Archaeobotany, or plants in the 4th dimension

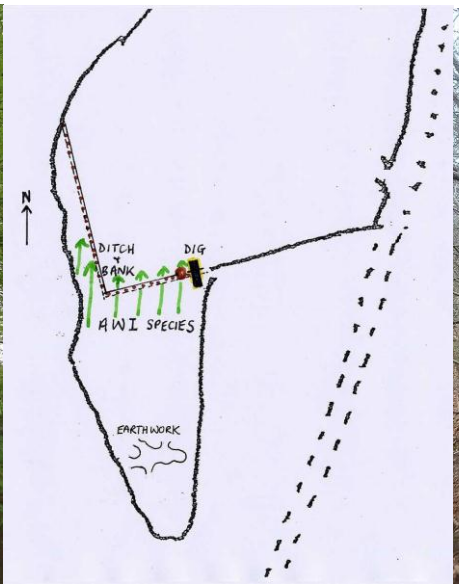
by Barry Wright.

Archaeobotany is the study of plants in relation to what they can tell us about the history of the ground on which they are growing. This uses so-called 'indicator species' that have particular relevance to the habitat or feature being studied. Some of the more rewarding features to study using archaeobotany are hedgerows and woodlands.

Hedgerows are a fascinating subject as some have been in existence for many centuries and can have been formed, extinguished and reformed with changing agricultural needs and practices throughout time. As far as archaeologists are concerned, determining which hedgerows pre-date others can be of significance when interpreting the land use of a given landscape.

The classic method of dating hedgerows using the 'Hooper rule' - that one species (in a random 30 metre section) colonises every hundred years - is not a reliable method of aging hedgerows. It pre-supposes that hedgerows planted 1000 years ago were planted with a single species of shrub. Much evidence exists to counter this, suggesting that hedgerows were formed using a mixture of species collected from nearby areas of shrubby vegetation. In some cases there is evidence suggesting that hedgerows were deliberately planted with a mix of species to fulfil different requirements. Basically using a count of the number of hedging shrubs is a rather blunt instrument when it comes to interpreting the history of a hedgerow. This is particularly so as it does not take any account of the ground flora underneath the hedgerow.

(Photo 1) Coppice on bank with dog's mercury advancing towards bluebells.



(Fig 1) Site of woodland earthwork, ditch & bank and advancing AWI species.

(Photo 2) Recording coppiced hazels on Hatfield Bank.

In ecological terms hedgerows are effectively linear woodlands. As such they can potentially encapsulate and contain a range of typical woodland ground flora species like Wood Anemones, Primrose, Bluebell and Dog's Mercury. These species will only persist if there is a canopy above them. If this canopy is removed they will eventually decline and become extinct at that location. If this hedgerow were to be reformed in the same position it could take many decades or even centuries before these typical woodland ground flora species would recolonise. This would be dependent on the proximity of nearby habitats supporting these species. Even if the hedgerow adjoined a woodland containing ground flora species, the rate of colonisation along its length would still be painfully slow.

As an example, Dog's Mercury has been shown to move along a hedgerow at only 15 centimeters per year. That means a colonisation rate of 15 metres per century. In practical terms looking at the Hedgerow ground-flora is like reading a history book. In most cases when you find woodland ground flora species in a hedge bottom you are looking at something that is of considerable age as the species present are more likely to have been retained from a former woodland history than they are to have colonised in recent times.

Having said that woodland ground flora plants are good indicators of hedgerow's age, it is also true to say that individual species can be better indicators of age than others. To use one of my favourite quotes "all indicator species are equal, but some are more equal than others". This plagiarism on George Orwell basically means that some species are very poor colonisers of hedgerows and others are more readily able to recolonise from nearby patches of scrub etc. Thus the presence of these poor colonisers gives a stronger indication of age than does the presence of species and that can colonise more quickly. As an indication, it is generally accepted that Wood Anemone and Primrose are relatively poor colonisers of new habitat, even with the proximity of similar habitat. Whereas species like Bluebell can more quickly colonise new habitat. Therefore finding only Bluebell in a hedgerow can be taken to indicate the hedgerow is at least of some antiquity, but a hedgerow containing Bluebell and Wood Anemone would suggest the hedgerow is of a greater age. How far these assumptions can be made is still unclear. My intention is to develop this area of study further over the next few years.

(Photo 3) Ancient sinuous hedge.

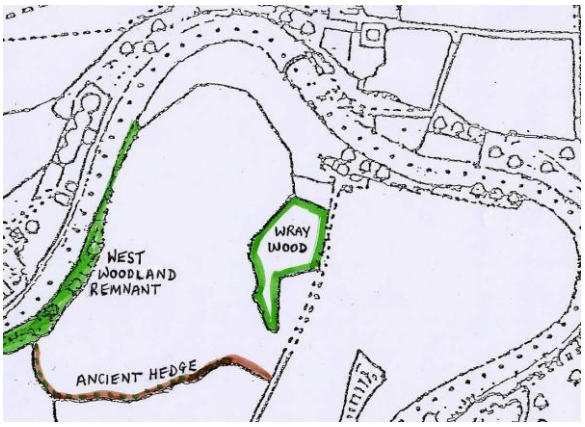
(Photo 4) Ramsons in sinuous hedge bottom.

One of the most fascinating hedgerows I have ever had the pleasure to study is south of Wray Wood, off Leys Lane (Fig 2 & Photos 3 & 6). This is a sinuous hedge of obvious antiquity based on its shape and appearance on historic maps. But it is also one that indicates historic origins based on the shrubby and ground flora elements contained along its length. Despite many attempts to unravel its history and origins there are still a number of unanswered questions which I still hope to resolve in the future.

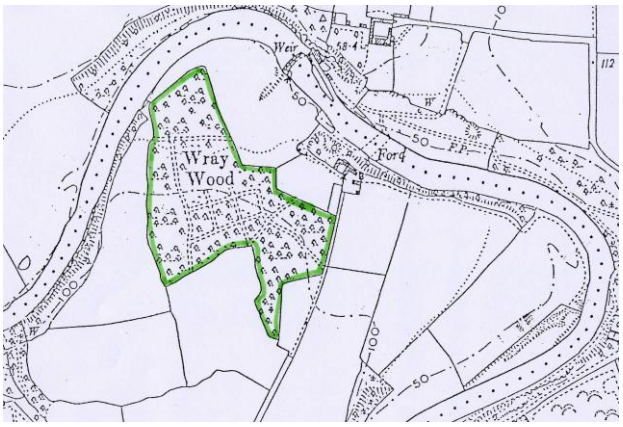
One of the imponderables relates to Wild Garlic or Ramsons (Photo 4). This species is present extensively along this hedgerow and yet it is almost totally absent in Wray Wood itself (some 30m to the north). By contrast Wray Wood contains a very large population of Bluebells, but the Hedgerow only has occasional scattered colonies along its length. The same also applies for Dog's Mercury. Although, curiously, Dog's Mercury is much more abundant at the extreme eastern end of the hedgerow where the hedgerow seems to have been realigned in the relatively recent past (within the last 300 years) as this section is straight and not sinuous.

Another fascinating area of study is Wray Wood (Fig 2 & 3), a really challenging and confusing plot of land covered with trees. I say 'land covered with trees' deliberately as my definition of true woodland includes at least some typical woodland ground flora species. Anyone can plant trees on a bit of rough ground, grassland or even an arable field. But, in my opinion, it is something altogether different to create a woodland.

Wray Wood is not evenly populated with woodland ground flora plants and AWI's. I'm sure a lot of people have classed ancient woods incorrectly because they don't look in detail at the distribution of AWI's in a woodland. If you classed Wray Wood based on the total species list of AWI's present throughout the wood you would conclude that the whole woodland is ancient. My studies can, so far, only confirm that it is ancient, in parts. The northern third contains either no AWI's or poor quality AWI's, like Bluebell, apart from its NW perimeter.



(Fig 2) Modern woodland remnants & old sinuous hedge.



(Fig 3) Fields and woodland recorded in 1850.

Many members may already know that the area around the 'sheepwash' dig (Fig 1 – see 'earthwork') is dominated by a rich woodland flora including many good AWI's like Wood Anemone and Yellow Archangel and that moving north you cross a ditch and bank that we excavated in 2000. Beyond here the AWI's decline and disappear, leaving mainly Bluebells and a few other woodland plants like Broad Buckler-fern. Curiously there is what appears to be an advancing front of Dog's Mercury moving north from this feature (Fig 1). This botanical chronometer has advanced approximately 15m (15cm/year), which would suggest that the area north of the ditch & bank was not woodland 100 years ago! Yet it appears as woodland on early maps! Why?

There is a definite concentration of 'good' AWI's stretching along the western perimeter of the wood, past the ditch & bank and northwards to the extreme NW of the wood. In particular there are two small patches of Wood Melick one south of the 'sheepwash' dig in the hedge bottom and one near the NW corner of the wood, again in the hedge bottom. Why?

The hedge west of the 'sheepwash' dig is also curious. The hedge plants themselves do not seem to be particularly old based on their trunk diameters. This can be misleading, but a generous margin for error would age them at between 150 and 250 year old. This would fit in with the current dating of the dig site. And could suggest that the western boundary hedge, next to the feature's exit ramp and pebbled yard (Photo 5), was planted on a small bank and ditch after the 'sheepwash' fell into disuse. In fact this ditch was found to cut through the pebbled surface. The presence of Wood Melick in the hedge bottom to the south of this stretch supports this theory and suggests that that section has been 'undisturbed' for a long period. As to why Wood Melick is currently only in the hedge bottoms is still a mystery. It does seem like the western edge of this wood is particularly significant and needs further study. Towards the NW, there is another ditch and bank east of the current wood boundary, running north south. Was this an ancient track running either along a woodland edge, or through the middle of an ancient wood?

Evidence suggests that the woodland west of Wray Wood, bordering the banks of the river Wharfe (called Hatfield Bank on some maps and referred to in Fig 2 as 'West Woodland Remnant'), was once part of the same woodland. But these two woods are now somewhat different, both in terms of species they contain and the way they were managed in the past.

'Hatfield Bank' contains an even better array of AWI's than Wray Wood as we know it today. There are Early Purple Orchids and Toothwort. It also contains ancient trees, coppices (trees and shrubs cut down to ground level to harvest the regrowth of poles) and pollards (like coppices, but cut high and out of the reach of cattle, or deer).

(Photo 5) 'Sheepwash' exit ramp (left), pavement (centre) and more recent in-fill hedge running right from **A**.

(Photo 6) Barry recording shrubs & ground flora in the ancient sinuous hedge.

These have been recorded and mapped (Photo 2) and will be reported on this year. The last time the Hazel bushes were coppiced was around 40 years ago. Some of the old Lime trees were last cut nearer to 70 years ago. But, the coppice 'stool' or, more correctly, 'coppice ring' of one of these is huge (Photo 7). So huge and old that the central trunk has rotted and been left behind by the ever-expanding ring of coppice stems. In the early years a coppice is cut and a new crop of stems grow from the circumference of the cut trunk. The next time it is cut the trunk is thicker so the ring of coppice growth is a larger ring of stems. Each time the coppice is cut the diameter of the stool is increasing in diameter. These stools can eventually reach many metres in diameter, but in the process the dead central part of the trunk will rot down and leave just the ring of new and vigorous growth, much like an expanding fairy ring of fungi.

The old lapsed coppiced Lime (Photo 8) in Hatfield Bank is 9.25m in girth at ground level or 2.9m diameter. The current stems are at least 70 years old. How old is the ring itself? A guess would by more than 400 years and could be much, much older. Some 7m diameter coppice rings in southern England can be traced back more than 1000 years from recorded evidence.

(Photo 7) Ancient lime coppice ring.

(Photo 8) Felled regrowth mimicking a coppice stool.

The whole subject of archaeobotany could potentially be an enormous area of study, but the rewards in terms of assisting in the interpretation of land use will, I hope, be worth the effort. I will be going into some aspects of archaeobotany in more detail with my talk on 26 May and also will be able to show some of the results on the walk on the late May Day bank holiday (30 May) as I we look at plants in the forth dimension - TIME.