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ARCHAEOLOGICAL RESEARCH & CONSULTANCY AT THE
UNIVERSITY OF SHEFFIELD

TREE RING ANALYSIS OF TIMBERS FROM 6-12 NORTHBROOK STREET (CAMP HOBSON CARPARK) NEWBURY

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Tree ring analysis of three timbers from 6-12 Northbrook Street (Camp Hobson carpark) Newbury

Summary

Tree ring analysis was carried out on three post medieval oak timbers from a sluice drain located at 6-12 Northbrook Street, Newbury. Comparison of the individual sequences did not show any internal crossmatching and it was not possible to date the individual sequences. Therefore these samples remain undated.

Introduction

Three oak samples from a timber and clay lined channel, uncovered during the excavation of evaluation trenches on the site of demolished workshops at 6-12 Northbrook street, Newbury, were submitted for analysis. The timbers appear to have been part of a sluice which carried waste from a tannery to the River Kennet. The remains of pottery found in the trench suggest that the drain is of 18th or 19th century date. Samples were taken from three of the worked timbers with the aim of providing more precise dates for the construction of the drain. **1057** was from a vertical support. **1003** and **1005** were both from horizontal timbers.

Methodology

The samples were prepared for analysis by freezing for a minimum of 48 hours. The cross-sectional surface was planed to highlight the ring boundaries. The dimensions of the cross-section and number and orientation of the rings were recorded for each sample (Table 1). The samples were then analysed using standard dendrochronological techniques which are summarised below (Baillie, 1982).

The ring widths were measured to an accuracy of 0.01mm on a travelling stage which is linked to an microcomputer. The ring width measurements were recorded automatically in a data capture program run on the computer (Tyers pers comm). Once measured the ring sequences were plotted using semi-log paper. The ring sequences were then crossmatched against each other visually, using the graphs, and statistically, using the crossmatching programs, CROS 73 and CROSS 84 (Baillie and Pilcher 1973; Munro 1984) to compare sequences and identify those which are contemporary. Generally, matches over $t = 3.5$ are considered significant, provided that the visual match between the tree ring graphs is acceptable and the match is replicated against a number of independent chronologies (Baillie 1982, 82-5).

Dating is usually achieved by averaging the data from the matching sequences to produce a site master curve, and then testing that master for similarity against dated reference chronologies.

A site master is used for dating whenever possible because it enhances the general climatic signal at the expense of the background noise from the growth characteristics of the individual samples. Any unmatched sequences are tested individually against the reference chronologies. All potential tree ring dates are then checked by examining the quality of the visual match between the graphs.

Once a date span has been established for the site master, it is possible to date the individual ring sequences incorporated in that master. To achieve a precise felling date the timber must have the bark edge present which marks the final year of growth. If a sample has incomplete sapwood it is possible to establish a felling date range using a 10-55 sapwood estimate. These are the 95% confidence limits for British oaks over 30 years old (Hillam *et al*, 1987). The maximum felling range will be 45 years, decreasing relative to the number of sapwood rings remaining on the sample (Hillam *et al*, 1987). Where a sample does not have any sapwood an extra 10 rings are added to the date of the last measured ring. These represent the minimum number of sapwood rings expected. A probable *terminus post quem* for felling is obtained but, because an unknown number of outer rings have been removed through timber conversion, the actual felling date may be much later.

The felling dates obtained for the timbers do not necessarily indicate the date of the structure from which they are derived. Consideration should be given to the delayed use of timber caused by seasoning, stockpiling or the reuse of timber as these factors may affect the interpretation of the tree ring results. Tree ring dating provides precise dates for the tree ring sequences and is a completely independent process but the interpretation of the results may be refined through study of other archaeological and documentary evidence.

Results and discussion

All three samples were considered to be suitable for analysis as they contained over 50 rings each (Table 1). This is the minimum requirement for dendrochronological analysis in order to be certain that the ring sequence is unique (Baillie 1982). Both **1057** and **1003** had over 70 rings and **1005** had 94 rings. All three samples still retained sapwood, although none of the samples had sequences complete to bark edge.

The samples were measured and the ring sequences compared against each other. However, no cross-matches were forthcoming so it was not possible to establish a site chronology. The sequences were therefore compared independently against all avaliable British and European master reference chronologies from the last two millenia but no consistent results were obtained for any of the samples.

Single timbers or poorly replicated site master chronologies are less likely to produce a reliable date than a well replicated master curve which contains data from a number of matched individuals. It is possible that these trees had been subject to local environmental influences which overrode the climate signal on which tree ring dating is dependant. Sample **1005** in particular has a banded growth pattern with distinct periods of poor growth after the 40th ring (Fig 1). It is possible that this tree was subject to deliberate management practices, such as pollarding, which affects the growth pattern of the tree making it unsuitable for dating. Alternatively the tree may have been subject to natural stress factors, such as periodic insect infestation, which can affect growth for several years.

Conclusion

Dendrochronological dating of the three oak timbers from the sluice drain at 6-12 Northbrook Street, Newbury has, so far, proved unsuccessful. It was not possible to establish a site master chronology as none of the individual samples could be crossmatched against each other. Comparison of the individual sequences against a wide range of medieval, post medieval and modern chronologies failed to produce conclusive dates for these timbers.

References

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Details of the sites were obtained from a summary of provisional results from the archaeological excavation at 6-12 Northbrook Street, Newbury, written by Graham Hull.

Table 1: List of samples obtained from 6-12 Northbrook Street

Key: +S - unmeasured sapwood rings

Sample	Location	Dimensions	Total rings	Sapwood	AGR	Comments
1003	Trench A	230 x 205 mm	73	4	1.88	
1005	Trench A	255 x 240 mm	94	27 +S5	1.51	banded sequence
1057	Trench A	165 x 150 mm	76	15	1.76	

Fig 1: Ring width curve for sample **1005**

The three narrow ring phases which indicate slow growth are indicated. The vertical scale is in mm. The horizontal scale shows the number of rings. HS indicates the heartwood/sapwood boundary.