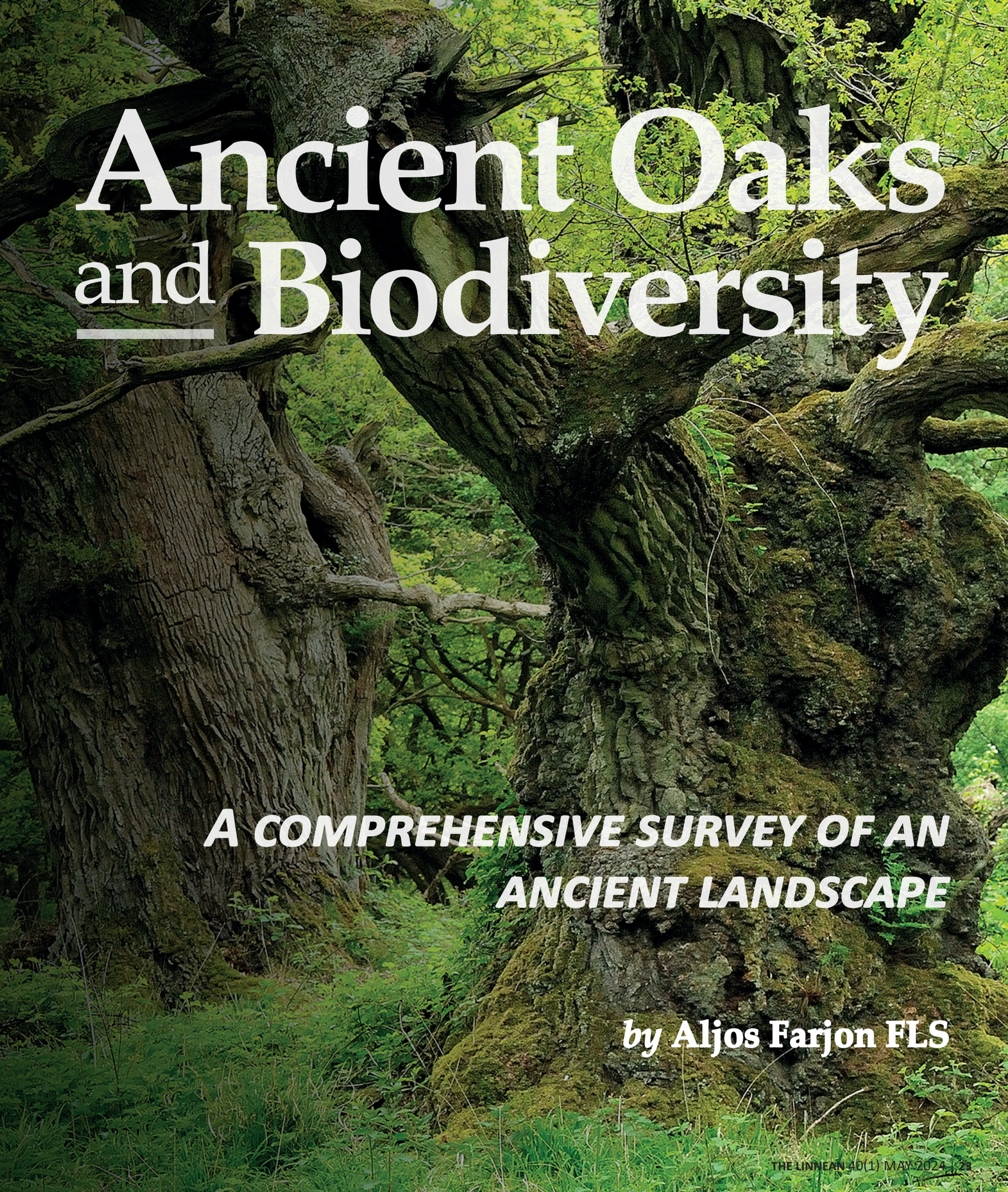

Ancient Oaks and Biodiversity

A COMPREHENSIVE SURVEY OF AN ANCIENT LANDSCAPE

by **Aljos Farjon FLS**

PREVIOUS PAGE AND BELOW: Ancient oaks in High Park, a wild section of Blenheim Park, Oxfordshire.

The Linnean Society's current exhibition, 'Lovely as a Tree', highlights the importance of trees to culture, economy and science. Aljos Farjon FLS previously reported on the preliminary results of a comprehensive survey of the biodiversity of High Park, a wild section of Blenheim Park in Oxfordshire, in *PuLSe* (48, July 2021). The survey has now come to a planned end and the results are to be published in 2024 in the book *The Natural History of Blenheim's High Park by Pelagic Publishing*. In this article, Aljos reports the 'final' results and discusses the importance of ancient oaks in relation to biodiversity.

High Park and its ancient oaks

Blenheim Park near Woodstock is the seat of the Dukes of Marlborough and one of the largest landscape parks in the country. Before it was granted to John Churchill by Queen Anne in 1705, it was known as Woodstock Park. This was a royal hunting park, carved out of the ancient Wychwood Forest by Henry I, the youngest son of William the Conqueror, in 1110. Many alterations have been made since 1705, including the creation of the lake, but on the hill above the new lake the ancient, wooded part of Woodstock Park was retained, providing a 'romantic ride through the wilderness' by carriage for privileged visitors on the Duke's estate. Ancient and veteran oaks, none of them planted by people, were numerous then and now. They form a semi-natural habitat known as pasture woodland, where deer or other grazing and browsing animals prevent trees from filling in the open glades and rides and closing the tree canopy. The ancient oaks are therefore mostly 'open grown' with spreading crowns receiving much sunlight, good especially for lichens.

The c. 130 ha site at High Park is managed as a strictly private reserve and is, by many accounts, the top site for large ancient oaks in all of England, and consequently Europe. I began in February 2014 by surveying the large ancient oaks for the Ancient Tree Inventory (ATI), completed in 2018. The total of recently recorded oaks in High Park, alive and dead, with a minimum girth of 5 m is 266. Pedunculate oaks (*Quercus robur*) have more insects associated with them than any other native tree (Tyler 2008) even before they are ancient, but with age and the decay of wood the numbers increase dramatically, especially of flies (Diptera) and beetles (Coleoptera). There is an intricate connection with the wood-decaying fungi, some of which cause 'brown rot' and others 'white rot' and these, in conjunction with the slowly progressing decay, create life conditions for different invertebrate species as time passes.

Images (previous page and this page): Aljos Farjon

The surveys

After my recording of the ancient oaks, I approached the Blenheim Estate again to propose a survey of the biodiversity of the site. I was granted permission but under limitations and an adherence to closure when management demanded it, such as the time of pheasant shooting in autumn and winter. Records were compiled by groups of organisms—listed in the Table—on Excel spreadsheets with all obtainable details; these were submitted to the Blenheim Estate and to the Thames Valley Environmental Records Centre (TVERC) at a special meeting in Blenheim Palace on 20 April 2022.

Although we did not neglect other habitats such as grassland and thorny shrubs, the surveys for most groups—especially the invertebrates—focused on the oaks. It is the ancient oaks that make the biodiversity of High Park stand out.

LEFT: Table showing total recorded species. While the data for several groups remains incomplete, it is hoped another round of surveys may be possible in the future.

Taxonomic group	Number of species	Years of surveys	Status by end 2021
Vascular plants	279	2015–2021	Complete
Bryophytes	120	2017–2020	Complete
Lichens	231	2017–2019	Complete
Fungi	459	2017–2021	Incomplete
Molluscs	76	2017–2020	Complete
Arachnids	106	2018–2020	Incomplete
Diptera	679	2017–2021	Incomplete
Hemiptera	86	2017–2021	Incomplete
Hymenoptera	233	2017–2021	Incomplete
Butterflies	28	2017–2021	Complete
Moths	684	2017–2021	Incomplete
Coleoptera	932	(2002)2016–2021	Incomplete
Other invertebrates	44	2017–2021	Incomplete
Amphibians/Reptiles	7	2016–2020	Complete
Birds	74	2017–2021	Complete
Mammals	26	2017–2021	Complete

The total of species recorded stands at 4,064, with, unsurprisingly, beetles (Coleoptera) being the most numerous at 932 species. Flies (Diptera) and moths are also quite impressive with 679 and 684 species respectively. As we can see from the Table, fungi and most of the invertebrate groups remain incomplete. Comparisons with other sites famous for their ancient trees, such as Windsor Great Park and the New Forest, make this clear. It is therefore hoped that at a future date, Blenheim Palace will consent to a second round of biodiversity surveys in High Park, stimulated by the book reporting the results from the first round.

Special discoveries

Plants

The flora of High Park is rather common. The causes are unclear, but its long history as a deer park and the current presence of a high feral population of fallow deer may have something to do with it. Mosses and liverworts are similarly scarce, this is attributed to the generally dry environment, only wet in winter. Some plants are notable regionally, among these are deadly nightshade (*Atropa belladonna*) and meadow saffron (*Colchicum autumnale*).

Right: Lichenologists at work on a big ancient oak in High Park, Blenheim.

Image: Aljos Farjon

Lichens

With 231 species found, High Park is considered a very good site for lichens by the specialists. Here the ancient oaks and their bark and bare dead wood form the special substrate for many species. The big old oaks have provided a long-time stable habitat and some are veritable gardens for rare species. I joined the lichenologists a few times on their surveys and noted that they were scarcely interested in the large and conspicuous lichens I had seen on thorn bushes (all very common they said) but instead spent an hour or so at a big oak trunk on which I saw only obscure grey smudges. Among these smudges were true rarities (most have only scientific names) and one, *Dimerella tavaresiana*, is the second record for the British Isles.

Fungi

The non-lichenised fungi (popularly known as mushrooms) are perhaps the most difficult organisms to survey. Just 459 species were found out of an unknown total. I joined all the fungal forays at High Park in the hope to learn and take some photos for another project I am working on. We found the rare oak polypore (*Buglossoporus quercinus*) on 22 oaks, a bracket fungus only found on ancient oaks.

Molluscs

Due to the mostly calcareous geology snails do relatively well, with the most conspicuous large species being the Roman snail (*Helix pomatia*). This species, although not originally native, is protected by law, cannot be collected for the kitchen and requires a permit to be handled. There is a species of bee in the park that makes its nest in the empty shells (presumably without a permit). The uncommon ear-shelled slug (*Testacella haliotidea*) only comes to the surface of the soil in very wet weather, typically in May.

Arachnids

The arachnids are the spiders and ‘allies’ and with 106 species found these remain under-recorded. I was present when they found what I thought was the most intriguing arachnid of all, the rare pseudoscorpion, *Dendrochernes cyrnaeus*. Pseudoscorpions are tiny and with 3.5–4.2 mm in body length this species is the largest in Britain. Its black claws are much like those of a scorpion but the abdomen is very different and of course lacks the sting. *Leviellus (Stroemiellus) stroemi* is a rare spider

recorded in High Park in 1985–1986 (TVERC data) as one of only two confirmed records in Oxfordshire (VC 23). It seems to be one of the few British spiders exclusively associated with ancient trees.

Top: The pseudoscorpion *Dendrochernes cyrnaeus.*

Bottom: The froghopper bug *Cercopis vulnerata* is the single species in its genus found in Britain.

Diptera

The two-winged flies are a highly diverse group with 679 species recorded. Peter Chandler, one of the top Diptera specialists in Britain, made several visits, but many records also came from 'bycatch' found in traps aimed at beetles or moths. I encouraged surveyors not to throw these out but send them to Peter; the same policy was encouraged in the opposite direction. Many 'saproxylic' (wood consuming) flies have their larval stage in wood rotting fungi, so in these cases the connection with dead wood is indirect. There were 188 saproxylic species in the records. Compared to other sites with ancient trees, these numbers are modest, but this only reflects the limited surveys executed in High Park.

Hemiptera

The order Hemiptera consists partly of insects known as bugs. True bugs have mouthparts modified into a sucking rostrum. With 86 species this group also remains incompletely surveyed. The leafhopper *Ledra aurita*, a large, flattened insect with ear-like lobes on the pronotum and found mainly on oaks is considered rare by some, but it has cryptic habits. A 'flatbug', *Aneurus avenius*, lives under the bark of recently dead wood where it feeds on fungal hyphae. Adapted to this narrow space it is so flat as to be almost two-dimensional.

Hymenoptera

These are popularly known as wasps, bees and ants, but sawflies also belong in this order. Remarkably, at least 50 colonies of honey bees (*Apis mellifera*) were discovered in targeted surveys by Filipe Salbany, breeding in hollow oak trees. They appeared to be darker coloured than domesticated bees and could represent a resident race in High Park. The long-horned nomad bee (*Nomada hirtipes*) is the specific brood parasite of the big-headed mining bee (*Andrena bucephala*); both are rare species and were recorded together at various locations in May when hawthorn (*Crataegus monogyna*) was in flower.

Butterflies

There were only 28 species of butterflies recorded in High Park, and most of these are common woodland species. Thanks to the oaks there is a very good population of purple hairstreak (*Favonius quercus*) and the iconic purple emperor (*Apatura iris*) breeds here. The food plant for this spectacular butterfly is goat willow (*Salix caprea*), abundantly present, while the males display to females high above the canopy of the oaks.

Moths

With 684 recorded species Martin Corley and co-workers did a good job of nightly moth trapping using lights. Like butterflies, moths have strong associations with plants, being almost exclusively vegetarian. Oaks have the highest number of species feeding on these trees: 58 in High Park, and for many overwintering moths the ancient oaks also provide shelter. A striking example of Batesian mimicry is the hornet moth (*Sesia apiformis*), which does not only look like a hornet, but sounds and behaves like one when it flies. A large and spectacular moth is the Clifden nonpareil (*Catocala fraxini*), figured in *PuLSe* (48, July 2021) on p. 13. This moth came to a 'wine rope' at night. *Aplota palpellus* was also found three times at light, but is very rare in Britain.

Images: Jovita Kaunang; Aljos Farjon

Below: Black-headed cardinal beetle (*Pyrochroa coccinea*).

Coleoptera

We now come to the beetles, the most speciose group with 932 species recorded. Beetles are by far the largest order of animals in the world, with more than 400,000 species so far named and described, with c. 4,100 known in the UK. We also know that the High Park beetle survey, led by Benedict Pollard, remains incomplete despite almost heroic efforts by him and co-workers, so we may say that High Park contains at least 25% of the UK beetle fauna. High Park is particularly important for saproxylic beetles, with 268 species found. Many of these are rare, and are first records for Oxfordshire (VC 23). Some notable species are: *Ampedus cardinalis*, *Mycetophagus piceus*, *Pseudocistela ceramboides*, *Trinodes hirtus*, all rare saproxylics, and *Longitarsus dorsalis* (nationally notable B).

Amphibians and reptiles

Britain is species-poor, with only 13 native species; seven of these have been found in High Park. Most common is the common toad (*Bufo bufo*) followed by the slow worm (*Anguis fragilis*) a legless lizard. There is a good population of the great crested newt (*Triturus cristatus*) and also the grass snake (*Natrix helvetica*). We looked in vain for adders (*Vipera berus*), but these are apparently extinct in Oxfordshire.

Birds

Birds were thoroughly surveyed by Anthony Cheke, helped from time to time by other birders. It is not easy to determine which birds are resident and which are visitors, or even only 'fly-overs'. There is also the adjacent lake and we had to determine which waterbirds could be given resident status in High Park, which has several ponds. In the end, 74 species were decided upon for High Park. By-and-large, these are common woodland species, but the return of raven (*Corvus corax*), buzzard (*Buteo buteo*) and red kite (*Milvus milvus*), all breeding in High Park, is the most notable change from the past. Conversely, the lesser spotted woodpecker (*Dendrocopos minor*) seems to have disappeared despite this excellent habitat.

Image: Aljos Farjon

Mammals

Lastly, the mammals. I learned that the surveying of mammals is difficult, despite bat detectors, traps for small mammals and the analysis of 'signs' such as footprints and owl pellets. Bats have plenty of cavernous trees at their disposal and are common, with one species, the barbastelle bat (*Barbastella barbastellus*) more or less dependent on ancient oaks. Footprints of otter (*Lutra lutra*) were found and photographed by myself well away from the lake; perhaps the animal was heading for the River Evenlode.

An in-depth look at an ancient site

High Park, Blenheim is a very special place for a naturalist. The Blenheim Estate recognises this, even more so with the knowledge obtained through the High Park Biodiversity Survey (2017–2021). The results, beside the basic data as mentioned, will be published in a book of which I am the Editor, *The Natural History of Blenheim's High Park*, with Pelagic Publishing (expected to appear in July 2024: https://pelagicpublishing.com/collections/aljos-farjon/products/the-natural-history-of-blenheim-high-park). It has been co-authored with 28 others, many of them top specialists in their fields. A detailed first chapter describes the site and its history to put the biodiversity in context, with accompanying illustrations and maps. The book is richly illustrated throughout, with examples accompanying this article.

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