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**Summary**

Eight samples were obtained from the roof timbers of the gatehouse of Markenfield Hall. Analysis of these samples produced a single site chronology of 202 rings spanning the period AD 1388 - AD 1589. Interpretation of the results suggests that all the timbers used were cut in a single felling operation dated to some time between AD 1604 and AD 1629.

**Keywords**

Dendrochronology
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# TREE-RING ANALYSIS OF TIMBERS FROM THE GATEHOUSE, MARKENFIELD HALL, NEAR RIPON, NORTH YORKSHIRE

## Introduction

Markenfield Hall (SE 295673; Fig 1) is one of the major medieval manor houses in the North of England being a grade 1 listed site. It has undergone little recent alteration and only small amounts in the sixteenth and seventeenth centuries; its original early fourteenth-century form and character are still clearly visible. The buildings of the Hall are set in three ranges round a large open quadrangle, Figure 2. This is approached from the south via a bridge across a still impressive protective inner moat and through a simple though attractive gatehouse (Fig 3). The principal range containing the Great Hall and solar are to the north, with a chapel and other chambers are found in the east range. To the west side are a series of barns and outbuildings. It is probable that there was also an outer moat, now filled in, the lines of which can still be traced on the west and north sides, and possibly an outer gatehouse too.

The present Hall was begun by John de Markenfield, one-time Chancellor of England, with a licence to crenellate being issued in AD 1310. It is probable that the Hall was largely completed before John's death in AD 1323. To his works were added a set of kitchens in the early fifteenth century.

The site was forfeited to Elizabeth I after the Rising of the North in AD 1569 and she sold it to Sir Thomas Egerton, her Lord Keeper. Sir Thomas undertook some modernisation work including, it is believed, the addition of the present inner gatehouse. Markenfield was later bought by Sir Fletcher Norton, Speaker of the House of Commons, who, upon his retirement from that post in AD 1783, was made 1st Baron Grantly of Markenfield. He commissioned further works including major repairs to the roofs. Only minor alterations were made between that time and the early AD 1980s. In the interim farm buildings were erected to the south of the Hall outside the moat in the AD 1850s, and the lower east range was converted into a farmhouse in AD 1960. Other parts of the Hall were abandoned leading to some neglect and dilapidation. Between AD 1981 – 4 the 7th Lord Grantly began repairs at which time a survey of the building and documentary research was undertaken (Miller 1985). Further grant-aided work, particularly to the roofs, has more recently (AD 2001) been undertaken.

The Laboratory would like to take this opportunity to thank the present owners of the site, Lord and Lady Grantly, for their interest and enthusiasm for this project and for their help and cooperation in sampling. We would also like to thank Jonathan Clark of Field Archaeology Specialists, University of York and David Sherriff of Martin Stancliffe, Architects, of York, who both helped in accessing the site and in discussing the possible phasing and sampling of the timbers. We would also like to thank Karen Farron, housekeeper at Markenfield Hall for her assistance and hospitality on site. Thanks are also due to John Sinclair Miller for the use of his report for the introduction and site history above.

## Sampling

Sampling and analysis by tree-ring dating of two areas of Markenfield Hall, the south chamber and the gatehouse, both of which were believed to be of sixteenth-century date, was commissioned by English Heritage. The purpose of this was to establish a more precise date for these parts of the site to inform grant-aided repairs.

Unfortunately close inspection of the timbers in the roof of the south chamber showed them to be of small scantling and to have very wide, and thus very few, rings. None of the timbers appeared to have anywhere near the 50 – 60 rings considered the minimum number for satisfactory analysis by tree-ring dating. It was noticeable too that all the timbers were very squarely and cleanly cut, possibly by a circular blade judging by the saw marks, with all the sapwood appearing to have been removed during carpentry. With these factors in mind it was considered not worth-while sampling these timbers.

The timbers of the gatehouse roof on the other hand did appear to be suitable, certainly as far as the number of rings the main timbers contained. The timbers of the roof here comprise of three principal trusses, each with principal rafters and tiebeam. The principal rafters have been chamfered on their lower arrisses, with a small square stop at each end. The trusses support single butt-purlins which in turn support common rafters. The common rafters are of very small scantling and appear to be very variable, some being little more than poles, others small quartered trees. It is possible that the common rafters are replacements, but none of them had sufficient rings for satisfactory analysis. The roof does not have a ridge-beam.

Thus, from the available timbers of the gatehouse a total of eight core samples was taken. Each sample was given the code MKF-A (for Markenfield, site "A"), and numbered 01 – 08. The positions of these samples are marked on drawings made by Field Archaeology Specialists and provided by English Heritage, reproduced here as Figures 4 and 5a-c. Details of the samples are given in Table 1. In this report the trusses have been numbered from east to west, with the samples being described to north or south as appropriate.

One of the difficulties of the timbers at this site was the lack of accessible sapwood on any of the timbers. In particular the rafters appear to have been well cut down from the original timber which, with the chamfering, has removed all the outer ring growth. Additionally sapwood could not be seen on the tiebeam of truss 3, nor could the heartwood/sapwood boundary on the tiebeam of truss 1 be accessed because of the way that both were set into their respective gable-end walls. It was only from the tiebeam of truss 2 that a sample which included the heartwood/sapwood boundary (denoted as h/s in Table 1) could be taken.

## Analysis

Each of the eight samples was prepared by sanding and polishing and their annual growth-ring widths measured. The data of these measurements are given at the end of the report. These were then compared with each other by the Litton/Zainodin grouping procedure (see appendix). At a minimum *t*-value of 7.0, an unusually high minimum value, all eight samples cross-matched with each other, as shown in the bar diagram Figure 6, to form a single site chronology, MKFASQ01, of length 202 rings. Site chronology MKFASQ01 was compared with a series of relevant reference chronologies for oak, giving it a first ring date of AD 1388 and a last measured ring date of AD 1589. Details of the cross-matching of the individual samples with each other are given in Table 2. Evidence for the dating of site chronology MKFASQ01 is given in the *t*-values of Table 3.

Only one sample in the site chronology, MKF-A04, has a heartwood/sapwood boundary, with a last measured ring date of AD 1589. On the basis of this date, and using a 95% confidence limit for the amount of sapwood on mature oaks from this part of England of 15 – 40 rings, an estimated felling date for this timber in the range AD 1604 – 29 can be calculated. Given the construction of the roof, ie, that it is all pegged and jointed and that there is no evidence for the reuse of older timber or of later repairs, and the excellent intra-site cross-matching (see Table 2), it is thought highly likely that all the timbers sampled were cut in a single felling sometime during the date range given.

## Interpretation and conclusion

Analysis by dendrochronology has produced a single site chronology of 202 rings spanning the period AD 1388 – AD 1589. It is very highly probable that all the timbers sampled were cut in a single felling operation some time, it is estimated, between AD 1604 and AD 1629. Such a date would be consistent with the building of the gatehouse by Sir Thomas Egerton, who died in AD 1617, or by his son and heir, John Egerton, the 1st Earl of Bridgewater who died in AD 1649.

A notable feature of some of the samples from the gatehouse roof is their unusual degree of cross-matching, as indicated by some high *t*-values in Table 2. Values of $t$=10 or more usually indicate timbers that are from the same

trees. This is probably the case with those represented by samples MKF-A03, A04, and A05; the timbers represented by these three samples are all from the same truss, truss 2. In any case it seems likely that the trees used were all growing very close to each other in the same copse or stand of woodland. The use of trees to provide more than one timber means that at this site relatively few trees are actually represented. The eight samples discussed here may in fact represent as few as two trees.

**Bibliography**


Baillie, M G L, and Pilcher, J R, 1982 unpubl A master tree-ring chronology for England, unpubl computer file *MGB-EOI,* Queens Univ, Belfast

Boswijk, G, 1998 *Tree-ring analysis of Thorpe Prebend House, High Saint Agnesgate, Ripon, North Yorkshire*, Anc Mon Lab Rep, **2/98**

Fletcher, J, 1978 unpubl computer file *MC10---H*, deceased

Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1991 List 39 no 8 - Nottingham University Tree-Ring Dating Laboratory results, *Vernacular Architect*, **22**, 40 – 3

Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1993 List 48 no 2a/b - Nottingham University Tree-Ring Dating Laboratory results, *Vernacular Architect*, **24**, 40 – 2

Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1995 unpubl Nun Appleton Hall, Tadcaster, S Yorks, unpubl computer file *NAPASQ07*, Nottingham University Tree-Ring Dating Laboratory

Howard, R E, Laxton, R R, and Litton, C D, 1996 unpubl Rectory Farm, Weston upon Trent, Derbyshire, unpubl computer file *WUTASQ08,* Nottingham University Tree-Ring Dating Laboratory

Miller, J S, 1985 Restoration work at Markenfield Hall, 1981 – 84, *Yorks Archaeol Journal*, **57**, 101 – 10

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 Archaeol Studies, Monograph Series, **III**

Siebenlist-Kerner, V, 1978 *Chronology, 1341-1636, for hillside oaks from Western England and Wales*, in Dendrochronology in Europe (ed J M Fletcher), BAR Int Ser, **51**, 295-301

Table 1: Details of samples from the gatehouse, Markenfield Hall, North Yorkshire

| Sample number | Sample location | Total rings | *Sapwood rings | First measured ring date | Last heartwood ring date | Last measured ring date |
|---|---|---|---|---|---|---|
| | Phase 3 timbers | | | | | |
| MKF-A01 | Tiebeam, truss 1 | 97 | no h/s | AD 1412 | ------ | AD 1508 |
| MKF-A02 | South principal rafter, truss 1 | 64 | no h/s | AD 1446 | ------ | AD 1509 |
| MKF-A03 | North principal rafter, truss 2 | 175 | no h/s | AD 1399 | ------ | AD 1573 |
| MKF-A04 | Tiebeam, truss 2 | 182 | h/s | AD 1408 | AD 1589 | AD 1589 |
| MKF-A05 | South principal rafter, truss 2 | 158 | no h/s | AD 1413 | ------ | AD 1570 |
| MKF-A06 | Tiebeam, truss 3 | 84 | no h/s | AD 1388 | ------ | AD 1471 |
| MKF-A07 | North principal rafter, truss 3 | 130 | no h/s | AD 1392 | ------ | AD 1521 |
| MKF-A08 | Lintel to west window | 104 | no h/s | AD 1401 | ------ | AD 1504 |

*h/s = the heartwood/sapwood boundary is the last ring on the sample

Table 2: *t*-value/off-set matrix showing the cross-matching between individual samples

| | A01 | A02 | A03 | A04 | A05 | A06 | A07 | A08 |
|---|---|---|---|---|---|---|---|---|
| A01 | | -34 | 13 | 4 | -1 | 24 | 20 | 11 |
| A02 | 7.6 | | 47 | 38 | 102 | 6 | 54 | 45 |
| A03 | 5.2 | 3.7 | | -9 | -14 | 11 | 7 | -2 |
| A04 | 3.3 | 3.4 | 14.3 | | -5 | 20 | 16 | 7 |
| A05 | 6.3 | 4.4 | 18.8 | 15.6 | | 25 | 21 | 12 |
| A06 | 8.5 | 2.9 | 6.5 | 4.6 | 4.6 | | -4 | -13 |
| A07 | 4.3 | 3.9 | 10.0 | 7.9 | 8.2 | 4.8 | | -9 |
| A08 | 4.8 | 5.3 | 10.0 | 8.0 | 9.1 | 4.8 | 12.5 | |

Off-sets above diagonal, *t*-values below diagonal

Table 3: Results of the cross-matching of site chronology MKFASQ01 and relevant reference chronologies when first ring date is AD 1388 and last ring date is AD 1589

| Reference chronology | Span of chronology | t-value | |
|---|---|---|---|
| Thorpe Prebend House, Ripon, North Yorks | AD 1356 – 1583 | 9.4 | ( Boswijk 1998 ) |
| East Midlands | AD 882 – 1981 | 8.0 | ( Laxton and Litton 1988 ) |
| Brook Farm, Knutsford, Cheshire | AD 1402 – 1585 | 7.7 | ( Howard *et al* 1993 ) |
| Gotham Manor, Notts | AD 1391 – 1590 | 7.4 | ( Howard *et al* 1991 ) |
| MC10---H | AD 1186 – 1585 | 6.2 | ( Fletcher 1978 ) |
| Rectory Farm, Weston upon Trent, Derbys | AD 1362 – 1503 | 6.2 | ( Howard *et al* 1996 unpubl ) |
| Wales and West Midlands | AD 1341 – 1636 | 6.1 | ( Siebenlist-Kerner 1978 ) |
| Nun Appleton, Yorks | AD 1478 – 1657 | 6.0 | ( Howard *et al* 1995 unpubl ) |
| England | AD 401 – 1981 | 5.8 | ( Baillie and Pilcher 1982 unpubl ) |