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**Tree-Ring Analysis of Timbers from Taunton Hall and Old Hall  
Fold, Newmarket Road, Ashton-under-Lyne, Lancashire**

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## **Tree-Ring Analysis of Timbers from Taunton Hall and Old Hall Fold, Newmarket Road, Ashton-under-Lyne, Lancashire**

Dr Martin Bridge

### **Summary**

Previous studies of these buildings and their surviving crucks had suggested an early fourteenth-century date for the east and west crucks, currently located in Old Hall Fold, and a late sixteenth-century date for the south cruck, currently located in Taunton Hall. This study was unable to find suitable timbers with which to date reliably the east and west trusses, although the smoke-blackened purlins attached to them dated to the late-fifteenth or early-sixteenth centuries. They may well represent the same phase of work on the building as the construction of the south truss, which utilizes timber felled in AD 1495-6.

### **Keywords**

Dendrochronology

Standing Building

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## Introduction

Taunton Hall and Old Hall Fold were originally a single building which has subsequently split at an unknown time, and now form two joined properties under separate ownership (NGR SD 927 004; Fig 1). The structures are now encased in eighteenth-century brick walls, but they retain cruck trusses inside, the eastern (C-CC) and western (B-BB) crucks (Fig 2) have been described as being unusually large overall (Nevell and Hradil 1998). These two cruck trusses are within Old Hall Fold, and the southern cruck (A-AA) is in Taunton Hall. The western truss is thought to mark the centre of an original two-bay open hall. It has an arch-braced collar. The eastern cruck truss has a collar and tie beam, but is now largely hidden within a wall. The southern cruck truss is in the cross-wing. It is pit-sawn with straight blades, a tie beam at floor level, and a collar above.

The southern and western cruck trusses were sampled in 1998 by the University of Manchester Dendrology Group, whose findings suggested that the western cruck truss (B-BB) dated to the early-fourteenth century, whilst the southern cruck truss (A-AA) dated to the late-sixteenth century. Their results quoted in Nevell and Hradil (1998) say that for cruck A-AA the first ring dates to AD 1508 and the last ring to AD 1577, although they also say that the series has only 57 rings. They add a sapwood estimate of 20 to 25 rings and suggest a probable felling date of AD 1597-1602. For cruck B-BB they say the series is 69 years long (including 18 whole sapwood rings) and give a date for the outside ring of AD 1310, with a suggested likely felling date of AD 1315-20. No supporting evidence showing how these dates were derived was given (Nevell and Hradil 1998; Nevell and Walker 1998).

English Heritage commissioned the present study in order to clarify the dates of the crucks in these buildings, doubt having been cast upon the University of Manchester dates as a result of studies at other sites 'dated' by this group and subsequently investigated by established dendrochronological laboratories (Tyers 1999a; Howard *et al* 2001).

## Methodology

The site was visited in March AD 2003. The original coring sites used by the Manchester group were sought, and where possible, cores were taken close by. Oak timbers with more than 50 rings, traces of sapwood, and accessibility were the main considerations in the initial assessment. Those timbers judged to be potentially useful were cored using a 15mm auger attached to an electric drill. The cores were glued to wooden laths, labelled, and stored for subsequent analysis.

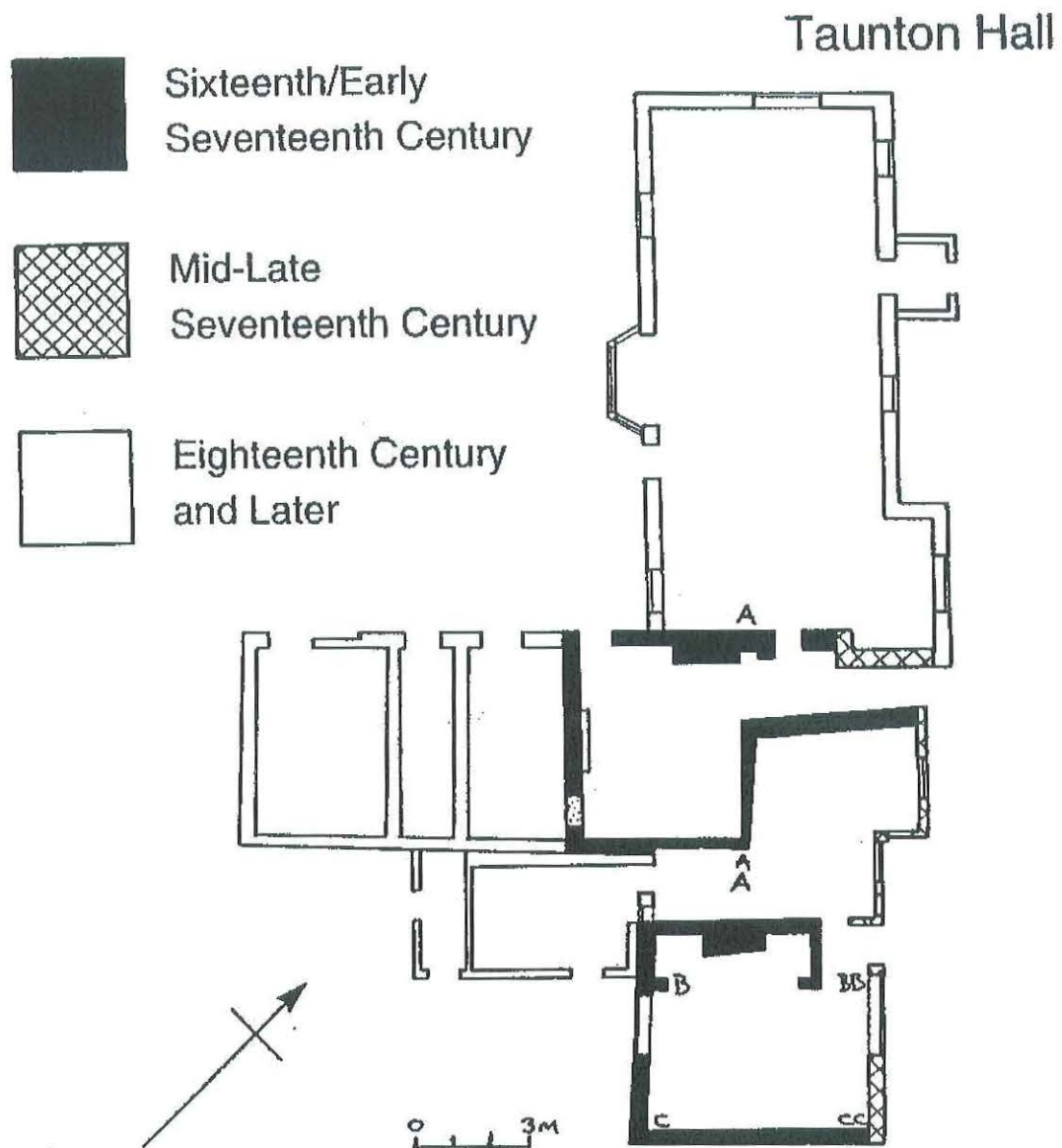
The cores were prepared for measuring by sanding using an electric belt-sander with progressively finer grit papers down to 400 grit. Any further preparation necessary, eg where bands of narrow rings occurred, was done manually. Suitable samples had their tree-ring sequences measured to an accuracy of 0.01 mm using a specially constructed system utilizing a binocular microscope with the sample mounted on a travelling stage with a linear transducer linked to a PC. The software used in measuring and subsequent analysis was written by Ian Tyers (1999b).

Ring sequences were plotted to allow visual comparisons to be made between sequences on a light table. This activity also acts as a measure of quality control in identifying any errors in the measurements when the samples crossmatch. Statistical comparisons were made using Student's *t*-test (Baillie and Pilcher 1973; Munro 1984). The *t*-values quoted below were derived from the original CROS program (Baillie and Pilcher 1973). Those *t*-values in excess of 3.5 are taken to be indicative of acceptable matching positions provided that they are supported by satisfactory visual matches, and give consistent matching positions.

When crossmatching between samples is found, their ring-width sequences are meant to form an internal 'working' site mean sequence. Other samples may then be incorporated after comparison with this 'working' master until a final site sequence is established, which is then compared with a number of reference chronologies (multi-site chronologies from a region) and dated individual site masters in an attempt to date it. Individual long series which are not included in the site mean(s) are also compared with the database to see if they can be dated.



**Figure 1:** Map showing the general location of Taunton Hall and Old Hall Fold



**Figure 2:** Plan of Taunton Hall and Old Fold Hall showing the locations of the trusses mentioned in the text. The dates shown are from Nevell and Hradil (1998), and may need to be re-interpreted in the light of this work.

The dates thus obtained represent the time of formation of the rings available on each sample. Interpretation of these dates then has to be undertaken to relate these findings to the construction date of the phase under investigation. An important aspect of this interpretation is the estimate of the number of sapwood rings missing. In this instance, the sapwood estimates are based on those proposed for this area by Miles (1997), in which 95% of samples are likely to have from 12 to 45 sapwood rings. Where bark is present on the sample the exact date of felling of the tree used may be determined.

The dates derived for the felling of the trees used in construction do not necessarily relate directly to the date of construction of the building. However, evidence suggests that, except in the re-use of timbers, construction in most historical periods took place within a very few years after felling (Salzman 1952; Hollstein 1965).

## **Results**

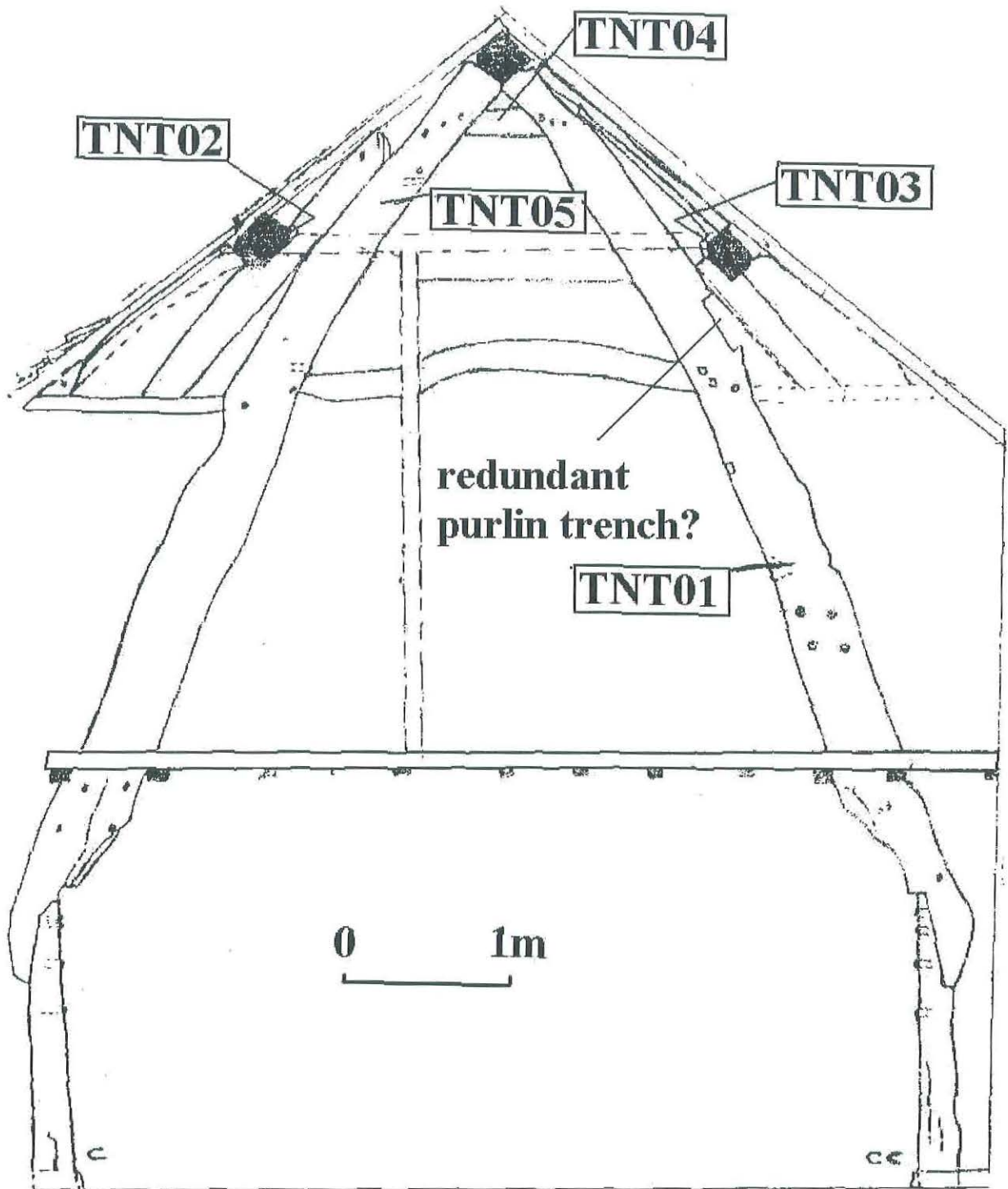
The general assessment of all the timbers associated with the cruck structures undertaken prior to sampling indicated that all the timbers were generally derived from fast-grown young trees which are not ideally suited to dendrochronological analysis. All the timbers investigated were of oak (*Quercus* spp.). The most promising looking timbers were sampled, however several of these turned out to have insufficient rings to be considered suitable for further analysis. The locations of the samples are shown in Figures 3-5, and described, along with other information concerning each sample, in Table 1. Sample TNT09 is a duplicate of the sample taken by Manchester University, their other samples could not be relocated.

Four of the six samples from the east and west cruck trusses were rejected as having too few rings for dating purposes. One of the two measured samples (TNT06) contained only 47 rings, and was measured on this occasion because it was considered vital to at least attempt to confirm or refute the results from the previous analysis. The other sample (TNT01), from the cruck blade, had 83 rings, but contained very dramatic growth variations (Fig 6), and could not be dated. Samples TNT01 and TNT06 showed no similarities with each other or any of the other samples from the site. Consequently, they were compared individually with a wide range of regional multi-site, and individual site, reference chronologies, but no consistent dating evidence was produced, and these two timbers remain undated.

The two smoke-blackened purlins connecting these two trusses did yield series of sufficient length to be analysed further. They matched each other ( $t = 5.8$ ; Table 2) and were combined to form a site master chronology TNT-PUR. This was dated to AD 1430-82 by comparison with a range of regional multi-site, and individual site, reference chronologies (Table 3a). One sample retained complete sapwood, but there was a break in this region of the core. The relative positions of overlap of these two samples are shown, along with their interpreted felling dates, in Figure 7.

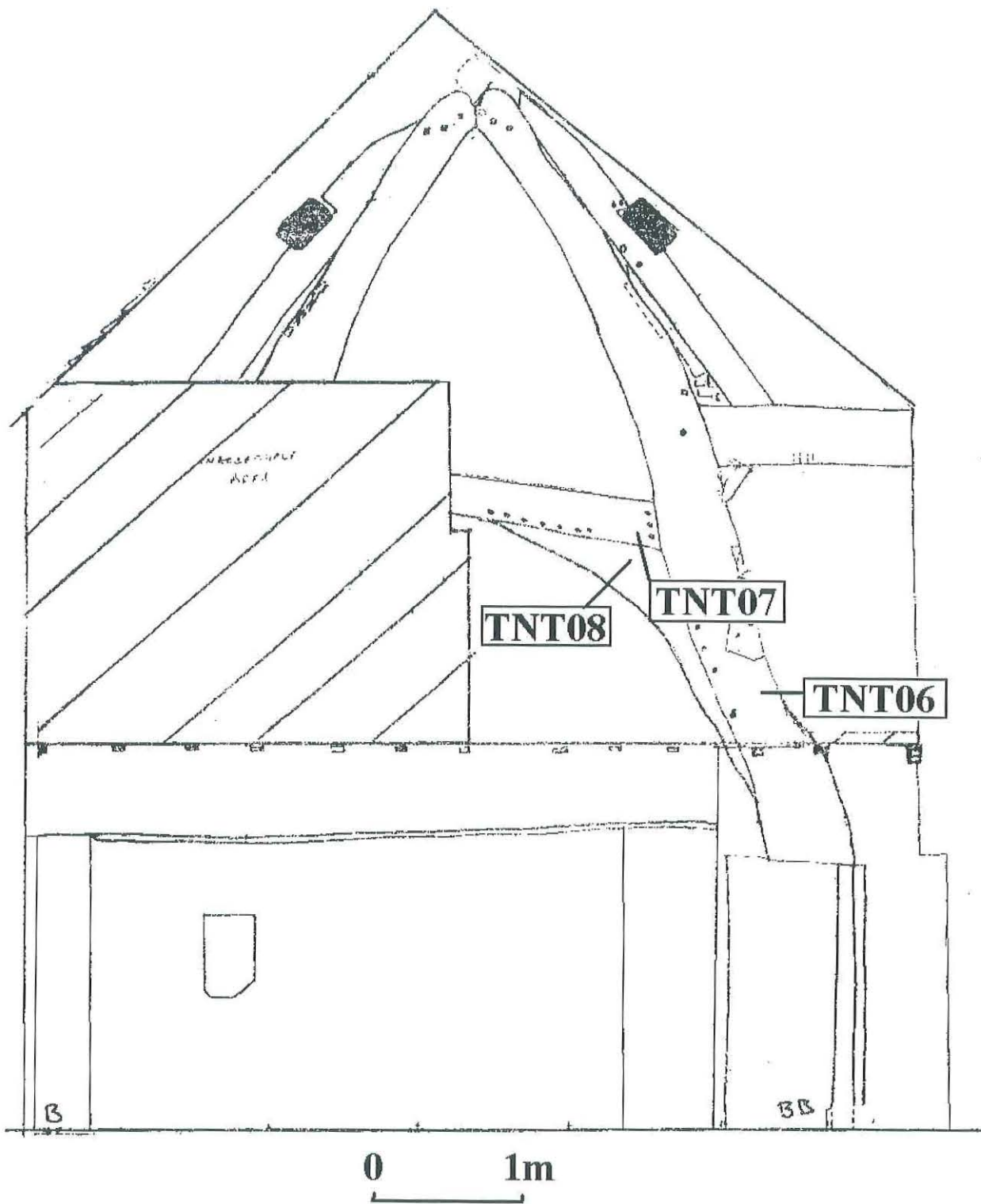
The two samples from the cruck blades of the southern cruck (Fig 5) were suitable for measurement. The resulting series matched each other (Table 2) and were combined to form a second site chronology TNT-SCK. This was dated to AD 1401-95 by comparison with a range of regional multi-site, and individual site, reference chronologies (Table 3b). The relative positions of overlap of these two samples are shown, along with their interpreted felling dates, in Figure 7.

TNT-PUR and TNT-SCK match with a  $t$ -value of 5.3 and were therefore combined to form a single site master TAUNTHLL, which matches remarkably well with a wide range of reference chronologies at AD 1401-95 (Table 4). The data for this chronology are given in Table 5.

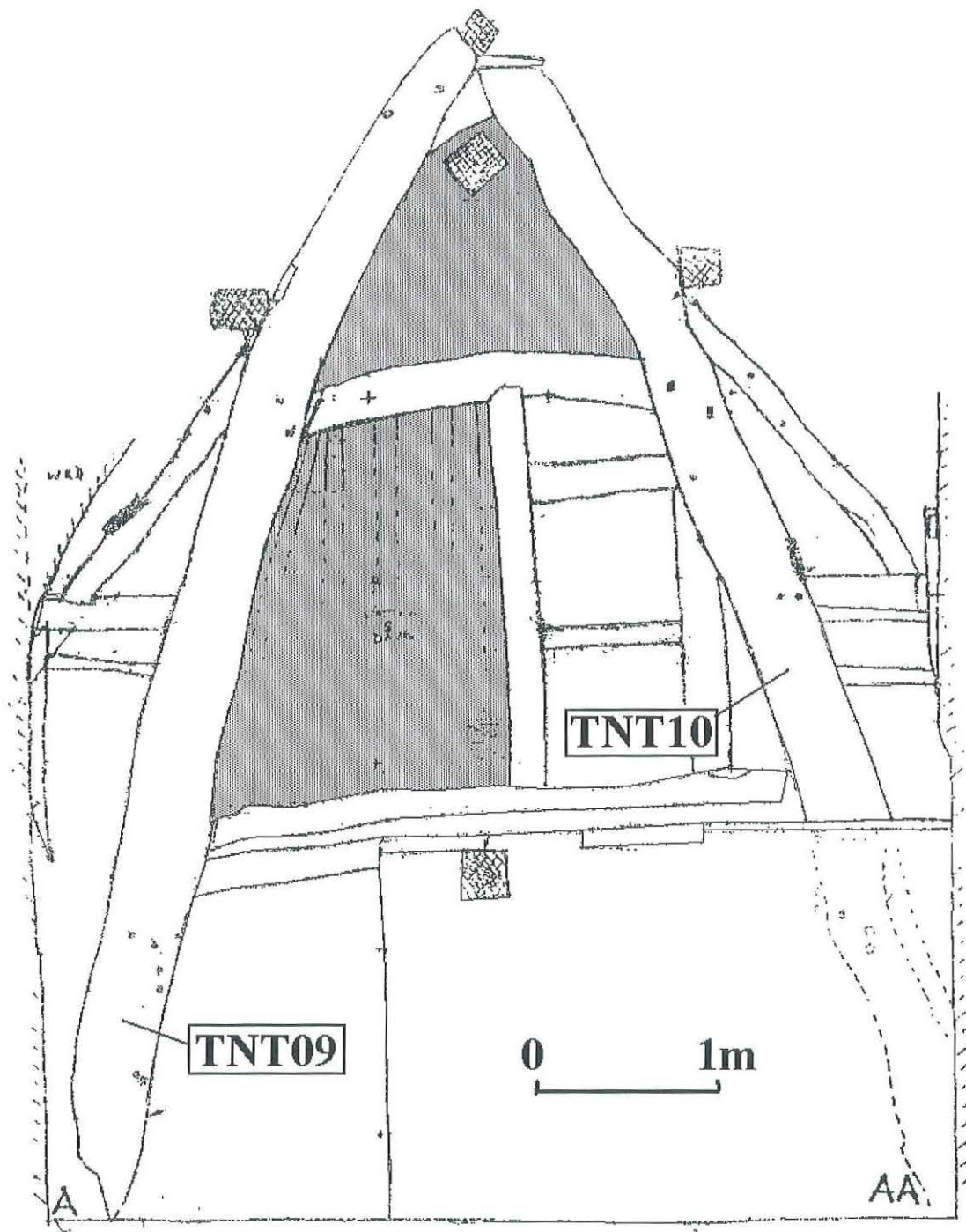


**Figure 3:** The eastern cruck truss (C-CC) showing the approximate locations of samples taken for dendrochronological analysis





**Figure 4:** The western cruck truss (B-BB), showing the approximate locations of samples taken for dendrochronological analysis



**Figure 5:** Southern cruck truss (A-AA), showing the approximate locations of samples taken for dendrochronological analysis

**Table 1:** Oak (*Quercus* spp.) timbers sampled from Taunton Hall and Old Hall Fold. h/s represents the heartwood-sapwood boundary, figures in brackets represent additional unmeasured rings, and C represents complete sapwood

Sample number	Origin of core	Total no of years	Average growth rate (mm yr <sup>-1</sup> )	Sapwood details	Date of sequence AD	Felling date of timber AD
TNT01	South cruck blade to east cruck	83	2.61	-	undated	unknown
TNT02	North purlin, Old Hall Fold	53	1.64	9 (+9)	1430-82	1491 – 1518
TNT03	South purlin, Old Hall Fold	52	2.01	3 (+14C)	1430-81	1495-6
TNT04	Yoke to east cruck	41	unmeasured	13	undated	unknown
TNT05	North cruck blade to east cruck	<30	unmeasured	-	undated	unknown
TNT06	North cruck blade to west cruck	47	4.08	-	undated	unknown
TNT07	Collar to west cruck truss	39	unmeasured	-	undated	unknown
TNT08	North arch brace to west truss	34	unmeasured	-	undated	unknown
TNT09	West cruck blade to south cruck	59	2.40	11	1432-90	1491 – 1524
TNT10	East cruck blade to south cruck	95	2.43	16C	1401-95	1495-6

**Table 2:** Crossdating between the dated timbers from Taunton Hall and Old Hall Fold. A (-) represents a *t*-value of less than 3.0

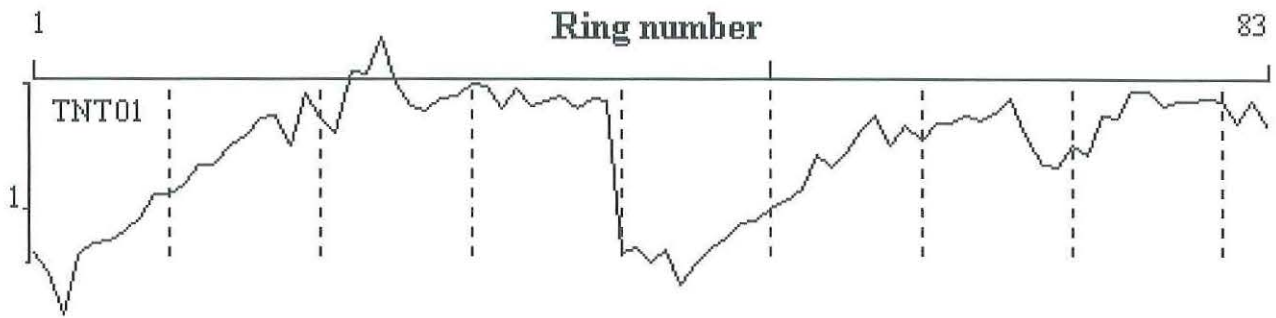
<i>t</i> - values			
Sample no	TNT03	TNT09	TNT10
TNT02	5.8	4.6	-
TNT03		4.9	-
TNT09			4.4

**Table 3:** Dating evidence for the two intermediate site chronologies, a) TNT-PUR and b) TNT-SCK

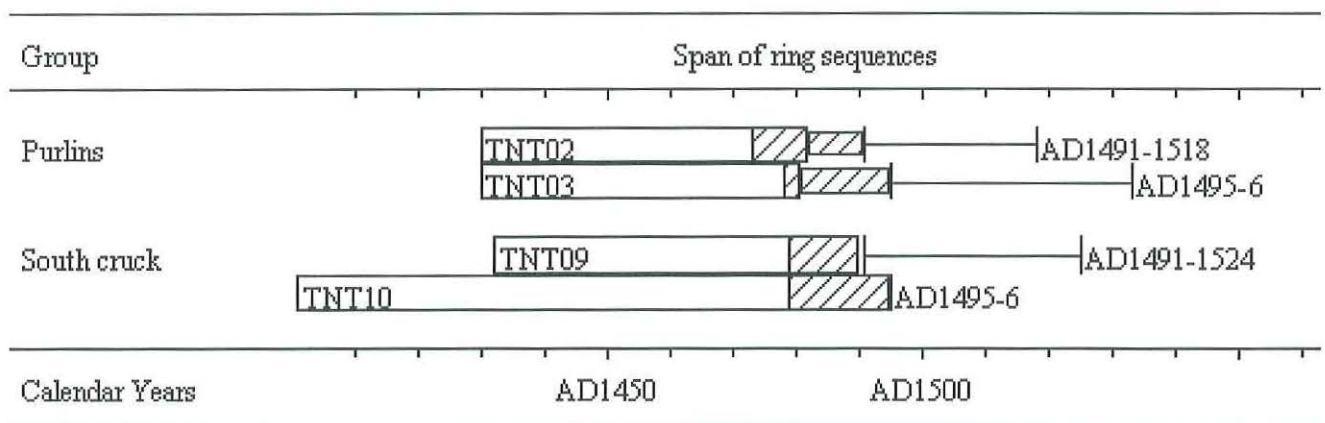
		<b>a) TNT-PUR AD 1430-82</b>	
<b>Dated reference or site master chronology</b>	<b>Dates spanned (AD)</b>	<b><i>t</i>-value</b>	<b>Overlap (yrs)</b>
Lathom House, Lancaster (Nayling 2000)	1369-1465	5.0	36
Old Worden, Lancashire (Bridge 2003)	1415-1531	4.9	53
Low Ham, Somerset (Miles and Worthington 1999)	1392-1480	4.7	51
Mynde, Herefordshire (Nayling 2001)	1392-1619	4.5	53
Alton, Hampshire (Hillam 1983 )	1348-1504	4.3	53
Alton, Hampshire (Miles and Worthington 1999)	1350-1500	4.0	53
		<b>b) TNT-SCK AD 1401-95</b>	
Salop95 (Miles pers comm)	881-1745	7.3	95
East Midlands (Laxton and Litton 1988)	882-1981	7.3	95
Wales97 (Miles pers comm)	404-1981	6.8	95
Welsh Borders (Siebenlist–Kerner 1978)	1341-1636	6.3	95
Maytree, Surrey (Miles and Worthington 2000)	1413-1559	8.6	83
Stayley, Greater Manchester (Leggett 1980)	1365-1554	8.4	95
Ightfield, Shropshire (Groves 1998)	1341-1566	7.6	95
Old Worden, Lancashire (Bridge 2003)	1415-1531	6.9	81
Coatsfm, Shropshire (Miles and Haddon-Reece 1996)	1346-1485	6.6	85
Ford, West Sussex (Bridge 2000)	1286-1511	6.6	95
Lathom House, Lancaster (Nayling 2000)	1369-1465	6.5	65
Sinai, Staffordshire (Tyers 1997)	1227-1750	6.4	95

**Table 4:** Dating of the oak site chronology TAUNTHLL

		TAUNTHLL AD 1401-95	
Dated reference or site master chronology	Dates spanned (AD)	<i>t</i> -value	Overlap (yrs)
Salop95 (Miles pers comm)	881-1745	6.8	95
Wales97 (Miles pers comm)	404-1981	6.8	95
East Midlands (Laxton and Litton 1988)	882-1981	6.7	95
Devon (Groves pers comm)	1124-1536	6.2	95
Welsh Borders (Siebenlist–Kerner 1978)	1341-1636	5.7	95
Hants02 (Miles pers comm)	443-1972	5.6	95
Maytree, Surrey (Miles and Worthington 2000)	1413-1559	8.0	83
Ightfield, Shropshire (Groves 1998)	1341-1566	7.6	95
Stayley, Greater Manchester (Leggett 1980)	1365-1554	7.5	95
Old Worden, Lancashire (Bridge 2003)	1415-1531	7.4	81
Lathom House, Lancaster (Nayling 2000)	1369-1465	6.7	65
Ford, West Sussex (Bridge 2000)	1286-1511	6.6	95
Coatsfm, Shropshire (Miles and Haddon-Reece 1996)	1346-1485	6.4	85
TheBold2, Shropshire (Miles and Haddon-Reece 1995)	1407-98	6.4	89
Vowchurch, Herefordshire (Nayling 1999)	1364-1602	6.4	95
Bruton3, Somerset (Miles and Worthington 1997 )	1363-1453	6.3	53
Bdleian2, Oxfordshire (Miles and Worthington 1999)	1346-1485	6.1	85
Mary Rose 'original' (Bridge and Dobbs 1996)	1334-1503	6.0	95
BowerCt, Worcestershire (Bridge 2002)	1359-1475	6.0	75
Wetasq03, Staffordshire (Arnold <i>et al</i> 2003)	1397-1480	6.0	80



**Figure 6:** Plot of the ring sequence for sample TNT01 showing the dramatic growth changes discussed in the text. The ring width (mm) is plotted (y axis) on a logarithmic scale



**Figure 7:** Bar diagram showing the relative positions of overlap of the dated samples from Taunton and Old Fold Halls, with their interpreted felling date ranges. Narrow bar sections represent additional unmeasured rings and hatched sections are sapwood rings

## **Interpretation and Discussion**

This study did not find timbers with sufficient rings to be able to date the western and eastern crucks dendrochronologically. Neither of the two measured sequences could be dated. One timber (TNT06) only had 47 rings, and did not match any of the other timbers at the site. It would be very unusual to be able to give a reliable date on such a short individual sequence. The other timber (TNT01) showed very atypical growth characteristics, with a very sudden decline in ring-width mid-way through the series, which almost certainly mask the general climatic signal required for dating. Consequently there is no evidence to support the late thirteenth-/early fourteenth-century date proposed in the previous analysis (Nevell and Hradil 1998; Nevell and Walker 1998)

As discussed above, it is assumed that the east and west cruck trusses pre-date the south cruck truss, with the west truss marking the original centre of a two-bay open hall (Nevell and Walker 1998). The purlins running between the east and west trusses match each other and are assumed to be contemporaneous. The AD 1495-6 felling date produced for both the south cruck truss and the purlins running between the east and west cruck trusses therefore suggest that the open hall was modified in the late fifteenth century, although the smoke blackening on the purlins indicates that the resulting structure was still not floored.

The lack of suitability of the timbers from the east and west cruck trusses means that it has not been possible to confirm dendrochronologically that these cruck trusses pre-date the south cruck truss. There is however an indication that the present dated-purlins replace original purlins, a possible redundant notch for an original purlin being evident on the east truss (Fig 3).

In the case of the southern truss, both cruck blades matched each other, and gave very strong dating evidence against a wide range of material, with felling of one tree used being in AD 1495-6, with the other having a likely felling date range that includes this date. They are assumed to be contemporaneous. This late fifteenth-century date for the south cruck truss is almost a century before the date of AD 1577 + 20-25 years suggested previously (Nevell and Walker 1998, 67).

The site chronology derived from all four dated timbers matches very strongly against material from a wide geographical range, though the majority of the best results are from relatively local sites, suggesting the probable use of locally-sourced timber.

## **Acknowledgements**

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## References

- Arnold, A J, Howard, R E, and Litton, C D, 2003 *Tree-ring analysis of timbers from the Bell Frame and Tower Roof of St Margaret's Church, Wetton, Staffordshire*, Centre for Archaeol Rep, **22/2003**
- Baillie, M G L, and Pilcher, J R, 1973 A simple cross-dating program for tree-ring research, *Tree Ring Bulletin*, **33**, 7-14
- Bridge, M C, 2000 *Tree-ring analysis of timbers from St Andrew's Church, Ford, West Sussex*, Anc Mon Lab Rep, **27/2000**
- Bridge, M C, 2002 Tree-ring dates, List 124, *Vernacular Architect*, **33**, 74-8
- Bridge, M C, 2003 *Tree-ring analysis of timbers from Old Worden Hall, Euxton Lane, Chorley, Lancashire*, Centre for Archaeol Rep, **47/2003**
- Bridge, M C, and Dobbs, C, 1996 Tree-ring studies on the Tudor warship *Mary Rose*, in *Tree Rings, Environment and Humanity* (eds J S Dean, D M Meko, and T W Swetnam), 515-23, Arizona
- Groves, C, 1998 *Dendrochronological analysis of Ightfield Hall Farm Barn, Ightfield, Whitchurch, Shropshire*, Anc Mon Lab Rep, **91/98**
- Hillam, J, 1983 Tree-ring dates, *Vernacular Architect*, **15**, 69
- Hollstein, E, 1965 Jahrringchronologische von Eichenholzern ohne Walkande, *Bonner Jahrb*, **165**, 12-27
- Howard, R E, Laxton, R R and Litton, C D, 2001 *Tree-Ring Analysis of Timbers from Astley Hospital, Church Road, Astley, Manchester*, Centre for Archaeol Rep, **66/2001**
- Laxton, R R, and Litton, C D, 1988 An East Midlands master tree-ring chronology and its use for dating vernacular buildings, University of Nottingham, Dept of Classical and Archaeological Studies, Monograph Series, **III**
- Leggett, P A, 1980 The use of tree-ring analysis in the absolute dating of historical sites and their use in the interpretation of past climatic trends, PhD Thesis, CNAA (Liverpool Polytechnic)
- Miles, D, 1997 The interpretation, presentation, and use of tree-ring dates, *Vernacular Architect*, **28**, 40-56
- Miles, D H, and Haddon-Reece, D, 1995 List 64 - Tree-ring dates, *Vernacular Architect*, **26**, 73-4
- Miles, D H, and Haddon-Reece, D 1996 List 72 - Tree-ring dates, *Vernacular Architect*, **27**, 97-102
- Miles, D H, and Worthington, M J, 1997 Tree-ring dates, *Vernacular Architect*, **28**, 159-81
- Miles, D H, and Worthington, M J, 1999 Tree-ring dates, *Vernacular Architect*, **30**, 98-113
- Miles, D H and Worthington, M, 2000 General list 107, *Vernacular Architect*, **31**, 91 - 101



- Munro, M A R, 1984 An improved algorithm for crossdating tree-ring series, *Tree Ring Bulletin*, **44**, 17-27
- Nayling, N, 1999 *Tree-ring analysis of timbers from The White House, Vowchurch, Herefordshire*, Anc Mon Lab Rep, **73/99**
- Nayling, N, 2000 *Tree-ring analysis of oak timbers from Lathom House, Lancaster*, Anc Mon Lab Rep, **5/2000**
- Nayling, N, 2001 *Tree-ring analysis of timbers from the Mynde, Much, Dewchurch, Herefordshire*, Centre for Archaeol Rep, **5/2001**
- Nevell, M, and Hradil, I, 1998 *A survey of cruck buildings in Tameside*, University of Manchester Archaeological Unit
- Nevell, M, and Walker, J, 1998 *Lands and Lordships in Tameside*, Chester
- Salzman, L F, 1952 *Building in England down to 1540*, Oxford
- Siebenlist-Kerner, V, 1978 The Chronology, 1341-1636, for certain hillside oaks from Western England and Wales, in *Dendrochronology in Europe* (ed J M Fletcher), BAR, **51**, 157-61
- Tyers, I, 1997 *Tree-ring analysis of Timbers from Sinai Park, Staffordshire*, Anc Mon Lab Rep, **80/97**
- Tyers I 1999a *Dendrochronological analysis of timbers from Apethorn Fold Farmhouse, Hyde, Tameside*, Anc Mon Lab Rep, **59/1999**
- Tyers, I, 1999b *Dendro for Windows Program Guide 2nd edn*, ARCUS Rep, **500**

**Table 5:** Ring width data for the site chronology, TAUNTHLL AD 1401 - 95

ring widths (0.01mm)										number of trees									
444	366	527	529	398	457	235	351	418	254	1	1	1	1	1	1	1	1	1	1
349	294	334	204	271	262	283	287	181	417	1	1	1	1	1	1	1	1	1	1
465	240	339	313	279	300	376	357	353	178	1	1	1	1	1	1	1	1	1	3
259	317	197	268	212	241	266	284	188	206	3	4	4	4	4	4	4	4	4	4
206	193	241	275	196	164	229	218	241	225	4	4	4	4	4	4	4	4	4	4
261	262	180	249	204	224	204	170	191	220	4	4	4	4	4	4	4	4	4	4
180	168	172	146	161	177	173	175	144	191	4	4	4	4	4	4	4	4	4	4
186	168	236	182	239	213	146	160	107	136	4	4	4	4	4	4	4	4	4	4
186	169	184	196	226	194	267	225	181	164	4	3	2	2	2	2	2	2	2	2
129	188	128	131	121						1	1	1	1	1					