# Some Historically Significant Trees in Norfolk

*by John White*

*Synopsis: At first glance Norfolk may seem to be devoid of significant trees but this is certainly not true. There is a wealth of arboreal diversity and history equal to any other county in England; some of this diversity is explored in this paper.*

## Introduction

The slate for trees in Norfolk was wiped clean during the last Ice Age, thus about 14,000 years ago there were no trees in the county. Yet by the time the British Isles became separated from mainland Europe by rising sea levels around 6,000 years ago a small number of what we can call 'Native Species' were established throughout the region. Subsequently species were added to the tree flora, mostly 'Alien Species' introduced through human activities.

In the past two hundred years Norfolk appears again to have been extensively cleared of trees, but this time in favour of agricultural and military activities. Fortunately enough historically significant individuals do survive to give us a tangible living link with our past. Oak has most to tell us about our recent history with extant trees dating back almost 1000 years. While, the wood of elm was widely used in ancient times, sadly few specimens remain since the last outbreak of Dutch Elm Disease. However, Black Poplar* is a tree for which this county is notable for there are more examples of this endangered species in Norfolk, Suffolk and Essex than anywhere else in England.

## Native Species and Native Trees

Most native woody plant species arrived in the British Isles by natural progression northwards after the last ice age. This process began as the climate warmed up about 13,000 years ago and ended 6,000 years ago when melting ice caused sea levels to rise sufficiently to isolate the British Isles from continental Europe. This restricted the number of species of woody plants to qualify for native status to around 150 and trees in particular to only 33. Here the term a 'British Native Tree Species' applies to the species as a whole and not to an individual plant.

In a strict sense a 'Native Tree' (as opposed to a 'Native Species') is a plant growing on a site it occupies naturally having never been moved artificially[2] and, moreover, it should have regenerated from only local British stock. Such authentic native plants include those found in ancient woodlands where there is no evidence of past modification, or ancient semi-natural woodlands where there has been continuous tree or coppice cover since before the year 1600.[3]

Using this strict definition only two or three species can claim to have 'Native Trees' in Norfolk. The problem is that plants growing outside these limited environments could have resulted from cross fertilisation by pollen from later imports of the same species. The products of such crosses would often be undetectable after many years except by DNA analysis of their genetic material. Economically genetic purity may not be significant, in fact 'corrupted' trees often have a very colourful background.

## Ancient woods in Norfolk

At the time of Doomsday there was more woodland in Norfolk. Now, with so much lost to agriculture and plantation forestry, only 0.5% of the present land area can be classed as old woodland. Indeed, it is estimated that 75% of medieval woodland has disappeared.

The are many definitions of ancient woodland, but one that is widely used today recognises for practical reasons woods that were in existence in 1600 as the starting point, even though by this date considerable changes had already taken place. It is the one used in all English Nature documents and is therefore worth repeating:[4]

**Ancient Woodland:** Land that has had continuous woodland cover since at least 1600AD and may be:
**Ancient Semi-natural Woodland:** Ancient

*Footnote: In this paper the English and Scientific names follow White (2005)[1]

woodland sites that have retained the native tree and shrub cover that has not been planted, although it may have been managed by coppicing or felling and allowed to regenerate naturally.

**Ancient Replanted Woodland:** Ancient woodland sites where the original native tree cover has been felled and replaced by planting, usually with conifers and usually this century (20th century).

Many woodlands belonging to these two types can be found in Norfolk, fortunately some of the more important sites are now reserves owned and managed by English Nature and the Norfolk Wildlife Trust. A few examples together with OS Grid refs are given in the list below; the one in North Norfolk is in italics.

Ashwellthorpe Lower Wood TH140980
Foxley Wood TG049229
Wendling, Honeypot Wood TF932142
*Swanton Novers TG013320*
Wayland Wood TL924995

All of these sites contain areas of ancient semi-natural woodland mixed with ancient replanted woodland and, on a smaller scale, similar associations can be found in the parishes of both Holt and Cley. However, many of the ancient woodlands in Norfolk belong to the replanted type, such as Hindolveston Great Wood and, in the Glaven Valley, Pereers Wood.

It must be remembered, however, that ancient or veteran trees are found in areas that are not considered woodland. An excellent example in North Norfolk is the Norfolk Wildlife Trust (NWT) reserve at Thursford Wood (TF979333) that is described as ancient wood pasture with some old oaks that are over 500 years old.

## Alien Trees

There are few places in the world where introduced trees play a more important role than in Britain. In Norfolk, even though it lacks a high rainfall, there is as rich and diverse tree flora as in any other part of the country, with over 2000 species and many more varieties of tree now growing in the county. Some alien species have become so familiar that it is difficult to regard them as introduced. A few, such as Sycamore and Horse Chestnut, have adapted themselves to the British climate and soil so well that they have become naturalized and taken on the superficial appearance of native species.

## Veteran Trees

Veteran trees are living testaments of history, besides being picturesque additions to the landscape. In addition they provide obvious benefits in helping to maintain a diversity of wildlife. However, much of this history was never recorded or has been lost over time. Yet these trees still retain a special meaning and mystery as the only living link we have with the distant past and our ancestors.

Veteran trees may be large or 'over mature' trees, but they have such diverse range of forms that a simple definition of what should be regarded as 'a veteran' is not possible. Each individual must be assessed on its own merits. Age is important, but how old is old? It depends very much on the species and the place where the tree is growing. An ancient beech will only ever reach a fraction of the age of a similar sized ancient oak. A hillside rowan will be older than a comparable city park rowan. So size too is of little help in resolving this matter. Certainly veteran oaks can be enormous, but no larger than a redwood that was only introduced from America after 1853. Authentic veteran holly, field maple, thorns or mulberry trees of enormous age will always be smaller than oak or redwood. However, it must also be remembered that a small stunted tree growing under adverse conditions may be the oldest of the lot!

Usually a veteran tree is one that is past maturity and in decline. In oak this means heavy branches will be dying back or falling off, and a new shorter twiggy crown will be forming. Oaks with burrs (woody lumps of stem regrowth) are the most likely trees to do this and survive longest. Such specimens become a vital lifeline for saproxylic* invertebrates and endophytic* fungi. Eventually epiphytic* plants will take root on their rotting stems and dead wood. Trees that are richest in such plants and animals are often species that take a long time to die; oak may take four hundred years, whereas birch may take only twenty.

## Local benchmarks for dating trees

In order to determine the age of old trees that are too precious to be damaged by drilling of any sort a method of estimating a date of origin has been devised that compares species, site and condition with other trees of known planting date. This depends on detailed knowledge of how a tree grows.[5]

Understanding the history of a tree depends to a large extent on knowing its age, but most veteran trees soon outlive any documentary evidence about planting and early management.

*Editor's footnote: saproxylic = living on or in rotting wood; endophytic = living within another plant; epiphytic = living on another plant.

***Photograph 1. The oldest living oak at Holkham from 1580. (Tree 63 in the park to the north of King George's Plantation).***

Nevertheless, several estates in Norfolk such as Kimberly, Oxborough and Felbrigg have valuable historical records, but none as comprehensive as Holkham Hall. Several extant trees are marked on the earliest surviving maps of this estate surveyed by Biederman, in about 1781.[6] Some of these trees were planted at least 200 years earlier and are probably old boundary and hedgerow specimens that predate the park. A more familiar outline of woods and belts at Holkham appears on the 1796 map published by William Faden, Geographer to King George III. By the time of the 1836 Ordnance Survey (OS) map Holkham Park had developed to virtually its present state.

Comparisons of the earlier maps and subsequent OS maps has verified planting dates in the Estate records, while cut stumps and fallen trees have enabled ring counts to be carried out to ascertain precise ages for most of the main periods of planting. These go back to a time before 1734, and are not related to Kent's mansion. Then there is a period from the building of the Hall (1734) to 1775, including William Kent's 'clumps'*. Followed by the 'John Sandys Period'** from 1775 to 1836, and finally 1836 to 1904 covering the activities of the Second Earl of Leicester.[7]

The park contains beech trees dated from 1754 to 1820, notably a plantation on Howe Hill (1781) and Sir John's Belt (1754). Planting dates for oak woods are recorded from 1794 to 1870 and to the present day. The Lombardy Poplars planted in 1785-7 are probably the earliest authentic record of a planting date for this species in Britain. A 'Willow Clump' was established in 1797 and vestiges of the same willows

* Walpole, who was a great admirer of Kent commented that: "Mr Kent's passion for clumps – that is sticking a dozen trees here and there till a lawn looks like the ten of spades. Clumps have their beauty; but in a great extent of country, how trifling to scatter arbours, where you should spread forest."[7]

** John Sandys was a nurseryman of Wells who supplied and supervised the planting of many of the Holkham trees.

***Photograph 2. Kett's Oak or Oak of Reformation on Mousehold Heath.*** *Copyright Norfolk County Council*

remain.

## Individual Trees and Species

**Lost but not forgotten, The Bale Oak**
(probably *Quercus robur)*
Norfolk has one of the best and rare examples in England of the history of a tree surviving for longer than the tree itself. The legendary Bale Oak lives on in the minds of local people 144 years after it was cut down. It is said that some of the hedgerow trees nearby were grown from acorns of this tree and that furniture was even made from salvaged wood. The Bale Oak was a remarkable specimen, it began to die in 1795 and by the time it was cut down and measured in 1860 it was a branchless and leafless hollow trunk that had even been used as a cobblers shop and a pigsty. It would be interesting to know what tools were used to cut through such a large specimen, but the wood was carted off with much festivity to Cranmer Hall, Sculthorpe.[8] However, the Evergreen Oaks now growing around the site belong to a species introduced from south-west Europe in the sixteenth century and have nothing to do with the original tree.

It would appear the Bale Oak, and others adjacent to it, were always venerated, protected and nurtured, as the Celtic name for Bale means 'a sacred grove'. It is likely that growing conditions were always good, so the estimation of age is based upon the fastest growth category of oak recorded in England to give a minimum estimate for the age of the tree – it may have been older. The mean radius of the stem when cut down was about 175 cm., with a massive stump area of over 9.5 sq.m.. The estimated age of a stem this size is 912 years. However the tree was severely pollarded (all the branches cut off) in 1795 and it probably never recovered sufficiently to increase its size subsequently, so the estimated age should refer to that year for calculating the starting date. Thus a tree 912 years old in 1795 started growing in the year 883 AD, in the reign of King Alfred!

**Kett's Oaks** (*Quercus robur*)
Amongst some of the best-known trees in the county are the two surviving Kett's Oaks. A third reported to be on Mousehold Heath appears to no longer exist and no information on its size has been found. These trees, often called 'Oaks of Reformation', are reputed to mark the places where the followers of Robert Kett gathered and dispensed justice in 1549.*

Over many centuries the central issues of the Rebellion have resonated with succeeding generations, grievances associated with, for example, loss of common rights and land,

*Editor's Footnote: At least 1 or 2 people from Blakeney and Wiveton joined the Rebellion. (Rutledge, E 44. Kett's Rebellion, in Wade-Martins, P *An Historical Atlas of Norfolk* 1994)

***Photograph 3. Ryston Kett's Oak: a 300 year old Ryston oak showing how Kett's Oak would have appeared in 1549.***

destruction of religious buildings and improving the lot of the labouring classes.[9] It is hardly surprising therefore that 'Kett's Rebellion' has evoked interest and sympathy and that these trees have been absorbed into local mythology. Although, the historical evidence for linking these trees with the ill fated 'Rebellion' may be questioned, that is not the issue here, rather it is the history of the individual trees.

**Ryston Kett's Oak**
(TF 627 006 access restricted)
The tree at Ryston is probably the only surviving specimen where the chances of this tree being authentic are good. It is very large and clearly a veteran by the standards of English Nature and The Ancient Tree Forum.[10] There are old measurements too, for example it had a 232 cm. diameter in 1906, but now it is 263cm at its narrowest point (measured 2004) giving a basal area of 5.4 sq.m.. Using comparative data from oak trees growing under 'Average Parkland' conditions the age is estimated to be 757 years, thus it started growing in 1247 during the reign of Henry III.

A tree selected as a meeting place by Kett's followers would almost certainly have been a dominant feature in the landscape and probably well known to many people. It was probably growing in comparative isolation, easily seen from the surrounding countryside and along the fen edge. In 1549, this tree would have been 302 years old, its stem is estimated to have been almost 158cm diameter with a basal area of 1.6 sq.m. (using the same 'Average Parkland' category). The massive branch scars and stubs still visible on the stem today suggest that it would have had a large wide spreading crown.

There are several park trees still growing near Ryston Hall that more or less match this size and age. They show clearly what Kett's Oak must have been like in 1549. Although the crown would probably be starting to break due to exposure, its height would have been in the region of 20-28 metres, the current maximum height for 300 year old oaks on this site. The height now after a further 455 years of sustained battering is only 14 metres.

**Wymondham Kett's Oak** (TG 139 036)
Although this far better known tree is called the Wymondham Kett's Oak, it is actually in the neighbouring parish of Hethersett, nevertheless this tree is also reputed to mark another of the spots where he gathered his followers. Certainly the Rebellion started in this area and Kett is

recorded as living in Wymondham. While wider grievances attracted people to his cause there were local issues and frictions centred on the enclosure of common land and the determination of the Reformation Commissioners to pull down monastic buildings at Wymondham.

It may be reasonable to assume that the tree under which the rebels met was growing on common land, perhaps in as bleak a situation as it is today, close to the old highway from London to Norwich. As in the case of the Ryston tree, it was probably a conspicuous feature visible from many directions. This would have meant that in 1549 it was a mature tree, for oaks of this species (*Quercus robur*) this is reached in 70-100 years, perhaps longer here on the Central Norfolk Clays.

This tree is very much smaller than the Ryston example having a stem diameter of only 113cm (measured 2001) giving a basal area of about one sq.m.. Using the slowest known growth category for estimating the age of oaks in the British Isles, this would date the tree back to 1574 some 25 years after the Rebellion. But employing the same estimation procedure as at Ryston it only dates back to around 1800.

Today the trunk is filled with concrete and there are no signs of a much larger stump or older root system from which a later tree could have developed, but much of this could have been removed in 1933 when the tree was 'repaired' and concrete was added.[11] So whether the tree we see today could be the actual tree under which Robert Kett gathered his men must be open to question given the above calculations.

It would seem there are three alternative options to consider:

1. The tree has indeed grown more slowly than any other recorded oak in lowland England and really is Kett's tree.
2. The original was destroyed, perhaps by the 'gentry' out of spite or fear, soon after 1549, but acorns were saved and grown by local supporters of Robert Kett and planted out much later on.
3. The existing tree simply commemorates the place and the event and was planted to replace the original. It may be of unknown origin and not the progeny of the original tree.

**Common or English Oak** (*Quercus robur* ): **Veterans in Norfolk**

Common or English Oak is the commonest historically-interesting tree in Norfolk, not least because it can live for such a long time. The soils and climate also favour oak climax woodland that once extended across much of the County, except for the most boggy areas. It is also a species that survives in close proximity to the sea because it can withstand salt-laden winds and salinity in the soil.

Oak has always been prized as a valuable timber tree as shown below in a graphic and detailed account by J Evelyn[12] of a timber sale in the county around 276 years ago – little has changed!

"*There were in 1636, an hundred Timber-trees of Oak, growing on fome Grounds belonging then to Thomas Daye of Scopleton, in the County of Norfolk, Efq; which were that year fold to one Rob. Bowgeon of Hingham, in the fed County, for 100 l, which Price was believed to be equal, if not to furmount, their intrinfic Worth and Value; for, after Agreement made for them, a Refufal happening (which continued the Trees ftanding till the Year 1671.) thofe very Trees were fold to Tho. Ellys of Windham (Timber mafter) and one Hen. Morley, Carpenter, by Mr Daye (Son of the faid Thomas Daye, Efq;) for 560 l. And this comes to me attefted under the Hand of 'Squire Day himfelf, dated 4 May 1678*".

[Editor's note: It will be easier to read this account if you substitute s for f and pound currency for l]

Many of the oldest living oak trees in the County today date back to the time of the Black Death when the agricultural workforce was decimated and trees were able to grow on neglected land. The largest trunk on the Bayfield Estate dates back to 1346. It is likely that many other trees near it are of similar age. Two huge stems in the wood pasture at Kimberly Estate are 243cm and 248cm in diameter and date back to 1373 and 1380.

Sixteenth century 'Elizabethan Oaks' are still frequent in the County and research into these trees has been greatly assisted by the records held at the Kimberly Estate. Furthermore, cut wood and stumps around this Estate showing annual growth rings have provided precise data on which all the local age calculations have been based. In the year 2000 some of the so-called 'Elizabethan Oaks' in the park had an average age of 486 years (1514) and thus were actually planted in Henry VIII's time before Elizabeth became Queen. Another landmark tree nearby with a 199cm mean stem diameter is estimated to have originated in 1571 and some of the trees in the wood pasture were planted between 1571 and 1579. Later individuals in the Wood Pasture Field and Downham Lodge Field date back to the time of James I (1621).

'Elizabethan Oaks' also occur at many other locations in Norfolk including Sandringham, Oxborough, Sheringham Park and even on the military battle training area at Stanford, where they are probably better protected than anywhere else. Almost without exception the surviv-

***Photograph 4. Bayfield Oak dated to 1346***.

ing trees in this age group only remain in place by default as they are commercially useless and in the past, before chainsaws were invented, were too big to be worth cutting down.

The era of the true English Oak in England ended abruptly in the seventeenth century because of possibly the earliest recorded case of 'genetic pollution'. James I imported vast quantities of acorns from France to 'improve' his woodlands, so any 'English' oak planted from around 1610 onwards may not be English at all. It is known, for example, that around that time two chests of French acorns were planted in the heartland of English oak, Windsor Great Park.[13] So by now Anglo-French hybrids could have spread throughout the land.

**Sessile Oak** *(Quercus petraea)*
This alternative English Oak is generally associated with rocky upland sites in the British Isles. It is not common in Norfolk and contrary to popular belief it will seldom hybridise with Common Oak. It is often a straight stemmed tree with multiple up-swept branches, but not invariably so.

There are occasional examples in Norfolk scattered amongst Common Oaks, probably the best tree of the upright form is at Holt Hall. It has a stem diameter of 170cm (2002) and is in the region of 340 years old, planted in the reign of Charles II. The oldest found so far in the County, which has the more twisted Common Oak form, is at Felbrigg on the track from the house to the lake. Its stem is 728cm in girth (232cm diameter) and it is estimated to date back to 1507 (Henry VII). Nearby slightly smaller trees of the same species and form date back to around 1646.

**Evergreen or Holm Oak** *(Quercus ilex)*
Until recent climate changes began to take effect in Britain thriving Holm oak trees were mostly confined to Devon and Cornwall and just the mild coastal fringes of the British Isles. Occasionally trees survived in mild urban microclimates.

In Norfolk, Holkham is a stronghold of Holm Oak or 'Ilex' as it is known locally. It is said that the first trees arrived as stray acorns in the packing around Italian marble used to decorate the great hall when the house was built between 1734 and 1764. The oldest specimens in the park certainly date back to that period and the provenance of the oldest extant trees does support an Italian origin. To this day additional

plants continue to be added to the collection by The Earl of Leicester.

**Turkey Oak** *(Quercus cerris)*
This fine looking but commercially useless timber tree was introduced from Asia Minor in 1735 and grows very well in the County. There is a giant specimen, possibly from the original introduction, in the garden at Blickling and another very good example at 'The Walks' in Kings Lynn.

**Sweet Chestnut** *(Castanea sativa)*
The acid sands and gravel of North Norfolk suit this species very well. Its origin in Britain is said to date back to the Romans, but charcoal at an archaeological site in Southern England suggests an earlier presence. Most of the big trees in our region are seventeenth century, but a large clump in Holt Hall woods, if it is all one tree, may date back to 1034, i.e. pre Norman Conquest. Large timbers were used but they tend to be of poor quality and prone to splitting. Small split logs were, and still are, used for fencing. The wood is durable when used out of doors without treatment with artificial preservatives.

**Ash** *(Fraxinus excelsior)*
This is not a common hedgerow tree in arable country because in the past its shallow roots trapped horse drawn ploughshares that could seldom be recovered. It is also a light demanding tree that does not thrive in dense woodland. However, the strong pliable wood was valuable for farmers, so trees were traditionally pollarded to obtain a sustainable supply of small flexible poles.

There is an interesting fifteenth century reference from the Dean and Chapter Rolls of Norwich Cathedral which states that men were paid to plant ash trees in hedges at Hindringham and Gately that were 'pulled up' in Hindolveston Wood. Earlier in 1297-8 new boundary banks, amounting to four miles, had been constructed at Hindolveston Wood for Norwich Cathedral Priory.[14]

**Beech** *(Fagus sylvatica)*
The native status of beech in Norfolk is the subject of much argument. The County is on or just beyond the natural range of the species. However, large trees are frequent and in places such as Felbrigg and Blickling they are as old and as large as beech gets, but many have fallen in recent gales. One of the finest is on the lawn at Bayfield House where it was planted in 1741. Three hundred years is exceptional for a beech tree. Traditionally trees were pollarded to produce small poles that could be split into four and turned on a pole lathe to produce table and chair legs.

**Plane** *(Platanus* species)
London plane *(P. x hispanica)* is a hybrid that probably arose in the seventeenth century. It is a common tree dominating many of the urban parks in the County. At Kimberley, adjacent to the walled garden, there are three very large examples of this hybrid with 137, 204 and 168cm stem diameters in 1999. The estimated age of a mean of these is 198 years, indicating they were planted about 1802. Trees of similar size and age can be seen in the Ryston Hall Gardens where the tallest tops 34 metres.

Much less frequent is the Oriental Plane *(Platanus orientalis)*. There are good trees in Kings Lynn and a splendid layering specimen covering a huge area in the garden at Blickling.

**Common Lime** *(Tilia x europaea)*
This Lime is usually planted as an avenue tree, but infrequently in Norfolk although there is a short avenue at Kimberley dated to 1802. It is generally recognized by dense twiggy epicormic growth at the base or up the stem.

**Large-leaved Lime** *(Tilia platyphyllos)*
A tree near Binham Priory is interesting not for its great size and age but because of its origin. It is the southern form of the species *(Tilia platyphyllos* subspecies *pseudorubra)* from the Ukraine and Romania. At Kimberley south of the house there is an impressive lime of the British native form thought to be 243 years old (1757), an age which fits nicely into the period when 'Mr (Capability) Brown' was landscaping the estate.

**Small-leaved Lime** *(Tilia cordata)*
Hockering Wood is the third largest lime wood in the British Isles.[15] For a time in prehistory when the climate was mild this species was the commonest tree in lowland England. It has been coppiced regularly, which prolongs the life of the plant. So it is likely that some extant plants may have originated over 1000 years ago, even possibly 6000 years ago when the species arrived in the region naturally from continental Europe. The largest individual stem in Britain, 184cm diameter, is at Haveringland Hall (OS grid ref.: TG 154 214).

In Roman times, and possibly earlier, this was known as the tree of a thousand uses, most important was the 'bast' or inner bark that could be processed into a coarse fibre for making rope, besom ties, fishing nets and rough cloth. Lime charcoal was the best for artists and it made excellent gunpowder. Grinling Gibbons preferred the soft, even-grained wood in the seventeenth century for wood carving. Since then it has been used for toy making, hat blocks, bobbins, beehive frames domestic utensils and plywood.[16]

***Photograph 5. Working Small-leaved Lime coppice.***

**Field Maple and Hawthorn**
*(Acer campestre & Crataegus monogyna)*
Ancient hedgerow trees abound in Norfolk. They are not spectacular so most of them are overlooked. Relict hedgerow hawthorns at Holkham suggest ages up to 500 years. Usually it is only possible to calculate age when broken stems reveal annual rings that can be counted. Even then there are problems, as exemplified by the hawthorns growing along the edge of the former saltmarsh at Wiveton. These trees probably date from the early 19th century, but they could be much older if they are growing on old rootstocks, even surviving from the time the harbour fell into disuse in the 16th or 17th centuries. A field maple stem at Kimberley with 92cm diameter at 40cm above ground is quite outstanding. At present, there are unfortunately no data for estimating field maple ages, but recent investigations of similar trees in Yorkshire suggest about 2-300 years, growing possibly on a much older rootstock.[17]

**Bird Cherry** *(Prunus padus)*
The ancient woodlands of Wayland and Swanton Novers are southern outposts of this north British native species.

**Hornbeam** *(Carpinus betulus)*
The northern limit of native hornbeam is Sexton Wood (OS TM296915). There are fine old pollarded hornbeams at Burgh Heath Farm near Attleborough. They are probably relicts of ancient coppice coup (area to be cut in a particular year) boundaries, although they now stand in open farmland and pollarding has lapsed. It has been difficult to estimate the age of these trees because unfortunately this aspect of hornbeam has not been studied in detail.[5] So the top growth may be over 50 years old, but the rootstocks and bollings (stems) could in some instances be more than 5 times that age. One of the problems is that cut stumps of hornbeam are rare and they tend to decompose rapidly, which is perhaps unexpected in such a hard timber. Furthermore, even in the green wood the annual rings are not well defined.

Lapsed pollards of hornbeam, which may be defined as individuals not cut back for more than 13 years are notoriously difficult to rework.[14] Although initial recovery after belated cutting may initially appear successful, mysteriously they decline and death can follow some years later.

It was common practice when pollarding to keep to a recognised timetable for cutting. Traditionally this was between St. Martin's Day

***Photograph 6. Hawthorns at Wiveton showing multiple stems growing from possibly an old rootstock.***

(11 November) and St. George's Day (23 April), but thought to be best towards the beginning rather than the end of this period.[18]

**Elms** *(Ulmus* species*)*

English Elm *(Ulmus minor var. vulgaris)* represents one of our most tangible links with the past. Except for its close relative, the small-leaved lime (*Tilia cordata)*, it is the oldest living tree species we have in Britain. Forms of it were originally brought here by Bronze Age farmers between 3000 and 5000 years ago. They came from South East Europe where the tree is a native species.

Seed is seldom produced in Britain so it reproduces vegetatively, usually by suckering indefinitely from an extensive in-situ root system. This exceptionally long life is attributed to centuries of intensive management. By cutting hedges, cropping foliage for fodder, or harvesting timber, people have inadvertently rejuvenated the plant and stimulated it to grow and spread over and over again as if it was a young sapling. Historical references to elm hedge planting appear to begin in 1320 in Essex.

Although elm wood as such is seldom found on ancient archaeological sites, there is some evidence of elm being used for wheels of carts and chariots from the eighteenth dynasty in Egypt (even though elm is not native to Egypt). Elm has also been identified on wetland sites in preserved boats, from ancient dug-out craft to late nineteenth century ships keels. Structural and domestic wood finds are common after the twelfth century. Piles, posts, pipes and coffins made of elm occur frequently, while wheel naves, chair seats, mallet heads and bows have also been identified. Medieval floor boards and long timbers occur as archaeological material and of course as components of extant buildings.

The naming of the different species and varieties of elm has suffered from excessive 'tinkering' and a huge number of cultivated forms have been developed. Some of the latter have had enough time to out-cross with native and different cultivated populations. The resulting confusion is difficult to unravel. In Norfolk there are two native species Wych Elm *(Ulmus glabra)* and Smooth-leaved Elm *(Ulmus minor subsp. minor)*, plus an endemic hybrid only found in East Anglia.

Since prehistoric times, when forest land was first converted to agriculture, elm trees have often been retained because of their value as producers of cattle-fodder, hard rot-resistant wood and bark products. Suckering species were cultivated as boundary hedges or for home-

stead shelter. So it is easy to understand the high regard in which country people held elms for it represented a locally available resource that was self perpetuating with very little effort or expense.

So it is thought that people carried their favourite elms from place to place with them. This could account for the origin and spread of English Elm in Bronze Age England; this variety does not occur in adjacent areas of Continental Europe. Wych elm and Smooth-leaved elm on the other hand are native species in Britain and Europe. Their post-glacial occurrence in The British Isles was in the Mesolithic period some 7000 years ago. The East Anglian hybrid, which has dubious parentage, is also considered to be native in Britain.

Since the latest ravages of Dutch Elm Disease few mature trees remain in the County; a comprehensive map of these was produced in the 1990s by Norfolk County Council. The earliest recorded hint that elm was liable to catastrophic disease came in pollen records indicating 'Elm Decline' some 6000 years ago. In prehistory elm was a common species throughout Britain and Europe, but the evidence from fossil pollen during this decline suggests that the number of trees was reduced by half.[15]

Another disease of elm, until recently widely known and feared, is elm branch drop. So few large trees exist today that it has almost been forgotten. The condition is brought about by bacterial disease called ‘wetwood’ that can produce in the wood a build up of methane gas under pressure. Eventually, and without warning or outside provocation, structural timber ruptures and large branches will fall.

**Dutch Elm Disease**

The theory that Dutch Elm Disease was a twentieth century phenomenon introduced from China that had no part in earlier declines in elm species has been disproved. There are records of dying elms in fifteenth century England. Deaths were reported at intervals again and again from 1658 onwards. After 1819 a serious outbreak of what was clearly Dutch Elm Disease occurred. Strangely though the disease was not even noticed in France until 1918. In the twentieth century the years 1927, when Dutch Elm Disease was first identified, 1936, 1965 and finally 1971 marked the start of new epidemics.[19]

Dutch Elm Disease is the result of a microscopic fungus *(Ostoma novo-ulmi)* interfering with the trees hormones and blocking vessels in the wood. A virulent strain began its fatal progression through England and Wales in 1971. It is no surprise that it started close to the ports of London, Tilbury, Southampton and Gloucester. Infected elm timber with the beetle-infested bark still on was being imported to Britain from America through these ports at that time. It has been calculated that the disease then spread at about 8 miles a year until 1983, with the 'Bronze Age' clone of the English elm rapidly succumbing. This clone would have had a narrow range of genetic variation and it presents a graphic demonstration of the dangers in planting a population with a narrow genetic base.

The fungus is transmitted by two species of Scolytus bark beetles, but the fungus will also translocate through adjacent root systems of suckering species so a whole row of trees may succumb to a single attack. There is hope that some form of natural biological control will eventually suppress the disease, as it has done many times in the past.

**Grey poplar** *(Populus canescens)*

The Poplar and Willow family, probably originated some 110 million years ago in the sub-tropical Northern Hemisphere, perhaps in the geological equivalent of the present day Euphrates basin.[20] Subsequent spread has been transglobal, mostly in the temperate and cold Northern Hemisphere, but only two species are native in the British Isles, the Aspen and the Black Poplar.

The Grey Poplar is a hybrid, but it is impossible to be certain whether clonal plants of this hybrid are native or introduced in Norfolk. The scarcity of trees in the district would suggest introduced. The status of Grey Poplar as a ‘Native Species’ in the rest of Britain is uncertain. One of its parents (White poplar) is not a British native species. It is a heat-loving tree better suited to its natural range along the Black Sea coast and Mediterranean region, but possibly in the warmer Atlantic Period (around 5000 years ago) it did thrive in Britain. If this is the case true native stock of Grey Poplar dates back to prehistoric times, as suckering plants may last virtually for ever, extant trees could have originated thousands of years ago![14]

Except for limited numbers of experimental cultivated forms introduced after 1960, the last recorded 'new' introduction to Britain was in 1641.[21] Then 10,000 plants were imported from Holland probably for the production of sabots (wooden shoes) used in the Low Countries, France, Italy and Germany. The green unseasoned wood of Grey Poplar was, and still is, prized for this, but it is good for little else. Once established, stocks of trees are self-perpetuating and as propagation is difficult there has never been much incentive to produce any more.

Fine stands of Grey Poplar exist on the Bayfield estate, best of all is the small ‘wood’ along the River Glaven close to the Glandford bridge. Other extensive clumps occur in the County, notably in Broadland around Brundel.

***Photograph 7. Clump of Grey Poplar at Glandford; this is a single tree that has 'suckered' to produce this small wood.***

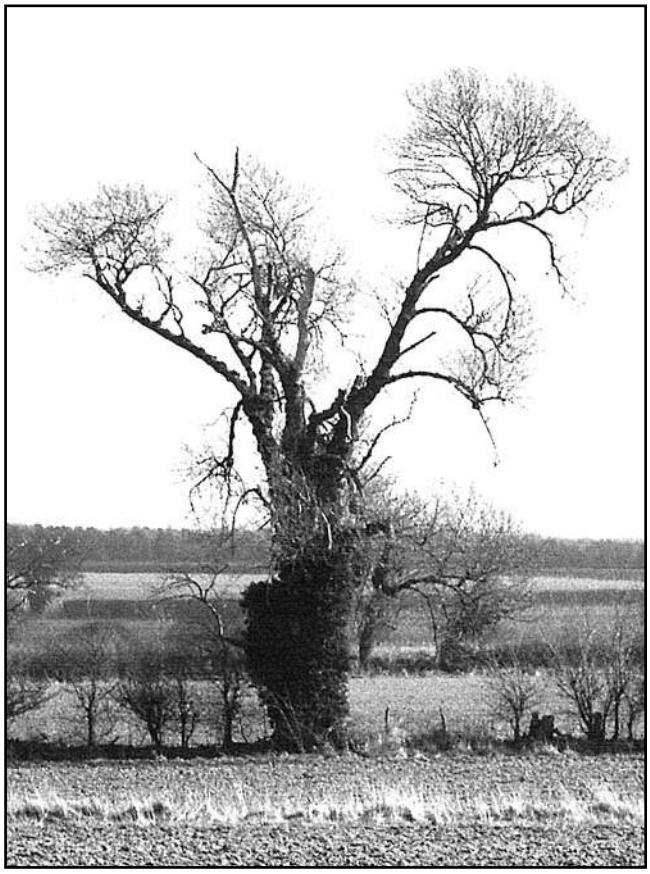
At Illington in South Norfolk one with a 93cm diameter stem is growing in a most curious position. Clearly it is a much-loved stem for it is in fact growing right through a tractor shed, with the roof being crafted round the stem to give ample room for expansion and no nails or screws have ever been driven into it. The roots complete with sucker shoots live in the moist soil outside.

**Aspen** *(Populus tremula)*
Another suckering slender-stemmed poplar, and one of the parents of the Grey Poplar, is Aspen. It is fairly rare in Norfolk probably because it co-hosts a disease of cereals and has been persistently rooted out by farmers. There is a good surviving clump with remarkably large stems at Baconsthorpe Castle.

**Native Black Poplar** *(Populus nigra)*
Our native Black poplar in East Anglia is the Atlantic race of European Black Poplar *(Populus nigra* subspecies *betulifolia)*, as a mature specimen in can be a spreading giant of a tree up to 30 metres tall and 20 metres wide. Positive morphological identification of the native subspecies is seldom easy and there are distinct variants to contend with. Positive identification is best achieved by 'genetic finger printing' based on DNA.[22] At least four regional types are recognized. A distinctive feature is the foliage, samples are best inspected in early summer when the colour of young leaves as they emerge from the buds is a distinctive fresh green as opposed to bronze in many hybrid impostors.

Black Poplar is not a woodland tree.[23] So when the plains of the Old World (of which East Anglia is part) started being cleared for agriculture in Neolithic times, its numbers must have increased dramatically. Country people must have relied on it for fuel wood, shelter and low grade timber as no alternatives were available. Thus this fast growing poplar became a symbol of self-sufficiency and was dubbed *Arbor Populi*, the tree of the people. Later spongy shock resistant poplar wood was in great demand for industrial and domestic flooring and cart bottoms. It contains no volatile oils or resins so it would not ignite as readily as pine boards, a considerable advantage in the age of candles, oil lamps and open fires.

This tree is the most endangered native timber tree in Britain.[23] Only relict clumps and ancient individual trees are likely to be free of contamination by alien pollen from modern commercial plantations. A complete survey of the British population was undertaken by Edgar Milne-Redhead from 1973 to 1989.[24] He concluded that little or



***Photograph 8. Black Poplar at Langham***

no planting had taken place since 1850 when new hybrid poplar clones became popular. In 1975 only about 1000 standard trees were known in the British countryside. Even more alarming only about 6 female clones were found in the entire population (Black poplar trees are either male or female). Females were not usually planted in the nineteenth century because the seed fluff they produce spoiled some crops, such as strawberries.

In terms of historical and environmental interest this tree takes second place only to oak in Norfolk. The County holds one of the largest and most diverse stocks of old specimens in the British Isles. In 1998 the County Council published details of 72 live individuals and 29 dead trees for which historical records exist.[25] A huge tree once stood at Binham (TF 992 390). Two big trees at Grove Farm south of Langham have recently been discovered which may be cuttings from it, they are over 100 years old. The Council has undertaken an extensive and properly documented planting programme of trees grown from local cuttings. Only in Suffolk and East Wales are there comparable numbers with Norfolk. Large numbers of trees can be found in places such as Aylesbury Vale, Essex, Malvern, Shropshire and Greater Manchester, but they are mostly single or limited clone populations that are vulnerable to disease.

Early British records are scarce. In 1310 one John Petye was fined 2 shillings for felling a poplar tree. In 1422 an ancient and decayed tree was condemned for growing out too far over the King's Highway at Great Canfield in Essex.[14] In the eighteenth century entries in botanical works included scant reference to black poplar even Linnaeus tells us very little about it.[26] In the briefest of notes Threlkeld states under Populus lybrica the Asp-tree (aspen), "There is a sort of poplar called black".[27] The oldest recorded planting date appears to be 1715. John Constable painted Black Poplars fairly frequently and his pictorial records provide some of the best clues we have to the status of the tree in the landscape at the time.

Black Poplar was well known to Pliny who recommended it as a living support for vines.[29] In Roman mythology there is a fable relating to Phaeton who tried to drive the 'horses of the sun' for a day, but lost control of them. In order to avert a disaster Jupiter flung him from the chariot into the River Po where he was drowned. His sisters stood on the banks of the river dressed in black and trembling with grief, they became such a nuisance that they were turned into the first (black) poplar trees.

**Hybrid poplars in Britain.**

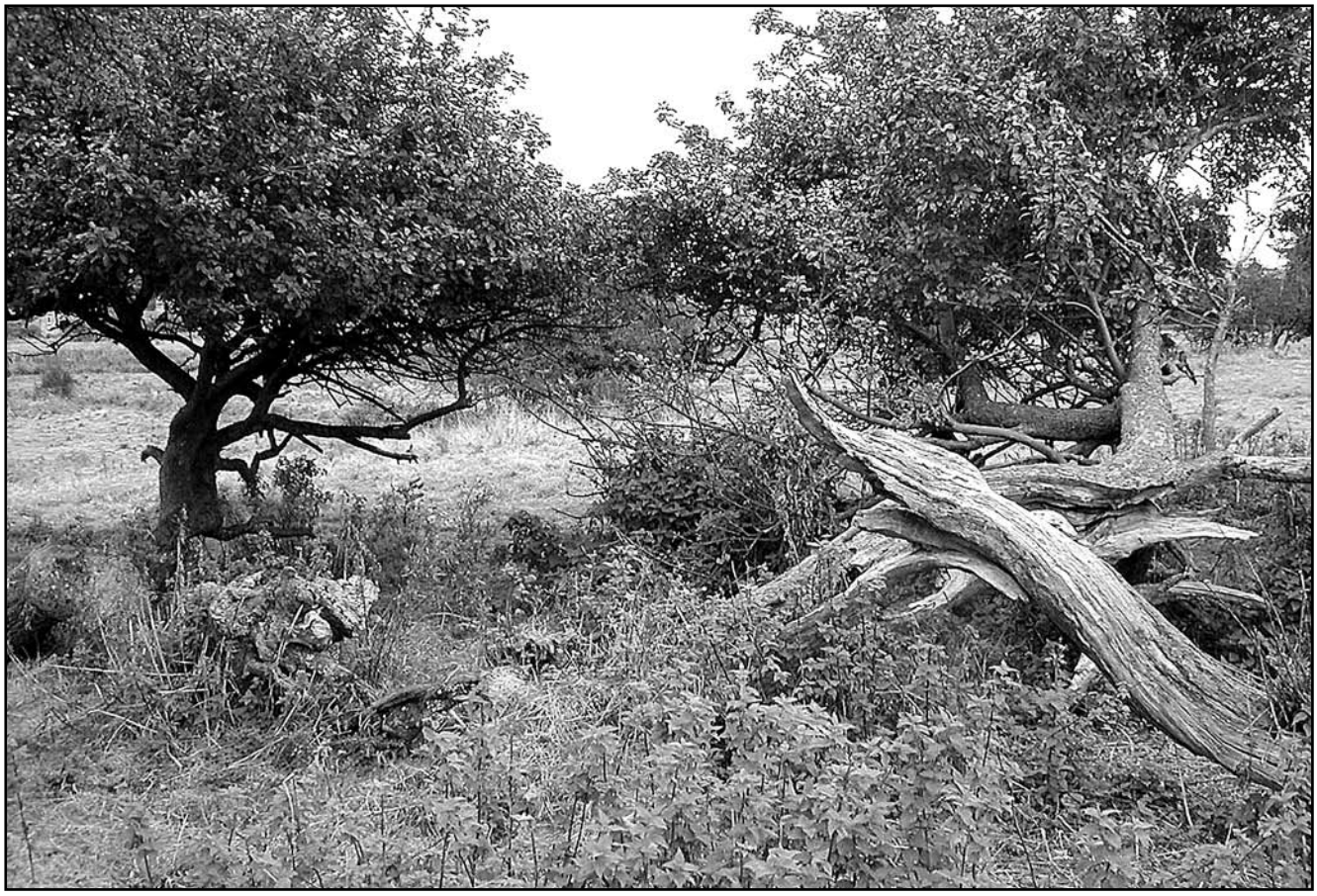
The history of modern poplar cultivation in Britain has been influenced greatly by the Norfolk family owners of the Ryston Estate near Downham Market. To this day some of the finest hybrid poplar timber in Europe is produced there with some of the wood being used to produce paper pulp. Many forms have been tested involving many clones and hybrids of American and European species.[29]

**Apples and Pears**

There is now an active research programme into old East Anglian varities of apples and pears, including the development of an orchard and a propagation scheme for many of the old cultivars.[30]

One of the interesting apples is ‘Dr. Harvey’ which may be unique to East Anglia, but very few trees exist and many of these are old and decaying. It is not certain what the relationship is between this apple and the more familiar ‘Harvy’. Although spelt differently this too is an old clone. Stem analysis of a ‘Dr Harvey’ tree at Blythburgh in Suffolk has provided useful information for estimating the age of trees growing in similar conditions. The 28cm diameter stem contained about 90 rings but the tree had reached maturity in only 40 years.

Using comparative data the size of ancient apple trees can be related to age. A stem 60cm in diameter suggests an age of 300 years and an old apple at Wiveton, possibly a ‘Pineapple Russet’, falls into this category. This is a most



***Photograph 9. The old apple tree at Wiveton, possibly 'Pineapple Russet'. The old trunk has split and collapsed; where branches touch the ground they have rooted.***

interesting variety for it is one of over 30 named varieties that are thought to have a Norfolk origin, but now listed as lost. Attempts are now being made to identify it, so it will be interesting to watch how these progress.[31]

The curious 'Robin Pear' appears to have some affinity with Norfolk that is not yet fully understood. There is an outstanding example with a stem some 90cm in diameter (not easily measurable due to dead ivy) growing near Attleborough. Without doubt this tree is one of the most unusual in the county. It is the largest of its type and has distinctive fruit.

## Conclusion and Acknowledgements

Although trees are fairly permanent landscape features it is surprising how easy it is to overlook them. No doubt more significant trees will be found in Norfolk nevertheless it would be a pity if we ever found them all and spoilt the magic of discovery.

The author would like to thank all the landowners who take such good care of their trees and allow them to be measured, and hugged, from time to time.

## References

1 White, J.E.J., White, J. and Walters, S. M. *Trees: A field guide to the trees of Britain and Northern Europe.* Oxford University Press. 2005

2 Peterken, G F *Woodland Conservation and Management* London 1981

3 Marren, P. *The Wild Woods.* David and Charles, Newton Abbot. 1991

4 English Nature: http://www.english-nature.org.uk/pubs/gis/tech_aw.htm

5 White, J.E.J. *Estimating the Age of Large and Veteran Trees in Britain.* Forestry Commission, Edingburgh. 1998

6 Biederman, H A Survey of the properties in the vicinity of Holkham. Holkham Archives ref, E/G

7 Tinsley, M and McMullen, D. Holkham Park, a Landscape Assessment. Unpublished report. 1992

8 Stone, R M Robertson and Stone, Joyce E *A short history of the Bale oak*. 1993

9 Wood, A *Kett's Rebellion*. In Rawcliffe, C and Wilson R *Medieval Norwich* 2004

10 Ancient Tree Forum and Woodland Trust. *Ancient Trees in the UK, Securing their Future*. Woodland Trust, Grantham. 2002

11 Long, S Preservation of Kett's Oak. *Transaction of the Norfolk and Norwich Naturalist's Society.* Xlll (Pt lV) 1932 - 33

12 Evelyn, J. *Silva, or a Discourse of Forest Trees*. 5th Ed. Stobart and Sons (Facsimile). 1729

13 Ted Green person. comm.

14 Rackham, O. *Trees and Woodlands in the British Landscape*. 2nd revised ed. J.M. Dent and Sons. London. 1990

15 Beckett, G and Bull, A *A flora of Norfolk*. Jarrold Book Printing, Thetford. Norfolk. 1999

16 White, J.E.J. *Forest and Woodland Trees in Britain*. Oxford University Press, Oxford. 1995

17 White, J.E.J. Dendrologists Report on Duncombe Park, North Yorkshire. Nature Conservancy Council, London. 1999

18 Dagley, J. and Burman, P. The Management of the pollards in Epping Forest its history and revival. In: Read, H.J.(ed.) *Pollard and Veteran Tree Management*, Corporation of London. 1996

19 Gibbs, J.N., Burdekin, D.A. and Brasier, C.M. Dutch elm disease. *Forest Record* 115, Forestry Commission, Edinburgh. 1977

20 Meikle person. comm.

21 Elwes, H. and Henry, A. *The Trees of Great Britain and Ireland*. R. and R. Clark Ltd., Edinburgh. 1913

22 Winfield, M.O, Arnold, G.M, Cooper, F. Le Ray, M. White, J.E.J. Karp, A. and Edwards, K.J. A study of genetic diversity in Populus nigra subsp. betulifolia in the Upper Severn area of the UK using AFLP markers. *Molecular Ecology* 7, 3-10. Blackwell Science Ltd. London. 1977

23 White, J.E.J. Genetic Pollution of British Native Black Poplar. A paper presented to a sympo sium of the Black Poplar Working Group at the Linnean Society, London (unpublished). 1993

24 Milne-Redhead, E. The BSBI Black Poplar Survey 1973-1988. *Watsonia* 18, 1-5. London. 1990

25 Shaw, J.M. The Native Black Poplar in Norfolk 1997-8. *Norfolk County Council, Planning and Transportation, Occasional Paper*. Norwich. 1990

26 Linnaeus, C. *Species Plantarum* (1957 Facsimile) The Ray Society, London. 1753

27 Threlkeld, C. *Synopsis Stirpium Hibernicarum*. F. Davys, Richard Norris and Josiah Worrall, Dublin. 1727

28 Johns, C.A. *Forest Trees of Britain.* Soc. for Promoting Christian Knowledge, London. 1882

29 Jobling, J. *Poplars for Wood Production and Amenity*. Forestry Commission Bulletin 92, HMSO London. 1990

30 East of England Apple & Orchards Project (info@applesandorchards.org. uk)

31 Pers. comm. Martin Skipper to John Peake