

A POSSIBLE MILL ON THE RIVER MERSEY, ASHTON UPON MERSEY, GREATER MANCHESTER TREE-RING ANALYSIS OF TIMBERS

SCIENTIFIC DATING REPORT

Nigel Nayling



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SUMMARY

Dendrochronological sampling and analysis was requested for a timber structure exposed in the eroding bank of the river Mersey at Ashton upon Mersey near Manchester. Assessment of the timbers suggested they could represent the remains of a mill. Dating was requested to help inform future management decisions. One of six samples taken produced a *terminus post quem* of AD 1498 indicative of a potentially early post-medieval date for the structure.

CONTRIBUTORS

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ACKNOWLEDGEMENTS

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INTRODUCTION

This document is a technical archive report on the tree-ring analysis of samples recovered from timbers exposed in the left bank of the River Mersey downstream from the town of Ashton upon Mersey. The site had been the subject of field recording commissioned by the Greater Manchester Archaeological Unit following notification by a local resident (Roberts 2010 *passim*). Dendrochronological sampling was requested in the hope of dating the site, and informing any subsequent management decisions.

The site was visited by the author in October 2009 and samples recovered using a hand saw with the assistance of John Roberts, author of the field record report.

METHODOLOGY

Methods employed at the Lampeter Dendrochronology Laboratory in general follow those described in English Heritage guidance documents (English Heritage 1998). The samples were cleaned using razor blades so that the ring sequence could be clearly discerned and measured. The complete sequence of growth rings in each sample was measured to an accuracy of 0.01mm using a micro-computer based travelling stage (Tyers 2004). Cross-correlation algorithms (Baillie and Pilcher 1973; Munro 1984) are employed to search for positions where the ring sequences are highly correlated against each other. The ring sequences were also tested against a range of reference chronologies from Britain and Northern Europe. The *t*-values reported below are derived from the original CROS algorithm (Baillie and Pilcher 1973). A *t*-value of 3.5 or over is usually indicative of a good match, although this is with the proviso that high *t*-values at the same relative or absolute position must be obtained from a range of independent sequences, and that satisfactory visual matching supports these positions. Correlated positions were checked visually using computerised ring-width plots.

RESULTS

Details of individual samples from timbers are given in Table 1. A total of six samples were taken of which four had sufficient rings to merit analysis. The tree ring series from two samples (**AUM09_S1** and **AUM09_S4**) were correlated with each other (Table 2a), and a combined ring-width series calculated (**AUM_T2**).

The tree-ring series from unmatched individual samples, and the mean sequence **AUM_T2** were compared with tree-ring chronologies from throughout Britain. One sample (**AUM09_S6**) correlated with a number of site masters from previously dated historic buildings in the region (Table 3), with its outermost surviving ring dating to AD 1488. Assuming a minimum sapwood ring number of ten rings, this indicates a *terminus post quem* for felling of AD 1498.

DISCUSSION

Given the eroded nature of the timbers exposed on the banks of the river, it proved impossible to recover samples with partial or complete sapwood. Sampling was also restricted by the need to ensure that the recovery of slices did not destabilise the eroding structure. As a result, the full dating potential of this assemblage has yet to be realised. If management decisions include either further evaluation or major excavation, consideration should be given to the recovery of additional samples if timbers are recovered that are in better condition than those exposed by the erosion of the river bank. The exact function of the timbers recorded and sampled is difficult to determine at this stage, given their displaced state. Whilst interpretation as a mill site seems most probable, it is unclear whether the site contains one or more structures and hence the single date provides limited but useful chronological information.

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FIGURES

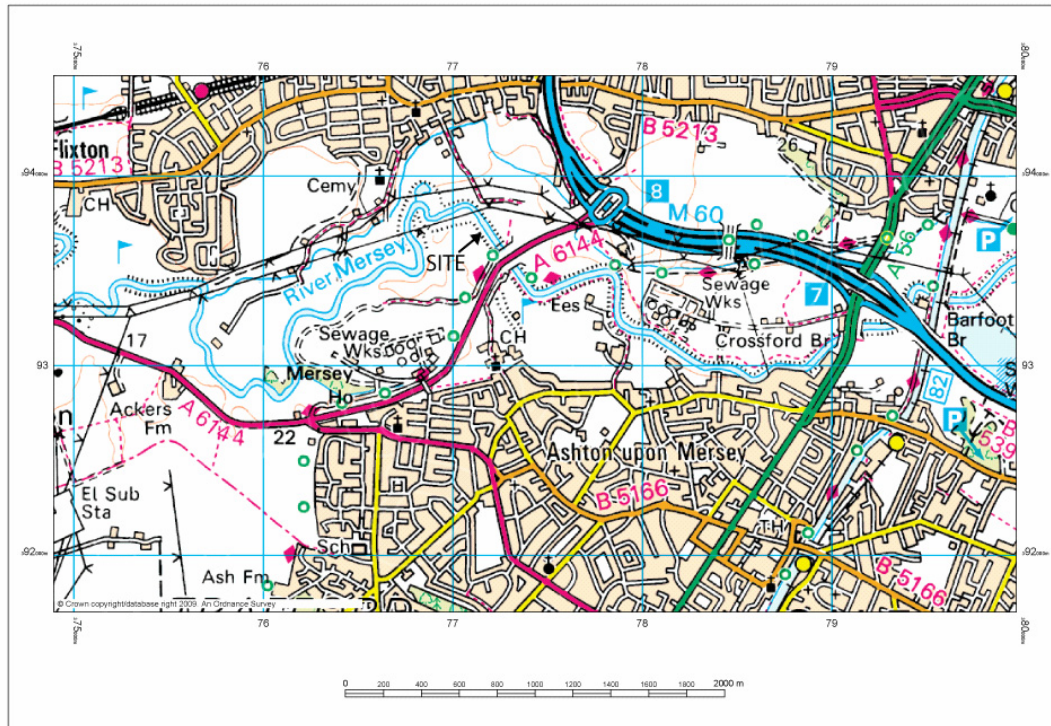


Figure 1 Location of the possible mill site at Ashton upon Mersey

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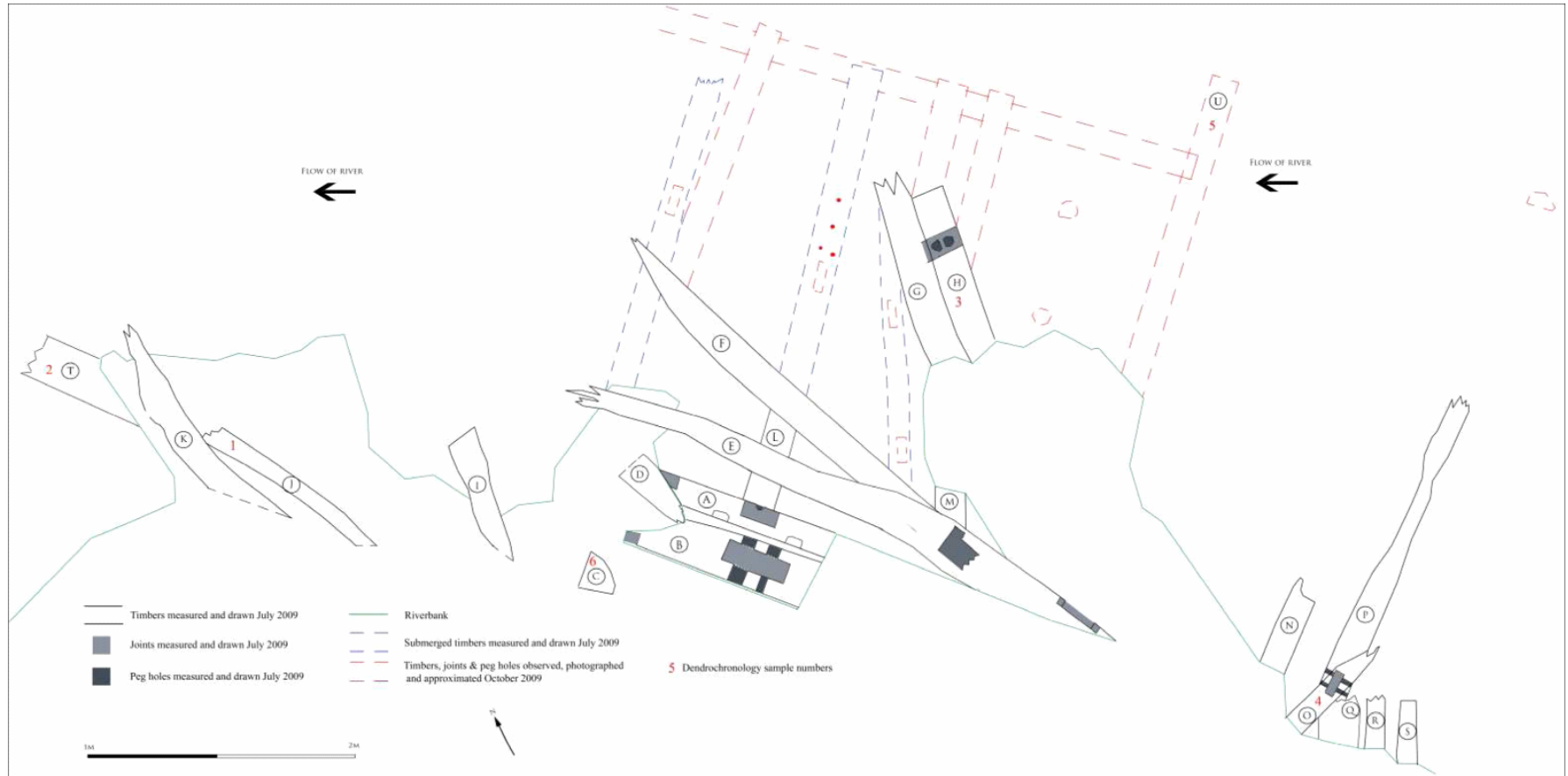


Figure 2 Location of samples taken for dendrochronological analysis. After Roberts 2010, figure 2



Figure 3 A view of the site looking south-west from the opposite bank. After Roberts 2010, plate 5

TABLES

Table 1 Sample details, Ashton upon Mersey possible mill

Sample code	Origin of core	Cross-section	Dimensions (mm)	Total rings	Sapwood	ARW mm/year	Date of sequence	Felling date range
AUM01	Timber J	Radial	120 × 90	130	+?HS	0.85	Undated	-
AUM02	Timber T	Halved	225 × 140	172	+?HS	0.84	Undated	-
AUM03	Timber H	Halved	300 × 170	43	+?HS	4.10	Unmeasured	-
AUM04	Timber O	Halved	205 × 110	130	-	1.09	Undated	-
AUM05	Timber U	Radial	140 × 120	23	-	6.09	Unmeasured	-
AUM06	Timber C	Quartered	110 × 90	121	-	1.36	ADI368-ADI488	after AD1498

Total rings = all measured rings ARW = average ring width of the measured rings. Sapwood: +?HS = possible heartwood/sapwood boundary. All samples were oak (*Quercus* spp.)

Table 2 Correlation between samples AUM09_S1 and AUM09_S4. These tree ring series were combined to form a single series AUM_T2

Sample	AUM09_S4
AUM09_S1	7.76

Table 3 Correlations between dated sample AUM09_S6 and site masters from previously dated buildings

Site Master	t-value
Apethorn Fold Farmhouse, Greater Manchester (Tyers 1999)	5.85
Lathom House, Lancashire (Nayling 2000)	6.22
Risley, Cheshire (Nayling 1998)	5.02
Ordsall Hall, Salford, Greater Manchester (Arnold <i>et al</i> /2004)	5.88
Dewsbury Low Mill watermill, West Yorkshire (Hillam pers comm)	5.08
Elland Old Hall, West Yorkshire (Hillam 1984)	5.50
Houndhill Barn, Barnsley, South Yorkshire (Groves and Hillam 1990)	6.83

Table 4 Tree-ring widths for dated sample AUM09_S6, dated to AD 1368–1488 inclusive

Date	Ring Widths (hundredths of mm)									
AD1368								135	190	116
-	133	238	179	210	128	149	149	163	225	111
-	90	97	73	131	114	191	173	154	125	95
-	79	77	91	100	111	163	183	140	126	162
AD1401	180	158	228	194	205	173	127	197	180	152
-	180	192	185	176	152	136	116	154	104	184
-	191	156	164	122	125	113	146	182	196	177
-	161	155	100	88	141	166	138	185	117	107
-	135	98	143	161	94	56	57	64	86	73
AD1451	95	114	103	127	118	143	146	81	81	107
-	102	139	143	142	140	218	198	102	114	126
-	114	123	178	166	82	88	58	57	77	134
-	131	124	178	125	118	115	118	98		