The Yews of Alice Holt

Including field notes and data from the Lodge Inclosure that contribute to the yew growth rate curve presented in The Alan Mitchell Memorial Lecture (2000).

Alice Holt is a managed ancient wood on the Surrey-Hampshire border, it is known that its products were used to fire Roman kilns that produced large amounts of indifferent quality pottery that was distributed widely over Southern England. Various sources show that the forest was maintained as productive woodland from that time onwards. The earliest example known at present is an ecclesiastical record which attributes Alice Holt's ownership to Aelfsige, a Saxon bishop of Winchester.[1] Later, the Normans passed poaching laws over the forest, and later still Gilbert White's Natural History of Selborne sketches Alice Holt's history from the beginning of the 16th century.[2]

There is a lot of yew growing in the Lodge Inclosure, the compartment of the forest which contains the Forestry Commission research station buildings. The Lodge Inclosure has been harvested for oak in recent centuries. Considering the volatility in the price of yew for export and domestic veneering markets that caused the felling at Cherkley Court in the 1980s, and given that yew is traditionally seen as a weed by Hampshire foresters, both old and young trees are at present under threat. The old yews are (or were) deemed unsafe, and a waste of productive land, while the younger sound specimens still constitute an opportunist crop. The larger stumps pictured below fall into the former category; they were felled but not harvested for wood, though any sound branches may have been sold.

In 1996 about 40 yews were felled in the Lodge Inclosure for a variety of reasons, and that felling activity brought the site to my attention. Immediately and for several years afterwards I concentrated a great deal of my attention here, producing substantial records and field notes. These I faithfully reproduce below with some analysis which benefits from 10 years experience of the place, and consequently ample amounts of that extraordinarily valuable commodity: hindsight.

The report that follows is a roundup of those three years of study and fieldwork during 1996 to 1999, with some longitudinal and analytical work up to the present. The results go some way to illuminating the question of the ages of the yews on the site, because solid evidence in the form of ring counts has now been gathered and analysed to a point where questions about the yews left standing can be answered statistically, and in some cases by well-supported inference.

Despite the substantial felling in 1996 and in the 1940s there are still many yews growing here, some with considerable girths. One yew in particular may well exceed 1,000 years in age. All the yews and yew stumps described in this document are within a short walk of the research station buildings.

The Alice Holt Lodge Inclosure report includes:

1 A census of the remaining yews with girths above 14 feet.

2 A census of felled yews with girths above 14 feet.

3 A selection of lower girthed living yews, particularly those with partial ring counts.

4 Field notes and ring counts on felled yews representing a census of what this researcher could find on the site.

5 An in-depth study of the largest and oldest complete yew stump.

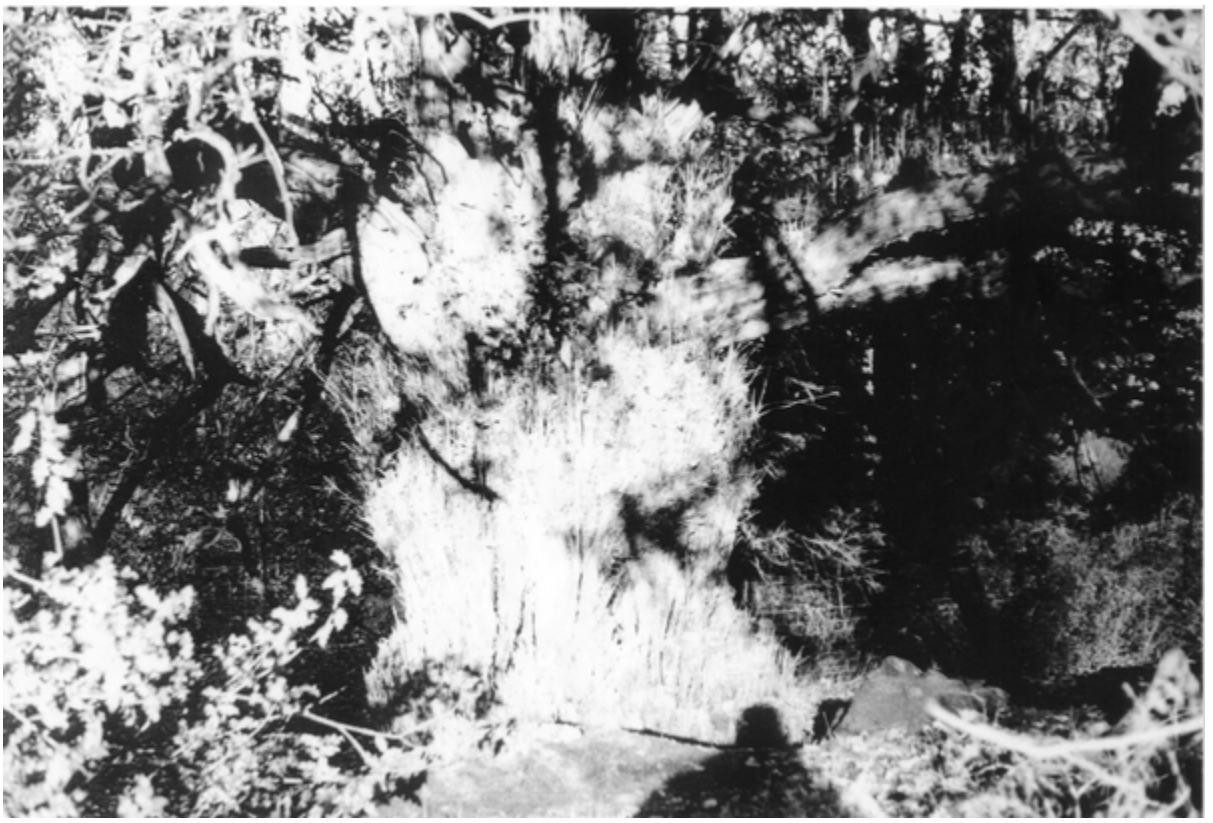
6 Some analysis of the growth patterns revealed by the work.

7 Details of ongoing micro studies at the site.

8 Sketch maps.

Illustration: Faces in the tree

The hourglass yew 1997



A Census of yews in the Lodge Inclosure with girths over 14 feet

1 The Great Yew

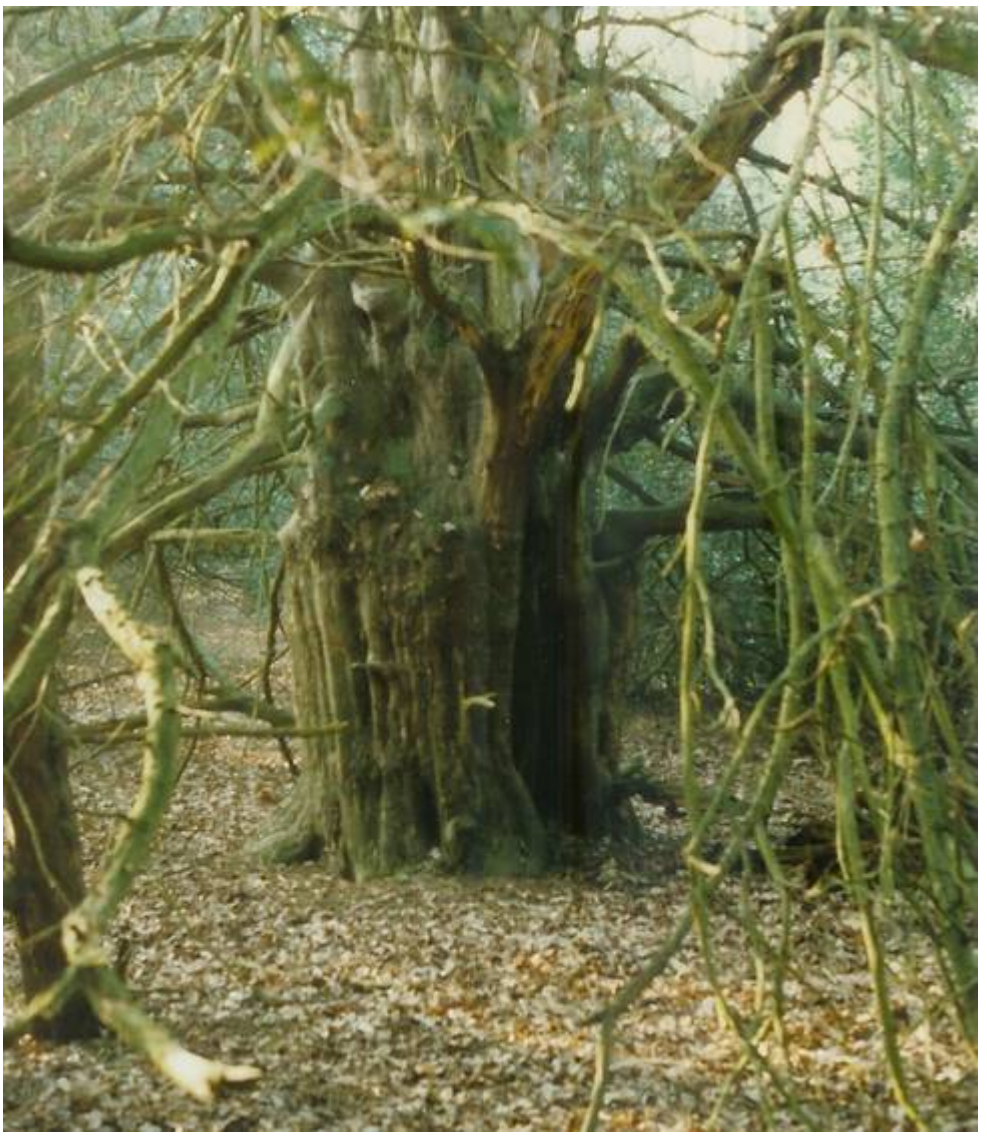
The Great Yew in 1997. GPS: 51dg 10.65mnN 00dg 51.59mn W

The Great Yew is the largest yew in the forest, with a girth of 17'6" at three feet from the ground and a basal girth of 18'4" (1996). It stands alone in an area of long since clear cut pine stumps. It appears sound, and is male. The trunk seems slightly divided as if it were two trees grown together, but on close inspection one sees that the "join" has old dead wood connecting the two halves and forming a perfect circumference fragment for a single tree. The yew has therefore regenerated from both sides over a dead vertical section. The tree has at some time been in a state of decay or damage, which will soon no longer be evident as the two flows of cambium merge. The tree has been measured by this researcher at three feet from the ground a number of times since 1996. At present it is clearly fast growing as the measures below illustrate.

1996	1999	2000	2003	2004	2006/7	
17'6"	17'7"	17'8"	17'9.5"	17'10"	17'11"	At 3 feet

2 The Hollow Yew

An extremely interesting and once beautiful yew, with a girth of 14'1" at three feet, and 15'7" at the base (1996). Minimum girth found 13'8" at under 3 feet (1996). It is very hollow, the shell of the bole is only a few inches thick in most places, and one can see the sky by peering up the trunk and branches from inside. It is female. The canopy is very thin, and added to this it is heavily shaded by surrounding trees, including large oaks. Rotten wood found inside the shell confirms that there have been no recent growth spurts; however, the cambium is beginning to curl around the edges of the split in the trunk. (1996). A large oak has been felled onto the yew in the last few weeks (Jan 1998) breaking off side branches and opening a patch of sky in the general canopy. It could be that there will be a burst of regeneration. The shoulders of the bole have had green shoots on them since before 1996.



Alice Holt, the hollow yew before damage of 1998

3 The Hourglass

There are reasons for supposing that the Hourglass is the oldest tree in the forest. It is by the track at the forest entrance end of the Gravel Hill Lane public car park. Although it is not the largest of the Alice Holt yews it has a most peculiar and fascinating pattern of growth. The girth is 16'6" at 3 feet, at the base 19'10" and at the narrowest point of the "waist" in between these measure points it is 14'10" (1997). There is a layer still attached to a branch which reaches the ground, and the canopy is fuller and more vigorous than one would expect for such a contorted and decrepit looking bole. The bole is very strange. It seems to consist of columns of growth about the thickness of a man's arm that have a base in the basal bulge of the tree, and run up the trunk hugging the hourglass form all the way to the base of the branches at about head height. If one looks between these columns it can be seen that there are chunks of dead burr wood that was clearly outer bole imprisoned within. The inside of the tree appears to be packed out with internal stems. This suggests a tall but dead or dying stump that has regenerated, or perhaps a pollard. Looking at head height, it appears that most of the branches are relatively new, perhaps 80-150 years old. In several places it is very clear that they have replaced and grown around old broken branches. The effect is particularly noticeable where there is a hole at the base of a slender up reaching branch which is twisted around the space where the hole shows that the old branch emerged.

The Hourglass in 1997 GPS 51dg 10.98mn N 00dg 51.22mn W

4 The Internal Stem Yew

GPS 51dg 10.97mn N 00dg 51.25mn W

This female yew is by the track to Gravel Hill car park from the pond. It is near the Hourglass Yew. The yew has a very clear and interesting example of an internal stem, about wrist thickness, and growing separately from the inner wall of the hollow trunk. An internal stem is a root that has grown, usually from the base of a branch, into the rotten centre of a tree. Eventually, if the tree survives to hollow completely, the rot falls to the ground and is lost to decay and through splits in the trunk leaving the internal roots exposed to view. The girth of the tree at three feet from the ground is 15'2", and a maximum of 16'5" at the base. The canopy is very thin, and the foliage is yellowing and stunted. The tree appears to be nearing death. One fervently hopes that it regenerates, because this tree completes the census of yews over 14 feet in girth remaining on the site.

The Internal stem yew in 1998

Update spring 2008. The yew has lost a small section of hollow branch. 87 rings were found on a case section 3 inches in radius. The branch originated 6 ft from ground level; the case section was growing 1 foot from the trunk where the branch girth is 4 feet.

Yews over 14 feet in girth which have been felled at Alice Holt

Haunted by the numerous stumps and felled trunks of old yews, I felt like a pathologist at an autopsy as I wandered in this wood. What a waste. Ten years later the felled boles pictured here are still lying, in one case probably half a tonne of solid yew in a single piece rotting in the forest. I wish I could drag it out of there and do something with it, a carving, anything. Or is that a foolish view? Is it better and more dignified as habitat and eventually compost? With my pathologist's hat on, and armed with a chisel, notebook, pencil and tape measure, I set to work to make the most of the opportunity to study all the newly exposed wood. It was the least I could do.

AH (17'6'') Hollow Stump no. 1

This stump is in the Pond Grove. The girth has been re-checked to standardise it with later stump finds, originally it was loosely measured at 19'. It has a girth of 17'6" when measured by the standardised method, i.e. best minimum base girth just above ground. The structure in the photo nearest to observer is an internal stem.

AH(17'6") in 1997

AH(18'3'') - Hollow stump no. 2

About 200 yards NNW of the car park with the Hourglass Yew, near the hard path at the brow of the slope, are the fragments of a burned out hollow yew stump forming an almost complete circle about a foot high. The tree could possibly have burned down rather than being felled. It is 18'3" around the base and seems to have been well over 16 feet in girth at three feet. There is no sign of any internal stem. As a marker, a few yards from it, down the slope is a solitary male yew which measures 6'10" at three feet. Five samples of shell and

upper buttress wood were taken from the level of measurement, all including the outmost available ring. They yielded 190 rings in a total radius of 207 mm. Mean ring separation is therefore 1.09 mm. Mean ring separation on AH335a, the largest complete stump found at Alice Holt was 1.4 mm.

AH(18'3") in 1998

AH(18'6'') Hollow Stump no. 3

This hollow stump is the remains of a massive yew. It is on the slope to the right below the latter part of the track from the car park to the pond. The tree was sawn down and burned out. There is a large and ancient branch or trunk section lying three yards away. This also has burn marks on it as well as large areas of burr wood. There seems to be little buttressing, so the girth of the trunk would probably have been about 18 feet. The base measure is 18'6"

AH(18'6") in 1997, with large bole remnant nearby.

AH(18'0'') Hollow Stump no. 4

Similar to the other large stumps in that it was felled at 1 foot from the ground and burned out. One large hollow branch with a girth of 3'4" remains. This yew is about 40 yards down the slope from the Hourglass Yew.

GPS: 51dg 11.03N 000dg 51.17W

AH(18'0") in 1998

AH(C17'0'') Hollow Stump no. 5.

GPS 51dg 10.87N 000dg 51.45W

The stump is inferred from a dip in the ground and sections of yew buttress either side of the dip. The base of the yew, if it was a single tree was 17 to 19 feet in girth. All of the hollow yew stumps found so far have created this characteristic dip in the ground under the main trunk, so its existence is taken as good evidence for a single large yew. The site is near (AH18'6") but closer to the pond at the crossroads.

No photograph at present.

AH(14'0'') Hollow Stump no. 6

Near the pond, and very rotten. Was hollow. The girth above the buttress is 14'0"

AH(14'0") in 1997

End of census of lost yews exceeding 14' girth.

Following correspondence with the Forestry Commission [3] regarding the felling documented here, and consequent attrition of ancient yew stocks in the Lodge Inclosure, it seems that all of the large yews detailed above that have been destroyed were cut down at the end of World War 2. The purpose of the felling was to make the then existing mixed woodland into productive forestry (fast growing conifer plantations) in accordance with their government remit to ensure sufficient wood stocks to use in the event of another war. Some of the smaller but still significant yews described below were lost in the same way. The Commission argue that their management of the site is "balanced" and that decisions to fell are now carefully weighed and considered. They explain that Alice Holt contains a great many good examples of a variety of tree species, and that they consider their management of them in line with their commitment to good conservation practice, including the felling of a 340 year old specimen in 1996, the wood from which remains unharvested. On a personal note, while I accept the necessity of managing and profiting from a commercial wood, I would contend that the felling of any yews not of saleable quality due to their age and state makes no sense at all. The cost of the relatively small area that they occupy is vastly outweighed by their individual importance. Replacement philosophy cannot apply to ancient yews.

Ring Counts and partial ring counts on yew stumps

Construction of the tree reference

AH is the site code for Alice Holt. The number is the highest number of connected rings clearly counted on that yew (not its age)

The letter(s) indicate the data type:

a Good clear count

q Visible rings counted, more suspected. Q means "not less than".

b Count on a sawn off branch or scar.

h Was hollow. Rings will be missing.

r Partly rotten, complete count not possible.

x There is stated problem with the data that excludes it from standard analysis.

e The stump is interesting enough to warrant an estimate.

A letter inserted between the site code and ring count number is to distinguish between two or more otherwise identical references.

Girth measures are at base (lowest possible measure near ground) unless specified. Girth measures at the base can be translated to a girth measure at three feet by the subtraction of thirteen inches. The relationship was checked on a random sample of twenty standing yews on this site, and a very strong linear relationship was found between girth at three feet and base measures.

Yew stumps

AH91rx Gravel Hill inner car park. Found opposite the entrance to the inner car park from the track, at an earth gateway to the grassy clearing beyond. The stump is hard to measure as earth is heaped up against one side, the end of a low embankment above the ditch. Judging by the saw marks it was sound when cut, but has now mainly rotted. Two areas near the outer bole were found to be clear enough to study. The first area yielded 91 rings in 8.9 cm radius, the outer part of the sapwood being preserved as charcoal, and showing dense rings. The sapwood was rotten on the other section, so the count was started perhaps one inch from the outer surface. 73 rings were found over 6.6 cm radius. The yew was cut off at 18" from the ground, at which point it measures 7'9" girth. The basal girth could only be measured by digging which was not attempted. The shape of the stump is unusual as it has heavy fluting and a pronounced "waist" about halfway up. Its shape is reminiscent of the Hourglass Yew. The rotten area at the centre has a girth of over 4 feet, implying at least a further 100 rings. This yew was well over 200 years old. Growth habit and girth seem to be similar to AH209r.

AH(13'7")rx The stump measures 13'7", the cut bole to which it belongs measures 12'6" at what would have been 18" from ground when the yew was intact. From the pond at the crossroads, go down the track towards Bentley Train Station. 100 yards on the right is a grove of conifers. There are a number of rotten yew stumps of which this is the largest. This stump remains to be studied in detail.

AH(13'7")rx-bole

AH(13'7")rx-stump

AH139a Gravel Hill inner car park. To be found a few dozen yards behind AH91rx, by the edge of the deer fence. There is a good sized holly just by it. Several yew layers have been preserved and are alive over a year after cutting. The stump itself is 6'10" in girth, though the cut is slightly into the root buttress increasing the ideal measure. The ring count is 139.

AH134bx Gravel Hill inner car park. At present very obvious as it is about three feet high and bound around the trunk of a fair sized oak. There are three main trunks which have been lopped off the semicircular bole, and ring counts on each were 134, 131 and 126. This stump is impossible to measure as it is bound to the oak. However it is clear that it has grown exceptionally fast, despite, or perhaps because of its close association with the oak. Can yew and oak be symbiotes?

AH140a Gravel Hill inner car park. Cut off at the base in autumn 1996. No regeneration. Girth at the cut 7'3", 140 rings.

AHa131a Gravel Hill inner car park. Felled 1996. A single shoot of regenerating yew. Girth at the cut 5'11". The ring count is 131.

AH45q Gravel Hill inner car park. Felled 1996. There are four new shoots on this little stump. It appears to be a cut off grounded branch, i.e. a layer. The girth is 1'6" and the ring count is at least 45.

AH146a Gravel Hill inner car park. Felled 1996. There is one new shoot. The girth at the cut is 5'4", and the ring count is 146.

AH149a Gravel Hill inner car park. Felled 1996. No regeneration. The girth at base is 3'11", and the ring count is149.

AH129a Gravel hill inner car park. Felled 1996. The girth at the base is 5'5". The ring count is 129.

AH117a Gravel Hill inner car park. Felled 1996. No regeneration. The girth at the base is 4'10". The ring count is 117.

AH130ax Gravel Hill inner car park. Cut below base, i.e. into buttressed plate, no base measure. Hard to measure, near 7'10" around the cut so about 7'0" at base. Excluded for imprecise base measure. Ring count 130.

AH112r Gravel Hill inner car park. Within 2 feet of AH130ax, rotten, but 112 readable rings. Base girth 3'7", no regeneration.

AHa51a Gravel Hill public car park. Felled 1996. No regeneration, a few old sprigs of foliage, may sprout in future. Girth 2'7", ring count 51.

AH64a Gravel Hill public car park. Felled 1996. No regeneration. Girth 1'8", ring count 64.

AH55a Gravel Hill public car park. Felled 1996. No regeneration. Girth 2'2", ring count 55.

AH54a Gravel Hill public car park. Felled 1996. No regeneration. Girth 1'4", ring count 54.

AH42a Gravel Hill public car park. Felled 1996. No regeneration. Only 2 inches between this stump and AH54a. Girth 0'8", ring count 42.

AH57a Gravel Hill public car park. Felled 1996. No regeneration. Twin centre, single trunk. Ring count to other centre 53. Ring count 57, total girth 2'7".

AHa57a Gravel Hill public car park. Felled 1996. No regeneration. Girth 2'5", ring count 57.

AH52a Gravel Hill public car park. Felled 1996. No regeneration. Girth 2'5" ring count 52.

AH48a Gravel Hill public car park. Felled 1996. No regeneration. Very close to an old oak stump. Girth 0'11", ring count 48.

AH335a Gravel Hill public car park. Felled 1996. No regeneration. The largest yew felled at Alice Holt in 1996. The public car park is the small parking area off Gravel Hill before the gated path. The gate is by the Hourglass yew. AH335a is found on the right as you enter the car park, fifteen yards down the slope. The girth at the base cut is 10'6".

Analysis of AH335a

Three incremental ring counts were done on the stump. It is interesting that counting over the greater distance yielded a higher count, this is not entirely due to fieldworker error, a

sample from near the centre (retained) clearly shows one apparent ring dividing into three, and a dense band of eight rings shading into five. Clearly ring counts vary depending on where on the stump the count is made. The ring count was also checked on the bole, yielding 318 and 329 rings. The foliage of the felled yew was studied shortly after it was cut. This tree was female. Further work has been done in order to find out more about the ways in which growth rates change through the centuries. Are there stages of growth in yews? If so, then they could be revealed by a careful study of the distribution of annual rings on the stump. A photograph of the stump of the felled 340-year-old yew, prepared for ring counting:

AH335a prepared for ring counting spring 1997 GPS 51dg 11.03 mn N 00dg 51.22mn W

Ring counting

It seemed a shame to waste a rare opportunity to study the exposed stump of such an old and complete yew, so a method of recording the distribution of rings was devised. The stump, pictured above, is cleared for counting, and four straight lines are chased north, south, east and west with a sharp chisel. The "south" line had to be re-routed SSW as it initially went through a large unreadable knot. Importantly, the day was bright, as yew rings are narrow and hard to see when they are packed close together. I went prepared with a form to fill in. The raw data collected are shown below.

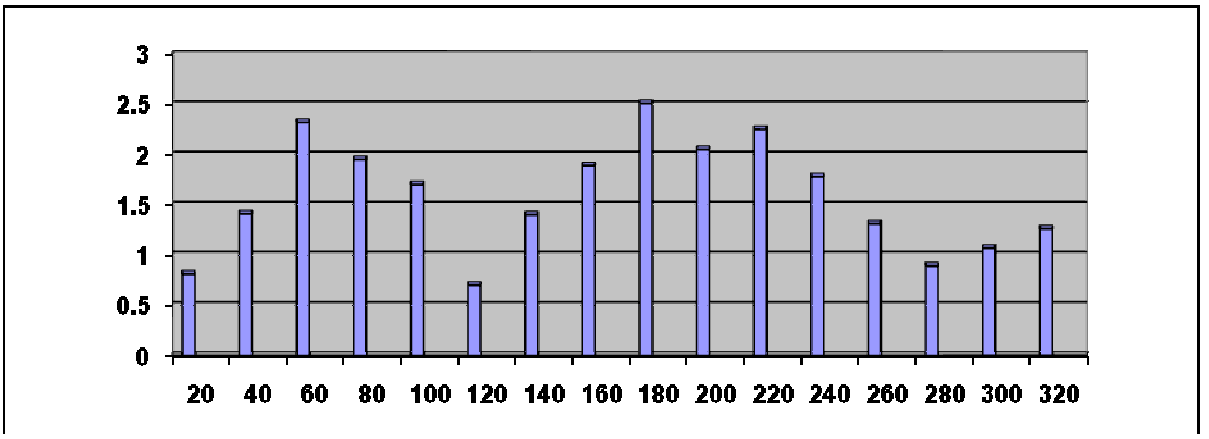
The "incremental" count

Twenty rings were counted from the pith at the centre, and then the distance to the middle was measured. A further twenty were counted, and the distance to the middle measured over the resulting span of forty rings. This was repeated until the bark of the tree was reached, and then it was repeated for each of the three other lines.

By the end, four separate incremental ring counts had been made, and these were averaged together. An interesting and exaggerated pattern of growth rate through the years became evident. The growth rate rose and fell smoothly, peaking and troughing over about a century.

Figure1: A growth pattern of AH335

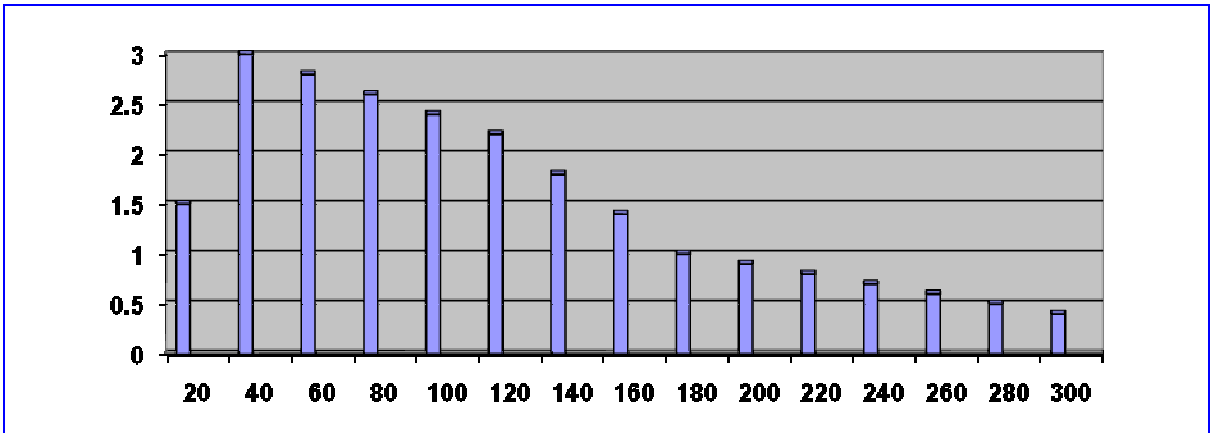
Horizontal axis (x): Annual rings
Vertical axis (y): Mean distance between the rings (mm)



This result is in contrast to the kind of result that was expected. Models of tree trunk growth tend to assume that the tree will increase in girth very fast in the early stages, and then start to put on narrower and narrower rings as it gets bigger,[4] as in figure 2, below:

Figure 2: Imaginary example of a conventional growth pattern assumption

Horizontal axis (x): Annual rings
Vertical axis (y): Mean distance between the rings (mm)



Obviously this yew did not conform to the expected model, and the question has to be asked, why not?

There seem to be two main possibilities, one an intrinsic, the other an extrinsic factor. Is this pattern found in all yews? If so then it is intrinsic to the tree, and mysterious. If it is found in a particular population, i.e. woodland yews alone, then quantifiable environmental factors may be responsible.

The best guess at present is that this is a phenomenon associated with woodland yews. The yews that grow in woodland have the capacity to far outlive any surrounding trees of other species. In Alice Holt, the oaks are harvested regularly, and the sudden increase of light levels when nearby oaks are felled may be responsible for the rises in growth rate that are apparent every century or so. The steady decreases are probably due to the growth of surrounding woodland and the resulting shading of the yew by the taller oaks. There is some evidence that this is the case, the oaks currently being felled are about 170-180 years old, which, given that they are very large timber, fits reasonably well with the idea that felling of oak creates a cycle with a period rather over a century. The only complete cycle is from 120 to 280 years, the difference being 160 years, a comparable time span with the ages of the oaks being felled now.

AH335 Incremental Ring Count Records

A measure in mm is made from the centre (pith) to every twentieth ring on four straight lines lightly chiselled on the stump. Each line is going in a different compass direction from the centre of the stump.

To Ring	20	40	60	80	100	120	140	160
(mm)								
East	19	41	83	115	148	168	195	229
North	17	38	79	105	135	147	163	184
SSE	16	40	96	157	196	208	243	295
West	13	30	77	114	148	160	194	238

180	200	220	240	260	280	300	320	>320
286	327	350	366	402	409	429	441	446
225	262	301	339	361	384	417	458	466
357	414	443	482	497	512	522	536	X
279	308	356	405	437	463	486	420	543

Wood Redistribution due to light factors in Yews

Further data analysis for AH335a: the concept of Wood Redistribution. The growth pattern of AH335a, when taken together with the yews felled from the clear cut AH144a and AH154a (below, living yews) suggests an interesting possibility. Note the re-growth on the bole in these two standing yews, it is related to the availability of light. The yews have adapted quickly to a situation where they no longer have to reach for light, and the long high canopy branches are redundant. The new branches are closer to the bole, and therefore transport between leaves and roots in both directions is made more efficient. The redundant branches are no longer being maintained, and I think that this is where the energy and new wood saving is made that allows an enormous and sudden increase in lower bole girth to occur. The bole increase is necessary because, as the small ring width increase while the yew was shaded implies, the bole was insufficient to support the canopy that was built to compete with the surrounding conifers, especially as the yews are now exposed to the wind. Now the yew is able to compensate by neglecting the redundant branches, and centring its activity on and near the bole. That mechanism would account for the rises and falls in bole girth increase noted in AH335a. It also suggests that girth measure comparisons between woodland and open grown yews might not show enormous differences, though the patterns of rings would differ, open grown yews showing fewer variations in growth rate.

It is quite common to see apparently healthy yews that have the dead branches of an old canopy protruding from a uniform living canopy. AH144a and AH154a are examples of the beginning of such a process of canopy death and regeneration, and illustrate one of the ways in which the yew can renew itself, i.e. re-growth of canopy from the bole allowing a cycle of loss and regeneration in a similar way to the loss and re-growth of leaves on deciduous trees, although the time span involved is obviously several hundred times longer. I conclude that the process is common to all yew trees of over several centuries growth which explains why the age of branch material always seems very low in comparison to the likely age of an old or ancient bole.

A useful comparison with AH335a can be made with a large sample of yews of a similar age, for example at Monnington Walk in Herefordshire, where the mean girth is just over 10 feet for 42 yews all aged about 370 years old.[5] AH335a sits very comfortably beside them with a base girth of 10'6" and an age of about 340 years. One concludes that yew is highly elastic in its ability to maintain an appropriate girth for its age when adapting to varying conditions of light and competition, and only continuous conditions such as growing as part of a large yew grove, or the yew being permanently sub canopy would cause a significant light related reduction in girth expected for the age of the tree. The main bulk of the variation found in girth for yews of the same age still seems individual and is most probably genetic, though the systematic variation in bole ring increment found in AH335a seems light related, and therefore environmental in origin.

AHa145r Gravel Hill public car park, about 10 yards from AH335a. A mossy stump, cut after being wind felled perhaps in 1987 or 1991. There is no regeneration. The girth is 4'7". The ring count is almost complete, it is 145 rings.

AH139a Gravel Hill public car park. Cut in 1996, this stump is also about ten yards from AH335. No regeneration. The girth is 5'2" and the ring count is 139.

AH209r Within 20 yards of AH335a, but further down the slope. It is not known when it was felled, though probably in the 1940s. The ring count lacks the sapwood, and the inner 2 inches of diameter across the pith. The readable count is 209. The girth at the base is 8'11" and at 1 foot from the ground 7'4". The tree was probably almost 250 years old.

AH149hx Found at the bottom of the slope below AH335a. This is a complete felled yew lying in line with its stump. The main bulk of the tree consisted of a single very straight columnar stem, ruinously hollow. The hollow bole was split, with a long vertical opening on the south side, and the edges of the opening had old and substantial re-growth of eccentrically shaped wood which might eventually have closed the "wound". The re-growth area had a complete ring count of 119. The yew was felled in the 1940s, and the stump has rotted to the point of uselessness for ring counting, but the cut on the bole has rotted less as this surface is held vertical, and so some fairly sound areas remain. The stump has a girth of 13'3" at the base, and 11'9" at 2 feet, which is the height at which the cut was made. Three ring counts were done at different locations on the exposed base of the felled bole. The sapwood was pulpy or absent in all cases and therefore not counted. Of the three, one chosen partial radius could only be counted over a 3 inch distance, being just too rotten. The count was 55 rings. Another radius was legible for a distance of 10" and yielded 149 rings. The third chosen (part) radius was also 10 inches, and yielded 140 rings. It is likely that the counts are on the low side because of the state of the wood, though the day was bright. The hollow centre had a maximum diameter of 35 inches, and a minimum diameter of 18 inches. The hollow contained a substantial (1'4" at 2 feet) internal stem which yielded 91 clear rings, plus some loss on the sapwood. When the incremental data from AH335a is used as "filler" for the hollow it appears that approximately 220 rings are missing from the centre. It is probable that there was a fairly dense band of perhaps 20 rings missing due to the rotted sapwood on the bole. This yew was about 400 years old when it was felled in the 1940s.


AH149hx in 1997

AH251r Gravel Hill inner car park. Two felled boles without their stumps, the nearest pictured is AH251r, they are found together in the yew grove to the right as one approaches the end of the inner car park. AH251r has a girth at the cut of 9'9". This appears to be the base. The bole is incomplete; the centre is missing a plug of wood about 5 inches in diameter. I removed it and counted the rings when I first found this bole, it contained 42 rings on a radius. There are a few rings missing from the sapwood, this yew was about 300 years old. There is a possible stump to match the bole about 100 yards away, it is very rotten and has not been investigated.

AH251r photographed in 1998, AH170hx visible behind it.

AH170hx More rotten than AH251r, the missing centre is a minimum of 15 inches in diameter. 170 rings have been counted despite this, and reconstruction yields about 300 rings. The girth at the cut is 10'3". AH170hx had the beginnings of an internal stem evident at the base of a broken branch at what would have been about 9 feet up the tree. The internal stem did not appear to have reached far into the bole.

AH170hx: internal stem formation 1998

AH170hx in 1998

Update: AH170hx spring 1998. The bole has been studied further, and a branch cut from the trunk at 9'6" from ground was found to have 201 rings. There is a very deep cleft under the branch, the cleft runs all the way down the trunk, and cambium had spread over the branch attachment to the trunk, therefore the branch had died by the time the yew was cut.

Moving towards the railway along gravel Hill road from the entrance to the car park there is a 2 to 3 foot high ridge that follows the line of the road on the left hand side. A yew on this ridge has been felled (AH152a) on the far side of the extreme bend which leads to the railway bridge.

AH152a Gravel hill roadside. Cut off slightly below the base, i.e. on the slope of the roots, the measure to the cut is 6'11". It was cut in 1996. The ring count is 152. The 3 foot girths of yews clearly on the ridge were taken. See living yews below.

AH119rx Gravel Hill roadside. This small stump is on the ridge next to AH137b (living yew). It is connected to another yew on the ridge by a root that runs over the surface, and although the cut is moss covered and starting to rot, there is still live bark on the sides of the stump. It must have been felled long ago, but there is no sign of new shoots despite the life in the cambium. Girth measure needed.

On the left hand side of the entrance going into the car park there are several smaller stumps. These are listed starting by the entrance and working towards the research station. AH71a and AH65a are under an existing yew with a curved and leaning bole, 3'6" at 3 feet, and female. The yew is the visible source of several ground level branches that have produced layers.

AH71a Gravel Hill roadside. Twin stemmed at base. Total girth 5'8", divided between 71 rings on a 2'9" girth and 65 rings on a separate 3'3" girth.

AH65a Gravel Hill roadside. One foot from AH71a is a small stump. It may be a layer, with one regenerating shoot. The girth is 1'11" and the count is 65 rings.

AH 51a Gravel Hill roadside. A little stump inundated with moss, and the bark has rotted off. Cut a long time go. The girth is 2' 0" and there are 51 rings. No regeneration.

AH58a Gravel Hill roadside. Under an existing yew, AH55b (see existing trees). It has a girth of 1'9", and a ring count of 58. There are two shoots on the stump. Probably cut 1996.

AHa52a Gravel Hill roadside. Girth 1'8" ring count 52. This stump was slightly deeper into the woods at the road verge. The felled bole remained; it was 1'3" girth at 3 feet.

AH41a Gravel Hill roadside. Base 1'6" girth, bole remains, bole is 1'1" at 3 feet from ground. Ring count is 41.

The other side of Gravel Hill road from the car park entrance is a clear cut border to the road about ten yards wide. Some yews were felled here.

AH75a Gravel Hill roadside. Cut some time ago, no regeneration. Girth 3'2" the ring count is 75.

AH78a Gravel Hill roadside. Cut some time ago, no regeneration. Girth 4'11", ring count 78.

AH56a Gravel Hill roadside. Cut some time ago, no regeneration. Girth 1'8", ring count 56.

AH52a Gravel Hill roadside. Cut some time ago, no regeneration. Girth 1'10", ring count 52

Moving through the wood from AH335a towards the railway bridge, keeping near the road, is a steep South facing bank. There are several yew stumps on this bank, all felled in 1996.

AHa134a South Bank. This stump has regeneration, two shoots. Girth 5'2", ring count 134.

AH136h South Bank. No regeneration The centre 0.5" diameter is missing. The girth is 6'4", and the ring count is 136.

AHb136a South Bank. Just touching the next entry, bark-to bark, AHb137a. Girth 5'3". One new shoot. Ring count 136

AHb137a South Bank. No regeneration. Girth 5'1", ring count 137.

AH81a South Bank. No regeneration. Closely bound with a large existing oak, the yew trunk has left an imprint in the oak trunk. Girth 4'3", ring count 81.

AHb139a South Bank. No regeneration. Girth 7'6", ring count 139.

AHb152a South Bank. Two new shoots. Girth 5'2", ring count 152.

Moving from the bank towards the road, there is a yew grove that contains The Hollow Yew (see above). Several younger yews have been felled here.

AH126hx Hollow Grove. The stump has a hollow centre, a diameter of 2 inches is lost. The girth is 7'7" but the cut is into the root buttress below the usual base measure level. No regeneration. The ring count is 126.

AHb145a Hollow Grove. This stump has one new shoot. Girth 5'6", ring count 145.

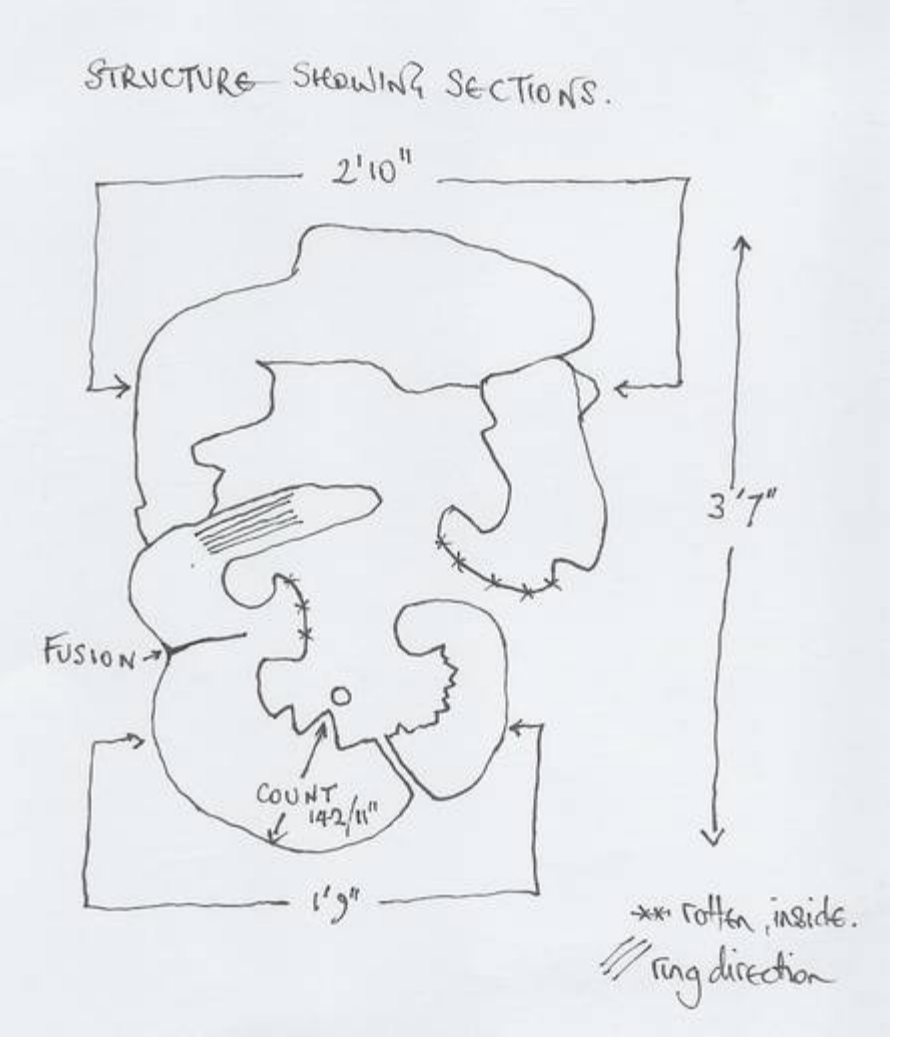
AH131hx Hollow Grove. The stump has a hollow centre 5 inches in diameter. No regeneration. The girth is 8'5" and the remaining ring count is 131.

Part 2 ...

More yew stumps found in spring 1998

AH142hx has been cut off at about three feet from the ground. It girths 9'8" at three feet, 11'2" at the base. There is no regeneration, and the stump is rotting. It was growing in sections and is very complex, being hollow, and with interesting features including fusion of separate stems with a strikingly womb-like section (photograph below). A ring count found 142 rings over a 24.5 cm radius. There is an apparent layer, (male, horizontal trunk, in line with stump, sweeping up) eight yards away. This stump is in the "basin" NW of the Hourglass Yew. Impossible to estimate age, certainly well in excess of 400 years.

AH142hx section



AH142hx showing independently formed sections of the stump, and the location of the womb-like fusion in the photograph above. The small circle near the count site represents an internal stem.

AH257b is near AH142hx. No regeneration, rotting, though sound wood under a thin layer of rot. The main count is on a vertical branch rising from a fat, rounded bole, with many low branches coming off it at different angles. The vertical branch on top of the rounded bole is in effect the main trunk, although it is unlikely to be the original one. This branch has several closely grouped contemporary centres, suggesting epicormic spray. The girth of the main branch is 7'7" at 3'6". The girth of the stump at three feet is 9'1". The girth at the base is 12'6". A second count was done from a centre near the one chosen for the first count. 252 rings were found. On both counts a few rings were missed in the rotten sapwood. The next largest branch is 2'6" in girth, and has a complete ring count of 146. It emanates about a foot from the base.

AH257b in 1998

Continuing up the other side of the valley towards the car park:

AH136bx has been cut off at about 3'6" from the ground, where branches sprang from the bole. One branch yielded 136 rings. The most upright branch was incomplete, and yielded 113 rings, the sapwood and centre being rotten. The girth is 7'5" at three feet, and 8'4" at the base.

Moving on into the conifer plantation on the hillside above the railway:

AH247r This very rotten felled bole is lying near its stump. The ring count is 247, a second count at 45 degrees to the first yielded 242, but had to be abandoned 2 inches from the centre because of the condition of the wood, the cut surface is complete, but sapwood and centre are gone, amounting to perhaps 30 rings worth of wood. The girth at 1 foot from the ground (the only practical measure without using digging equipment) was 9'8". The nearby stump measures 10'11", but is cut into the buttress, and is unreadable.

AH247r in 1998

AH148a Within sight of the research station in a plantation of very large conifers. The stump has several sprays of regeneration. The girth was 6'5" and the ring count was 148. Near AH126bx, see living yews.

AH67a Felled and left. Ring count 67, fast growing. Girth at base 3' 10", girth at three feet 4'2", cut 1997.

AH134ax This is a bole left by the trackside. No stump is in evidence. The base cut was 7'7", and the ring count was 134. Cut 1997?

AH92hx This very irregularly shaped stump had a 6 inch diameter hollow. The count yielded 92 rings and the girth was 7'8". Cut 1996/7

AH108hrx This twisted bole is minus its stump. It is hollow right through, including the lopped branches and has been scratched clean inside by animals (claw marks). The bole is part buried, and a rough measure of basal girth is 8'6". The ring count was 108 rings in 9" of outer wood. The hollow is 12 inches in diameter. The sapwood is missing.

AH113r A stump in the Pond Grove, about 14 yards from the Great Yew. It had 113 rings and a girth of 5'8". Rings are missing from the sapwood. An example of a faster growing yew specimen.

AH111a a dead yew which was cut down, probably a fatally shaded layer. Cut at 3 feet from the ground where the girth was 2'3" and 111 rings were counted. 3'2" at the base.

AH112bx This branch was one of two found lying in a heap of conifer material, with no obvious yew stump nearby. The largest was 5'6" in girth at the cut, hollow, and had 112 rings in a 4.4 cm radial section. The count on the underside was 73 rings in 5.5 cm. The second branch had a small internal stem growing down it. Certainly cut a long time ago, these branches may indicate a very large yew stump which remains undiscovered.

Addenda Spring 1988

In the sloping woodland between AH335a and AH149hx there are some rotten but readable yew stumps.

AH33rx Sapwood gone, centre sound. 33 visible rings. Base girth 1'4"

AH43rx No sapwood remaining. Girth 2'3", 43 rings visible.

AH177bx. This very complicated rotten stump is about 2 feet high, and hollow. The girth is 8'4" at the base. The stem was growing as multiple fused fragments with a non common centre at the base. Williamson's theory of composite fraternal boles appears appropriate to apply at first sight. On close inspection however it seems unlikely that these stems seeded together then amalgamated. Firstly, a count was managed on the most complete of the stems which yielded 83 rings plus some sapwood which was rotten. As there was a count of 177 rings on a branch that was part of the waste from the felling, the complete stem, with a girth of 2'0", must have been an internal stem growth. This 2'0" stem had visible multiple centres as seen on an internal stem at Cherkley Court.[6] The section was, significantly, largely amalgamated with the outer part of the trunk. When this is noticed, more evidence springs to one's attention. There is another clear internal stem of perhaps 1 inch girth, and several of the other sections look suspiciously like internal growth, though they are too rotten to analyse. Internal stems must grow into the interior of the yew, what was the girth of the lost outer trunk that exposed the internal growth when it decayed and fell away? There is a female layer about 4 yards from the stump, still attached to a sawn off branch, very likely the last remnant of this very old yew. I estimate: to substantially exceed the girth of the internal stem formation inside it, over 500 years. To lose the outer bole case without trace, over 300 years, with some overlap between these periods. 50 years since felling. Also unknown other growth. The layer is (in 2000) probably an 800+ year old remnant.

Summary Stats for felling 1940 to 2000: Lost Yews.

There are 65 yew stumps under 14 feet in girth at base. There are 6 of base girth 14 to 19 feet.

I find that there are remnants of at least 9 yews over 200 years old, and a further 9 over 400, of which 6 are probably in excess of 700 years old.

Total found felled: 71.

Eisteddfod Break

As a fellow denizen of the forest I record one of my responses to a particular older yew still standing at Alice Holt. Published in ENVOI poetry magazine no. 122, February 1999.

The Fox Tree

Running red,
Running red on a hilltop,
Where bloodstained bark
Petrified under the hard moon.

A moment passed,
Leaving a taut potential
Draining from the rooted earth,
Stealthy down slopes,

Mad hunting red,
Running convoluted landscapes,
Chasing flowing ghosts
And woody visions.

And in the rigours of first light
Hunter and earth fuse,
Blood glazed on roots,
Dawn under a twisted yew.

Living yews

In this section I present a very small selection of the yews still growing on this site which are less than 14 feet in girth.

AH197bx Gravel Hill inner car park. This female yew is by the side of the track, opposite the Internal Stem Yew. It has had a minor branch removed at 3-4 feet from the ground. The branch originates at the base but the lower part of it has been amalgamated into the trunk. The main bole leans away from the side with the cut off branch. The girth of the bole is 10'1" at the base and 9'11" at three feet. 197 rings were found on a good clear and complete cut surface. The cut was made in 1996.

AH197bx in 1997

AH93bx There is a grove of yews of about 140 years old still standing by the end of the inner car park in which are found the felled boles AH251r and AH170h. Some small (about 1' girth) branches have been lopped from one yew at about 3 feet from the ground. 93 rings were found on one cut, and 87 on another. This yew was closely bound up with an oak that has just been felled: the oak had a girth of 9'0" at 3 feet and a ring count of 180. A large number of similar oaks are currently being harvested here. (1997)

AH137b Gravel hill roadside. One yew 4'6" in girth had a secondary trunk (a vertical branch from the base) removed in 1996. 137 rings are visible on a cut 3 feet from the base. This tree is on the "AH152a ridge". The tree is within a few dozen yards of the car park entrance on the right going in.

AH55b Gravel Hill roadside. Count is on a minor branch scar 1' from ground. The branch origin was at the base of the yew. 55 rings. Cut 1996. The girth of the whole yew is 2'7" at 3 feet from ground.

Ah98bx Gravel Hill roadside. This is the second last yew remaining on the left hand ridge by the road going towards the research station from the A31 end. A branch has been lopped at 5 feet from the ground. There are 98 rings. The girth of the yew is 5'10" at the base, and 5'5" at three feet from ground.

AH104bx South Bank. There is a standing yew which has had a minor branch removed at 2 feet from ground. The branch was removed in 1996. The girth of the yew was 5'5" at three feet, and 6'9" at the base. The branch ring count was 104.

AH126bx Sparse but healthy foliage. The yew has clearly been heavily shaded over the last few decades, the bole is sprouting epicormic growth all over, but shoots below 3'6" are being grazed back. Judging by the lack of bark and the surrounding cambium at the branch base, the ring counted branch has been dead for some time. Girth at the base 9'2", 8' 2" at three feet.

AH113bx At the Pond Crossroads. Called “The Charismatic Yew” due to its oddly organic and flowing appearance. I have broken my personal rule of only naming yews that girth over 14 feet because the tree is so extraordinary. A branch has been removed at 5 feet from the ground. 113 rings were found on the cut. The cut is at least 10 years old judging from the condition of the wood. The base (minimum) measures 12'4", and the bole measures 10'2" immediately above the “arms” and below the cut branch (1998)

The Charismatic Yew in 1998

Walk past the inner car park along the track to the pond crossroads, and go straight over the crossroads leaving the pond on your left. Eventually you reach a hardcore track to your left (which leads towards a big mound, a smaller pond in a pit, and beyond that the Pond Grove). There is a large clear cut area, and you are looking at a long slope down and away from you into the valley. A few dozen yards from you, near the highest point of the rise you are on are two yew stumps.

AH144a Clear cut area. Felled in autumn 1996, after being left to stand for several years on the clear cut. It is interesting to note the sudden explosion of growth reflected in the ring separation, brought on by the exposure to light after the surrounding conifers were felled. The encroachment of the conifers is reflected in the dense band of very narrow rings that is just inside the sapwood. The effect found on both yews was an explosion of new shoots from the bole at 3-5 feet from the ground, rather than from the canopy, and a massively increased ring width near the base in the last few years. A photograph is included for illustration, thankfully taken before the unexpected felling of these yews. Girth 6'5", ring count 144.

AH154a Clear cut area. No regeneration after felling, girth 8'1" ring count 154.

Photographs of AH144a and AH154a before felling in the winter of 1996/1997

The Roadside Bank (ridge) Yews

A number of relatively young yews are growing on ridges either side of Gravel Hill Road. One has been cut down and is detailed above (AH152a). The yews were clearly deliberately planted on the ridges, and at the same time, evident from the homogeneity of girth, and regular planting distances.

Girths of all yews clearly on the ridge have been taken, starting with the nearest to the stump AH152a and working towards the entrance to Gravel Hill car park.

Girths at three feet from ground and sex where positively identified (1997).

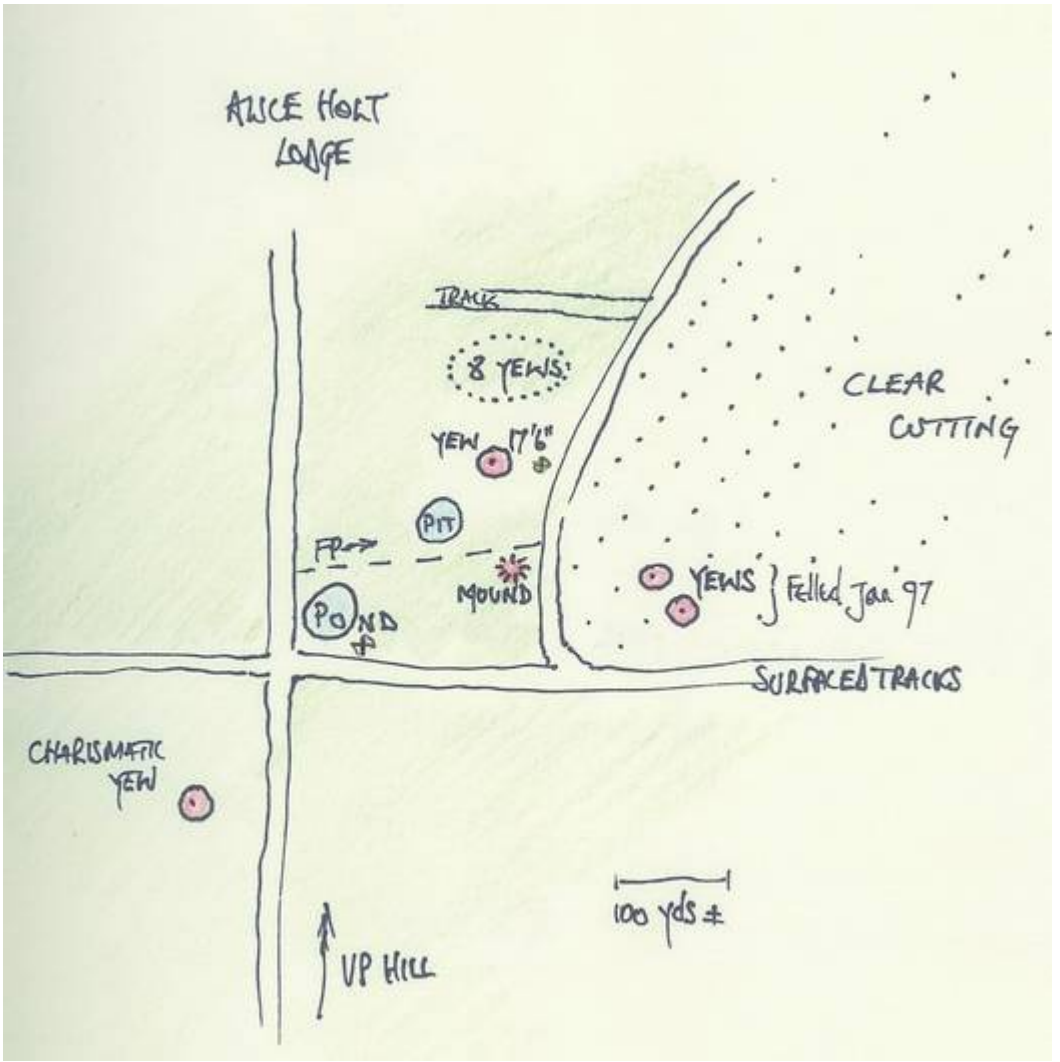
5'2"f, 5'1"f, 6'2"m, 4'6", 5'10"f, 5'0"f, 5'11", 4'6"

In 1997 these yews were about 156 years old.

The ridge yews next to Gravel Hill Road 1997

The “Pond Grove”

The Pond Grove is a small area containing nine individual yews which have been the focus of extra study over the last 12 years. The sketch map below shows their whereabouts in the Lodge Inclosure. The “8 yews” and the yew 17'6" form the Pond Grove.



Pond Grove Measuring

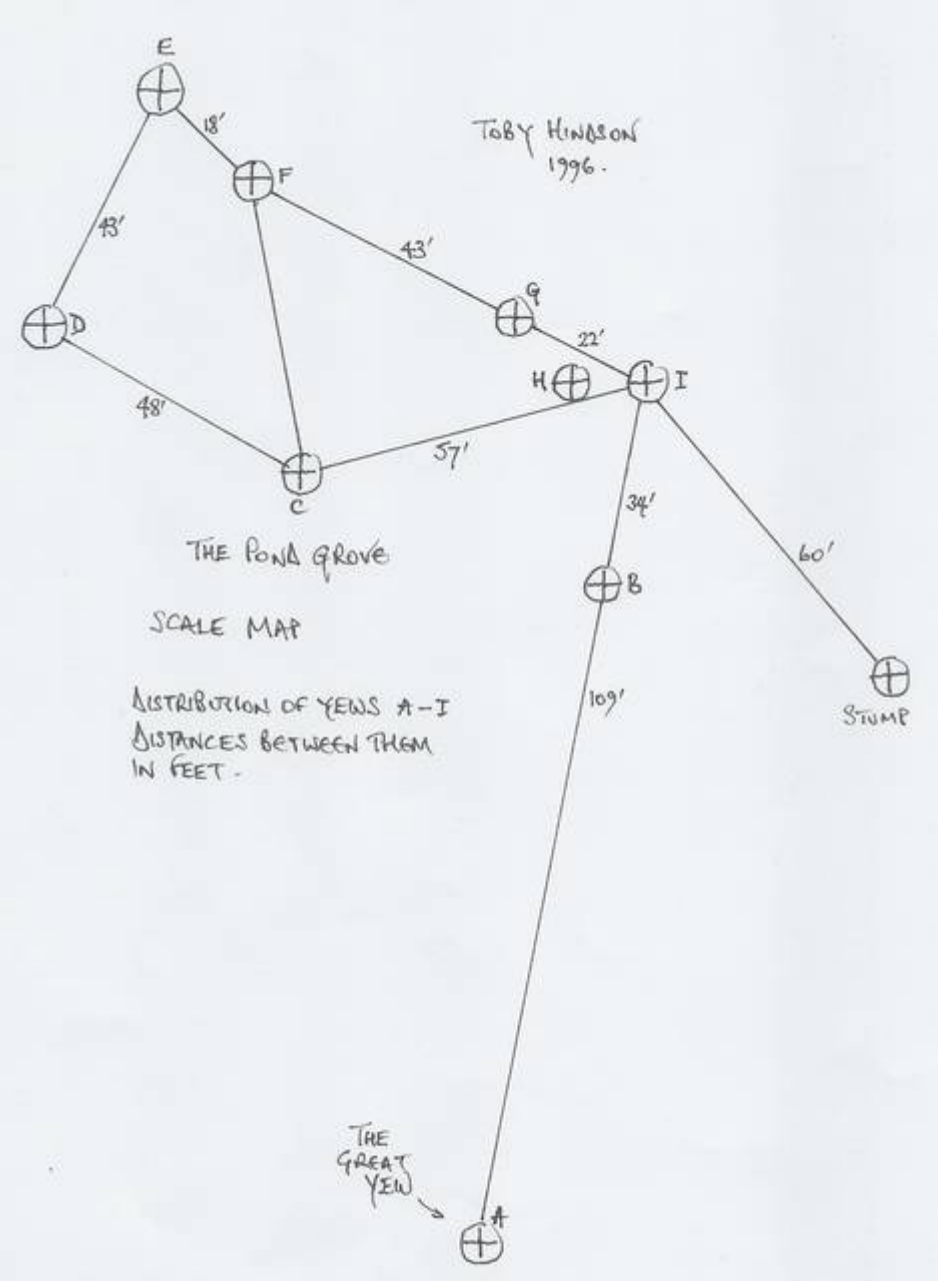
Below are the measurements taken over the last twelve years showing girth changes, there are some anomalies as I had to get my measurement method honed, and some of the earlier measures are therefore an inch or two too high. The data is fairly consistent however, and a good basis for further work over a longer time period.

Pond Grove measurements at three feet from the ground.

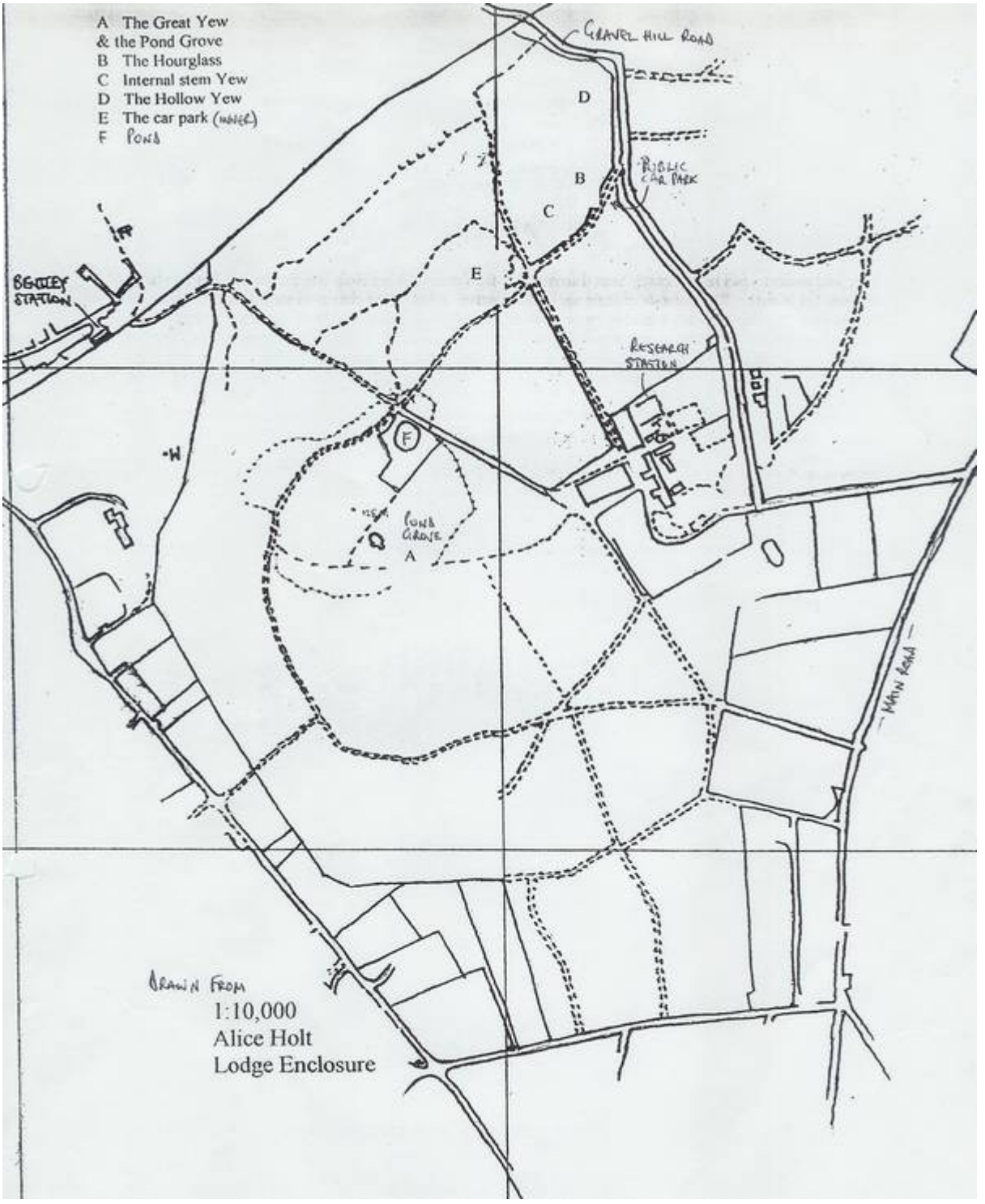
	1996	1999	2000	2003	2004	2006/7	
A (Gt Yew)	17'6"	17'7"	17'8"	17'9.5"	17'10"	17'11"	
B	8'10"	8'9"	8'9"		8'8"	8'10"	
C	11'9"	11'9"	11'8"		11'9.5"	11'10.5"	
D	13'8"	13'9"	13'9"	13'10"	13'10.5"	13'11"	
E	11'4"	11'3"	11'4"		11'5"	11'5"	
F	7'0"	7'0"	7'0"		7'1"	7'1"	
G	9'0"	9'1"	9'2"		9'2"	9'2.5"	
H	7'3.5"	7'4"	7'4"		7'5"	7'7"	
I	12'4"	12'4.5"	12'5"	12'6.5"	12'6.5"	12'7"	

The Detailed Scale Diagram, Pond Grove.

The yews have been given identification letters A-I, and the diagram below shows how they lie in relation to one another. Careful use of the diagram will ensure that future researchers have no problems identifying the individuals, even if some happen to be lost.



Sketch Map of Alice Holt Lodge Inclosure



Most yews mentioned in this study are found on the northern half of the map, to the West of the research station, though the whole area has been investigated.

Yew “D” in the Pond Grove. The Fox Tree.

Yew D will soon reach my personal 14 foot girth criterion for “exceptionally significant” in the wild, at which point it will receive the name “The Fox Tree”. The categorisation of yews by age or size is a thorny issue, I use 5 meters or 16.7 feet in churchyards as the watershed for “ancient”. Experience has led me to regard any wild yew over 12 feet in girth as unusually large and important, a wild specimen over 14 feet in girth I have found to be very rare.

I hope that this document will be used in further yew research. Despite my obvious issues with the felling of the larger yews at Alice Holt I have consciously refrained from allowing any emotion to detract from the scientific purity of the counts, measurements and estimates. There is nothing to be gained from exaggeration but devaluation of the attempt (that cost at least a thousand hours of my time) to create something useful from the loss of the felled yews.

Toby Hindson 2008.

1 www.woodland-trust.org.uk/ancient-tree-forum/atfscapes/focus/hampshire.htm (p 1)

2 White, G. (1789) *The Natural History and Antiquities of Selborne, in the County of Southampton; with engravings, and an appendix,* Benjamin White & Son, Fleet Street. (p 1)

3 North, W. (1997*),Pers. Com.,* Alice Holt, Manager, Forest Enterprise. (p 10)

4 e.g. Tabbush, P. and White, J. (1996) *Estimation of Tree Age in Ancient Yew Woodland at Kingley Vale,* Quarterly Journal of Forestry v.90, no. 3. ISSN 0033-5568. (p 15)

5 Hindson, T. Current longitudinal study, *Monnington Walk*, completion due after 2012. (p 17)

6 Hindson, T. (2008), *Brief studies of Felled Yews*, AYG website. (p 27)