

Dendrochronology and wood identification

Site code: ONE94

Undated

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Number 1 Poultry

Dendrochronology and Wood Identification

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5.17 Summary of the site archive

5.17.1 The physical archive

Timber slices were taken from 810 timbers from the main excavation phase. These were assessed for species type, the presence of sufficient rings for tree-ring analysis, and the presence of features that modify the likely quality of any date produced by dendrochronological methods, such as bark or sapwood. The 430 timbers that had some expectation of usefulness in any subsequent dendrochronological dating programme were retained. The remainder were discarded. 72 of the retained timbers were selected for initial spot-dating, these have been analysed and discarded. The remaining retained timbers are wrapped in plastic bags and stored in 19 numbered standard timber crates at MoLAS, these are almost entirely oak *Quercus* spp.. The excavation sampling methods and programme followed broadly that outlined in Tyers (1994).

5.17.2 The paper record

Timber record sheets of each complete timber provide information on precise location and stratigraphic relationships of the timber, scale plans and drawings exist for most. Many of the structural timbers were photographed *in situ*, and some of the timbers have also been the subject of detailed photography *ex situ*.

5.17.3 The digital archive at MoLAS

A simple database table at MoLAS provides a cross-reference between the retained samples and their crate location to ease subsequent searching for specific timbers. The same table provides cross-references to contexts and groups, and lists the presence of centres, heartwood, sapwood and bark, re-use, assessed species, and assessed ring counts, where samples have been discarded, and any other useful information.

5.16.4 The digital archive at Sheffield

At Sheffield for each of the 70 measured timbers from the 72 submitted for spot-dating there are more detailed records of the identified species, the measured ring-width sequences, the number of heartwood and sapwood rings, the details of pith, heartwood/sapwood boundaries, bark, average growth rates, precise dimensions, the years covered by the dated sequences, etc., each stored in an individual samples record file. Dates were obtained from 37 timbers, 27 early Roman, 9 late Roman and 1 Saxon (Tyers and Hall 1997), a further group of data relates to the evaluation trenches on the site (Tyers 1994).

6.4 Potential of the dendrochronological data

6.4.1 Introduction

In carrying out an assessment of the potential of the dendrochronological material two assumptions have been made. The spot-dated material from Poultry is assumed to be a fair reflection of the entire corpus of material sampled and retained at Poultry, and the results hitherto obtained from the nearby sites at DLR Bucklersbury BUC87 (Nayling 1990) and 72-5 Cheapside CID90 (Tyers 1992) are assumed to be broadly comparable assemblages which can inform judgements of the research potential of the material from ONE94.

6.4.2 Structural timbers - Early Roman

The early Roman data has great potential to answer some very specific questions. The CID90 samples showed unexpected opportunities to reveal the dates of the earliest Roman activity in the area particularly along the line of the via Decumana (some discarded offcuts of AD53). Some evidence was also forthcoming concerning the redevelopment of the area after the Boudiccan revolt. These issues remain of significant interest to both specialists and general public. The founding of London is generally assumed to be c. AD50 but there has never been any convincing evidence for up to 5 years either side.

Dendrochronologically the earliest currently known Roman material are felled in AD53 at Cheapside and spring AD52 at Regis House (Tyers 1995, Tyers and Boswijk 1996, Boswijk and Tyers 1996), these are the earliest proven dates for Roman tree-felling in the UK, let alone London. Any further examples of early felling from this central area, particularly anything associated with bridging the Walbrook would clearly assist in the development of general assumptions about the date of the laying out of London. Similarly CID90 produced some evidence for the rapid re-development of the roadside properties in the aftermath of the Boudiccan revolt, and again Regis House clearly shows major infrastructure projects within a few years with a major waterfront at AD63/4. Any indication of a difference in speed of redevelopment of such major projects and the re-occupation of areas of smaller semi-industrial use may clarify the degree of confidence held by the general artisan level of population as regards a repeat of the revolt.

Less positively, there is some evidence from the spot-dated material from ONE94 and the analysed material at BUC87 clearly demonstrates that the bulk of the driven piles are of relatively low value. The analyses at BUC87 clearly showed the difficulties of trying to interpret huge collections of scattered piles most with little retained sapwood, and few with any bark-edge. The assessment results from ONE94 indicate a similar problem will recur here. In simplest terms the material is demonstrably first century from the stratigraphic record and the absence of sapwood and bark will prevent a more precise date being obtained for many of these samples by dendrochronology.

6.4.3 Structural timbers - Late Roman

The spot-dating results currently obtained from ONE94 clearly demonstrate that the extensive constructional sequence from the late third to early fourth century includes datable timbers. The tree-ring sequence from ONE94 whilst not extending the London area sequence beyond its current extent (AD293/4, see Hillam 1992) due to lack of sapwood clearly shows that structures from the site were built some time after AD300 and a more extensive analysis of the associated timbers may not only clarify the construction dates of these features but also significantly enhance the strength of the tree-ring sequence at this point. The London sequence is the only major tree-ring sequence from England that covers the period AD100-294, the second and third century data from the rest of the country is geographically scattered and generally poorly replicated. The London series itself is dependent over its latter 50 years for piles from a single structure, a monumental arch base excavated on 2 sites. The tree-ring data for the third/fourth centuries from London has proved especially awkward to cross-match, with numerous failures to extend the sequence and lots of tantalising 'if only we had more data we could prove whether this does or doesn't cross-match' problems. There is some evidence to suggest that the latter 50 years of the replicated and solid sequence are not particularly typical trees of the period, and they may themselves be preventing the extension to the sequence. The late Roman data from ONE94 provides the only reasonably diverse assemblage of late Roman tree-ring data excavated for some time (although the recently assessed Guildhall material may also have some late Roman samples). The opportunity to strengthen and extend the London chronology at this point could have numerous knock on benefits to late Roman archaeology in England.

6.4.4 Structural timbers - post-Roman

Although there was an extensive and complex post-Roman structural sequence at Poultry, no associated structural timbers suitable for dendrochronological sampling were found, and

this was due to the bulk of the post-Roman sequence lying above the water-table, and to a lesser extent the methods of construction employed in medieval building calling for little use of piled foundations.

6.4.5 Non-structural timbers - all periods

Two groups of other timbers have the potential for further analysis. The first group is re-used timbers where the original use is of some intrinsic interest (elements of boats, clay and timber buildings etc.). This material will only become available for analysis at a later stage in the post-excavation program, after its analysis by the MoLAS Ancient Woodworking Specialist. Secondly, a significant number of artefacts made of fir-wood, *Abies alba*, a non-native conifer usually thought to be brought by the Romans from the eastern Prussian plain in the form of barrels, were recovered from the site. Fir-wood artefacts from ONE94 include barrels and writing tablets. There is a significant possibility of useful collaboration with colleagues from Germany reviewing the dendrochronological potential and patterns of trade that may be revealed by the analysis of this material. The potential of both categories of material will be assessed at an appropriate stage in the conservation review process.

7 Revised research aims

The most important of the revised dendrochronological research aims associated directly with dating and chronology fall into four areas. These are to date the earliest use of the area, the post-Boudiccan rebuilding, the late-Roman structures, and generally to extend and strengthen the dating of the regional late Roman sequence. Other research aims include the study of the re-used and non-structural timbers, particularly elements from boats, barrels, and re-used superstructures of buildings.

12 Bibliography

Baillie MGL 1982 *Tree-Ring Dating and Archaeology*, London: Croom Helm.

Boswijk G & Tyers I 1996 *Dendrochronological Spot Dates For 268 Timbers From Regis House (KWS94), City Of London, Bull Wharf (BUF90 & UPT90), City Of London, Bellamy's Wharf (BEY95), Rotherhithe, Battle Bridge Lane (BAB95), Southwark, Formula Hotel (BAFH95), Barking, London Bridge Station B (LBB95), Southwark, Three Quays House (LTS95), City Of London, Parliament Sq Shaft (PLQ95), Westminster, & 148-160 St John St (SJO95), Clerkenwell*. ARCUS Dendrochronology Report **258**

Eckstein D, with Baillie MGL & Egger H 1984 *Handbooks for Archaeologists. No 2 Dendrochronological Dating*. European Science Foundation, Strasbourg.

English Heritage, in prep, *Guidelines for Dendrochronology*

Hillam, J, 1992 Tree-ring dating of oak timbers from Peter's Hill and Sunlight Wharf, in Williams T, *Public Buildings in the South-West Quarter of Roman London*, CBA Res Rep, **88**, 95-99

Hillam J, Morgan RA & Tyers IG 1987 Sapwood estimates and the dating of short ring sequences. In Ward RGW [ed], *Applications of tree-ring studies: current research in dendrochronology and related areas*, BAR S333, 165-85.

Nayling N 1990 *Bucklersbury (BUC87)*. MoL Dendrochronology Report 01/90

Schweingruber FH 1978 *Microscopic wood anatomy*. Swiss Federal Institute of Forestry Research.

Schweingruber FH 1988 *Tree Rings*. Dordrecht: Reidel.

Schweingruber FH 1990 *Anatomy of European woods*. Haupt, Berne and Stuttgart.

Tyers, I 1994 *Excavated Wood from No 1 Poultry; Spot-dates from the evaluation trenches, Method Statement and Research Objectives, General Notes on Sampling and Preliminary Cost Estimates*. MoLAS Dendrochronology Report DEN12/94

Tyers I 1995 *Report on the Timbers from Regis House (KWS94). 1 Timbers from the perimeter trenches*. MoLAS Dendrochronological Report DEN03/95

Tyers I & Boswijk G 1996 *Dendrochronological Spot Dates for Timbers from Bull Wharf (BUF90) and Regis House (KWS94), City of London*. ARCUS Dendrochronology Report 239

Tyers IG 1992 *Dendrochronology Extended Spot date report on timbers from Cheapside, City of London*. MoLAS Dendrochronology Report SPT06/92.

Tyers I and Hall CIH 1997 *Dendrochronological Spot Dates For 103 Timbers From No 1 Poultry (ONE94), City Of London, Victoria Wharf (VIT96), Tower Hamlets, 179 Borough High St (179BHS), Southwark, Horsefair (HOR86), Kingston, Somerset House (SST96), Westminster, Temple Place (TMP96), Westminster, & Royal Opera House (ROP95), Westminster*. ARCUS Dendrochronology Report **302**

Wilson K & White DJB 1986 *The anatomy of wood: its diversity and variability*, London: Stobart & Son.