07
Panaeolus fimicola Hangar verge, in grass, RAA, 4.11.09
Parasola plicatilis 4.11.07
Paxillus involutus 4.11.07
Pluteus cervinus Riverside, on logs, RAA, 17.11.09
 * *Pluteus* aff. *hispidulus* 4.11.07
Psathyrella candolleana Riverside, grass, RAA, 6.2.08
Psathyrella gracilis 4.11.07
Psathyrella multipedata 4.11.07
 **Rhodocybe gemina* 19.11.09 (K)
Rickenella fibula 4.11.07
Rickenella swartzii 4.11.07
Russula amoenolens RAA 28.10.07
Russula atropurpurea 4.11.07
Russula betularum RAA, 28.10.07
Russula cyanoxantha RAA, 28.10.07
Russula exalbicans Hangar verge, grass birch/aspen, RAA, 4.11.09
Russula fragilis 4.11.07
Russula heterophylla Members Hill, oak, RAA, 7.8.09
Russula nigricans Members Hill, RAA, 22.9.10
Russula ochroleuca, 4.11.07
Russula parazurea Members Hill, oak, RAA, 25.9.08
Russula subfoetens Riverside, RAA, 22.9.10
Russula velenovskyi 4.11.07
Russula vesca Test Hill, grass/oak, RAA, 25.9.08
Russula xerampelina Riverside, oak, RAA, 7.8.09 & Hangar edge 15.10.09
Stropharia caerulea RAA, 28.10.07
Stropharia coronilla Lawn, grass, RAA, 25.9.08
Stropharia inuncta Test Hill, grass, RAA, 25.9.08
Tricholoma fulvum 4.11.07
Tricholoma lascivum RAA, 28.10.07
Tricholoma scalpturatum 4.11.07 (K)
Tricholoma sulphureum 4.11.07
Tubaria furfuracea 4.11.07
Volvariella speciosa 4.11.07

'Aphylophorales'

Bjerkandera adusta on *Quercus* 10.3.85; on small stump, 4.11.07
Chondrostereum purpureum Riverside, on *Salix*, RAA, 15.10.09
Clavulinopsis helvola in grass, 4.11.07
Daedaleopsis confragosa 10.3.85
Exidia glandulosa *Quercus* branch, 4.11.07
Exidia thuretiana on *Quercus robur* fallen branch, 20.5.08 (K)
Fistulina hepatica on *Quercus* trunk, 4.11.07

Ganoderma sp. on *Salix*, riverside. Large brackets, RAA, 14.4.10
 **Gloeoporus dichrous* Members Hill, on *Quercus* log, RAA, 22.10.08
Laetiporus sulphureus on *Prunus* stump by Pagoda, RAA, 22.9.10
Meruliopsis corium on *Quercus* branch, 4.11.07
Peniophora cinerea on dead branch, *Acer pseudoplatanus*, 4.11.07
Peniophora polygonia on *Populus* sp. dead branch, 4.11.07 (K)
Peniophora quercina on *Quercus* + *Acer pseudoplatanus*, 4.11.07
Phanerochaete sordida on *Quercus robur* decorticated branch, 20.5.08 (K)
Piptoporus betulinus (track bank), on *Betula*, 10.3.85; 4.11.07; 20.5.08
Schizopora paradoxa on *Quercus* branch, 4.11.07; *Q. robur* log, 20.5.08
Stereum gausapatum on *Quercus*, 10.3.85; 4.11.07
Stereum hirsutum on *Quercus* logs, 10.3.1985, 4.11.07; 20.5.08
Stereum rameale on *Quercus*, 4.11.07
Trametes versicolor on *Betula* stump (clubhouse lawn edge), 20.5.08; 28.10.07; 10.3.85

Gasteroid fungi

Bovista plumbea Aircraft area, in grass, RAA, 15.10.08
Lycoperdon perlatum RAA, 28.10.07
Lycoperdon pyriforme 4.11.07
Vascellum pratense Test Hill, RAA, 30.10.10

Uredinales (rust fungi)

Cumminsia mirabilissima (Test Hill), on *Mahonia aquifolium*, 4.11.07; 20.5.08
Melampsora epitea on *Salix* sp. leaves, 4.11.07
Melampsora hypericorum on *Hypericum*, 4.11.07
Melampsora larici-populina on *Populus x canadensis*, 4.11.07
Melampsora populnea on *Populus tremula*, 4.11.07
Milesina kriegeriana on *Dryopteris filix-mas*, 4.11.07 (K)
Miyagia pseudosphaeria on *Sonchus oleraceus*, 4.11.07
Phragmidium violaceum on *Rubus 'fruticosus'*, 4.11.07
Puccinia annularis on *Teucrium scorodonia*, 4.11.07
Puccinia behenis on *Silene dioica*, 4.11.07
Puccinia malvacearum on *Malva* (Test Hill), 20.5.08
Puccinia obscura on *Luzula campestris*, 20.5.08
Uromyces muscari on *Hyacinthoides hispanica*, 20.5.08

Ascomycetes (including anamorphs)

Alternaria cf. *solani* on *Geranium* leaf, 4.11.07 (K)
Ascodichaena rugosa on *Quercus* living branches, 4.11.07
Asteromella castaneicola on *Castanea* leaves, 4.11.07
Asteromella sp. on *Populus* sp. & *Salix fragilis* leaves, 4.11.07 (K)
Botrytis cinerea on *Quercus* leaf, 4.11.07
 **Caducirostrum foliicola* ined. on decaying *Viburnum tinus* leaves, 4.11.07
Calloria neglecta on dead *Urtica* stems 10.3.85; 20.5.08
Coleophoma rhododendri on decaying *Viburnum tinus* leaves, 4.11.07

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- Chromelosporium terrestre* on damp soil, 4.11.07
Cistella grevillei on dead *Urtica* stems, 20.5.08
Cladobotryum mycophilum on rotten agaric, 4.11.07 (K)
Cladonia furcata on heathy soil, 4.11.07 (lichen)
Clypeosphaeria notarisii March-June 1985
Coniothyrium concentricum in leaf spots, *Yucca* (Test Hill), 20.5.08 (K)
Cristulariella depraedens in leaf spots, *Acer pseudoplatanus*, 4.11.07
Cylindrium elongatum on *Quercus* leaf litter, 4.11.07 (K)
Dendryphion comosum on dead *Urtica* stem, 20.5.08
Diatrype bullata on dead branch *Salix* sp., 10.3.85
Diatrype disciformis on *Fagus* dead branch, 10.3.85
Diatrypella favacea on *Betula* fallen branch, 4.11.07
Diatrypella quercina on *Quercus* fallen branch, 4.11.07; 20.5.08
Dictyosporium toruloides 4.11.07
Erysiphe cichoracearum on *Sonchus oleraceus*, 4.11.07
Erysiphe cynoglossi on *Myosotis* sp. leaves (track edge), 20.5.08
Erysiphe howeana - *Oenothera* mildew, 4.11.07
Erysiphe taraxaci (track bank), *Taraxacum* mildew, 20.5.08
Eutypa maura on *Acer pseudoplatanus*, 4.11.07; (track bank) 20.5.08
‘*Fumago vagans*’ ‘sooty mould’, on *Quercus* leaves, 4.11.07
Geopora sumneriana Members’ Hill, under *Cedrus*, RAA, 25/2/09
Helvella crispa in grass by Hangar, RAA, 19.11.10
Hypoxylon confluens March 1985
Hypoxylon multiforme on *Betula* logs, 10.3.85; 4.11.07; (Test Hill top), 20.5.08
Lachnum brevopilosum 4.11.07
Lachnum virgineum on dead stem *Urtica*, 20.5.08
Lepraria ?incana (track bank) 20.5.08 (lichen)
Leptosphaeria acuta on dead *Urtica* stem, 10.3.85, 20.5.08
Microsphaera alphitoides on *Quercus* leaves, 4.11.07
Microsphaera hypericacearum - *Hypericum* mildew, 4.11.07
Monilia johnsoni on *Crataegus* leaves, 20.5.08
Neoerysiphe galeopsidis on leaves, *Lamium* sp., 4.11.07
Octospora rutilans Test Hill, on soil, RAA, 6.12.09
Otidea onotica in grass by Hangar, RAA, 19.11.10
Patellaria atrata on *Acer pseudoplatanus* decorticated wood, 20.5.08 (K)
Penicillium sp. on *Castanea* cupule, 4.11.07
**Phloeosporella* sp. in *Oenothera* leaf spots, 4.11.07 (K)
Phoma hedericola in *Hedera* leaf spots, 4.11.07; 20.5.08
Phyllactinia fraxini on leaves *Fraxinus*, 4.11.07
**Pseudomassaria* sp. in *Gaultheria* leaf spot, 4.11.07
Ramularia inaequale in leaf spots *Picris hieracioides*, 29.7.09 (K)
Ramularia superflua on *Urtica* leaves, 4.11.07
Rhytisma acerina (Test Hill top), on *Acer pseudoplatanus* leaves, 4.11.07; 20.5.08
Sawadaea bicornis - *Acer pseudoplatanus* mildew, 4.11.07
Seifertia azaleae on *Rhododendron* buds, 4.11.07
Sepedonium chrysospermum on *Paxillus*, 4.11.07
Septoria rubi in *Rubus* leaf spot, 4.11.07; (Test Hill), 20.5.08
Sphaceloma populi on leaves *Populus x canadensis*, 4.11.07
Sphaerotheca epilobii on leaves *Epilobium* sp., 4.11.07

Sphaerotheca fusca on leaves *Conyza* sp., 4.11.07
Sphaerotheca pannosa on *Rosa* 10.3.85 ; *Prunus lusitanica*, 4.11.07
Taphrina populina on *Populus x canadensis*, 20.5.08
Uncinula adunca on leaves *Salix caprea*, 4.11.07
Xanthoria parietina on control tower, 22.8.05 (K) (lichen)
Xylaria hypoxylon on *Betula*, 4.11.07; (track bank), 20.5.08

Peronosporales (downy mildews)

Pseudoperonospora humuli on *Humulus lupulus*, 4.11.07

Myxomycetes (slime moulds)

Lycogala terrestris RAA, 14.4.10
Enteridium (Reticularia) lycoperdon RAA, 14.4.10
Didymium difforme on *Pteridium*, 10.3.85
Trichia contorta on cardboard, 10.3.85

Appendix G

Summary of Relevant Legislation Relating to Protected Species

Badger

The *Protection of Badgers Act 1992* consolidates previous legislation (including the *Badgers (Further Protection) Act 1991*). It makes it a serious offence to intentionally or recklessly:

- Kill, injure or take, or attempt to kill, injure or take a badger;
- To damage, destroy or obstruct access to a sett;
- To disturb a badger when it is occupying a sett.

Bats

All British bat species are listed in Schedule 5 of *The Wildlife and Countryside Act 1981* (as amended). The Act transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (commonly referred to as the ‘Bern Convention’). All British bat species are listed on Schedule 5 of the Act in respect of Section 9, which makes it an offence, *inter alia*, to:

- Intentionally or recklessly kill, injure, or take (handle) a bat;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a bat uses for shelter or protection;
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

British bat species receive further protection under Regulation 41 of the *The Conservation of Habitats and Species Regulations 2010*, which make provision for the purpose of implementing European Union Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992. All British bat species are listed on Annex IV of the Directive, which means that member states are required to put in place a system of strict protection as outlined in Article 12, and this is done through inclusion on Schedule 2 of the Regulations, which makes it an offence, *inter alia*, to:

- Deliberately capture, injure or kill any bat;
- Deliberately disturb a bat, in particular any disturbance which is likely:
 - (a) to impair their ability
 - (i) to survive, to breed or reproduce, or to rear or nurture their young, or
 - (ii) to hibernate or migrate
 - (b) to affect significantly the local distribution or abundance of the bat species; or

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- Damage or destroy a breeding site or resting place of a bat.

Further details of the above legislation, and of the roles and responsibilities of developers and planners in relation to bats, can be found in Natural England's *Bat Mitigation Guidelines*, which can be downloaded from the NE website: <http://naturalengland.etraderstores.com/NaturalEnglandShop/IN136>

Birds

With certain exceptions³, all wild birds, their nests and eggs are protected by the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, *inter alia*, to:

- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built;
- Take or destroy the egg of any wild bird.

Bird species listed on Schedule 1⁴ of the Act receive further protection, thus for these species it is also an offence to:

- Disturb any bird while it is nest building, or is at a nest containing eggs or young; or disturb the dependent young of any such bird.

Reptiles

The four widespread⁵ species of reptile that are native to Britain, namely viviparous lizard, slow worm, adder and grass snake, are listed on Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to intentionally kill or injure any of these species.

Native bluebell

Native bluebells are listed on Schedule 8 of the *Wildlife and Countryside Act 1981* (as amended), which makes it illegal to collect plants from the wild for sale.

³ Some species, such as game birds, are exempt in certain circumstances.

⁴ Includes barn owl.

⁵ The two other native species of British reptile (sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*) receive a higher level of protection under the *Wildlife and Countryside Act 1981* (as amended). However, the distribution of these species is restricted to a limited number of sites in particular geographic locations.

Annex 1

Brooklands Museum Site Plan
