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# TREE-RING ANALYSIS OF OAK TIMBERS FROM 30A (STAIRCASE CAFE) AND 31 MARKET PLACE, STOCKPORT, GREATER MANCHESTER

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Summary

Difficulties of access to the complex of buildings at 30a and 31 Market Place, Stockport, prevented a detailed sampling programme from being implemented. Dendrochronological analysis of thirteen samples that were obtained resulted in the production of a felling date range in the early/ mid seventeeth century for one of the timbers. All other timbers remain undated.

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## TREE-RING ANALYSIS OF OAK TIMBERS FROM 30A (STAIRCASE CAFE) AND 31 MARKET PLACE, STOCKPORT, GREATER MANCHESTER

### Introduction

The purpose of the study was to carry out dendrochronological analyses of a variety of structural elements in order to assist the interpretation of this complex range of buildings. 30a (Staircase Cafe) and 31 Market Place, Stockport, Greater Manchester (NGR SJ897906) consist of shop frontages, residential accommodation, and storage areas on a prime location on the NE side of the ancient Market Place of Stockport. Detailed recording of the structure was initiated prior to a proposed major phase of restoration aimed at saving the near derelict buildings from total collapse. An earlier phase of dendrochronological study (Esling *et al* 1990) was aimed at providing a date for the cruck frame of the original frontage building of 30a Market Place. The analysis reported here was undertaken in order to assist the dating of the subsequent development of the complex.

### Methodology

All accessible timbers were assessed for suitability. Unsuitable samples are usually those with unclear ring sequences or fewer than 50 rings, or timbers from non-oak trees (at least for the provision of routine dates). Additional reasons for choosing not to sample a timber include avoiding situations where sampling would have to be undertaken on decorated surfaces, or avoiding timbers where the structural integrity may be adversely affected by the coring. The oak (*Quercus* spp.) timbers that appeared most suitable were selected for sampling and study. Cores were taken using a 15mm diameter hollow borer attached to an electric drill. The core-holes in timbers were left unfilled. The ring sequences were revealed by sanding.

The complete sequences of growth rings in the samples that were selected for dating purposes were measured to an accuracy of 0.01mm using a micro-computer based travelling stage. The ring sequences were plotted onto semi-log graph paper to enable visual comparisons to be made between sequences. In addition cross-correlation algorithms (Baillie and Pilcher 1973; Munro 1984) were employed to search for positions where the ring sequences were highly correlated. These positions were checked using the graphs and, where these were satisfactory, new mean sequences were constructed from the synchronised sequences. 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 these positions are supported by satisfactory visual matching.

All the measured sequences from this assemblage were compared with each other and if any had been found to cross-match they would have been combined to form a site master curve. Instead, since no sample matched any other, the ring sequences were tested against a range of reference chronologies, using the same matching criteria: high *t*-values, replicated values against a range of chronologies at the same position, and satisfactory visual matching. Where such positions are found these provide calendar dates for the ring-sequence.

These tree-ring dates can initially only date the rings present in the timber. Their interpretation relies upon the nature of the final rings in the sequence. If the sample ends in the heartwood of the original tree, a *terminus post quem (tpq)* for the felling of the tree is indicated by the date of the last ring plus the addition of the minimum expected number of sapwood rings that may be missing. This *tpq* may be many decades prior to the real felling date. Where some of the outer sapwood or the heartwood/sapwood boundary survives on the sample, a felling date range can be calculated using the maximum and minimum number of sapwood rings likely to have been present. Alternatively, if bark-edge survives, then a felling date can be directly utilised from the date of the last surviving ring. The sapwood estimates applied through-out this report are a minimum of 10 and maximum of 55 annual rings, where these figures indicate the 95% confidence limits of the range. These figures are applicable to oaks from the British Isles (Hillam *et al* 1987). The dates obtained by the technique do not by themselves necessarily indicate the date of the structure from which they are derived. It is necessary to incorporate other specialist evidence concerning the reuse of timbers and the repairs of structures before the dendrochronological dates given here can be reliably interpreted as reflecting the construction date of phases within the structure.

## Results

Despite the structure having a large number of identifiable phases very few timbers could be safely sampled. The rather small total of thirteen samples were obtained (Table 1). Two samples, **6** and **11**, included too few rings for reliable analysis. All the other samples were measured. The sequences from these cores were compared with each other. None were found to cross-match in a satisfactory manner. The individual ring sequences were then tested against a range of reference chronologies.

Only sample **5** has yielded a reliable result by this process (Table 2) and this indicates the last ring to be AD 1613 (Figure 1). Sapwood is present and implies felling in the range AD 1613-1651. This is compatible with its present interpretation as part of a structure incorporating a fireplace dated AD1618. Nevertheless a single dated sample such as this should be used with great caution. The dated sequence, sample 5, dated AD 1505 to AD 1613 inclusive, is listed in Table 3.

The ten remaining measured sequences failed to match either each other or a comprehensive collection of reference chronologies and therefore remain undated.

## Discussion

The paucity of results is clearly disappointing, though perhaps not unexpected in this instance. The number of phases present within the complex and the small number of samples per phase available were always likely to yield problems during analysis. Standard practise is to sample a minimum of six to ten timbers in each phase of a structure. However sampling was severely restricted here due to problems of access caused by the increasingly dilapidated nature of the complex. Consequently there are no samples from some phases, whilst others are represented by only one or two samples. When the future of the building is decided the provision of additional samples may allow the dendrochronological analysis to be extended and thus potentially provide more useful results regarding the development of this complex.

## Acknowledgements

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## References


Baillie, M G L, and Pilcher, J R, 1973 A simple crossdating program for tree-ring research, *Tree Ring Bulletin*, **33**, 7-14

Esling, J, Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1990 Tree-Ring Dates List 33, *Vernacular Architect,* **21**, 37-40

Groves, C, forthcoming *Tree-ring analysis of Hall I' Th' Wood, Bolton, Greater Manchester, 1995*, Anc Mon Lab Rep

Groves, C, and Hillam, J, 1993 *Tree-ring analysis of oak timbers from building1, Sefton Fold, Horwich, near Bolton, 1993*, ARCUS Rep, **118**

Hillam, J, 1978 *The dating of Featherstone Church, West Yorkshire*, Anc Mon Lab Rep, **2512**

Hillam, J, Morgan, R A, and Tyers, I, 1987 Sapwood estimates and the dating of short ring sequences, in *Applications of tree-ring studies: current research in dendrochronology and related areas* (ed R G W Ward), BAR Int Ser, **333**, 165-85

Hillam, J, and Ryder, P F, 1980 Tree-ring dating of vernacular buildings from Yorkshire, *Vernacular Architecture*, **11**, 23-31

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**

Munro, M A R, 1984 An improved algorithm for crossdating tree-ring series, *Tree Ring Bulletin*, **44**, 17-27

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 Int Ser, **51**, 157-61

**Figure 1**

Bar diagram showing the position of the dated sequence

White bar - heartwood rings; hatched bar - sapwood rings

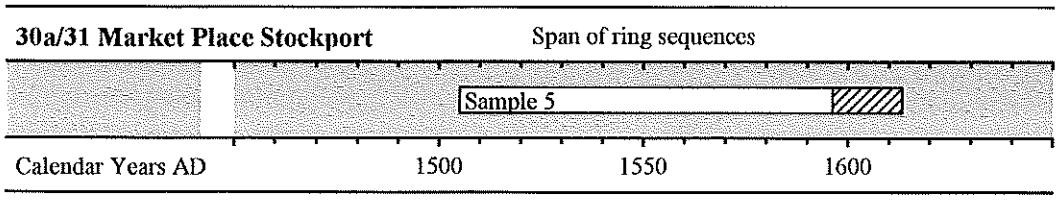

**Table 1**

List of samples.

| Core | Origin of core | Analysis undertaken | Wood type | Total Rings | Sap Rings | mm/year | Result | Date of sequence |
|---|---|---|---|---|---|---|---|---|
| 1 | LG Floor EW Crossbeam | Tree-ring sequence measured | Oak | 101 | 0 | 0.92 | Undated | - |
| 2 | LG Floor EW Crossbeam | Tree-ring sequence measured | Oak | 83 | 0 | 2.01 | Undated | - |
| 3 | LG Floor EW Crossbeam | Tree-ring sequence measured | Oak | 57 | 0 | 2.53 | Undated | - |
| 4 | 1st Floor EW Crossbeam closet | Tree-ring sequence measured | Oak | 64 | 8 | 2.68 | Undated | - |
| 5 | 1st Floor EW Tiebeam | Tree-ring sequence measured | Oak | 109 | 17 | 1.65 | Dated | AD1505 - AD1613 |
| 6 | 2nd Floor principal rafter | Species Identification only | Oak | | | | - | - |
| 7 | 2nd Floor principal rafter | Tree-ring sequence measured | Oak | 56 | 4 | 2.61 | Undated | - |
| 8 | 2nd Floor dormer ridge | Tree-ring sequence measured | Oak | 61 | 21 | 1.64 | Undated | - |
| 9 | G Floor EW Crossbeam | Tree-ring sequence measured | Oak | 66 | 0 | 1.23 | Undated | - |
| 10 | G Floor EW Crossbeam | Tree-ring sequence measured | Oak | 63 | 0 | 2.02 | Undated | - |
| 11 | 1st Floor EW Crossbeam | Species Identification only | Oak | | | | - | - |
| 12 | 1st Floor ridge-now purlin | Tree-ring sequence measured | Oak | 89 | 14 | 1.74 | Undated | - |
| 13 | 1st Floor principal rafter | Tree-ring sequence measured | Oak | 62 | 0 | 2.02 | Undated | - |

## Table 2

Dating of sample **5**. t-values with dated reference chronologies. All the reference curves are independent.

| Area | Reference curve | *t*-values |
|---|---|---|
| Greater Manchester | Sefton Fold, Horwich (Groves and Hillam 1993) | 5.2 |
| | Hall I' Th' Wood, Bolton (Groves forthcoming) | 3.7 |
| Yorkshire | Buildings Master (Hillam and Ryder 1980) | 5.8 |
| | Featherstone (Hillam 1978) | 3.6 |
| Cheshire | Whixall (Lagaerd pers comm, date Groves pers comm) | 5.4 |
| East Midlands | East Midlands Master (Laxton and Litton 1988) | 6.9 |
| England/Wales | Welsh Border (Siebenlist-Kerner 1978) | 5.3 |

## Table 3

Ring width data from sample **5**, dated AD 1505 - AD 1613 inclusive

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AD 1505 | | | | | 505 | 235 | 270 | 255 | 305 | 217 |
| | 316 | 265 | 199 | 206 | 151 | 145 | 91 | 135 | 133 | 196 |
| | 176 | 142 | 110 | 143 | 112 | 148 | 182 | 158 | 143 | 86 |
| | 133 | 112 | 96 | 125 | 168 | 176 | 176 | 229 | 92 | 125 |
| | 123 | 84 | 136 | 158 | 198 | 203 | 176 | 153 | 227 | 173 |
| AD 1551 | 214 | 132 | 187 | 61 | 132 | 63 | 55 | 91 | 157 | 146 |
| | 123 | 182 | 145 | 152 | 149 | 118 | 81 | 103 | 167 | 164 |
| | 183 | 102 | 136 | 118 | 149 | 170 | 177 | 104 | 141 | 215 |
| | 147 | 160 | 178 | 134 | 199 | 215 | 154 | 78 | 120 | 70 |
| | 71 | 146 | 283 | 216 | 349 | 323 | 314 | 261 | 188 | 158 |
| AD 1601 | 121 | 177 | 161 | 197 | 177 | 181 | 182 | 154 | 104 | 128 |
| | 132 | 129 | 115 | | | | | | | |