

Centre for Archaeology Report 59/2001

**Tree-Ring Analysis of Timbers from 44 High Street, Bagshot,
Surrey**

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ISSN 1473-9224

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Summary

Dendrochronological dating was requested to try and clarify the complex evolution of the current structure, which appears to embody fourteenth-century remains in one truss, and post medieval elements, both of which have been decorated with post-Dissolution paintings. Many of the timbers sampled were fast-grown oak, with relatively few rings, which were unsuitable for analysis. A single timber, the north-west corner post of the painted room did date, and gives a likely felling period of AD 1485-1517, slightly earlier than had been assumed for this wall on stylistic grounds. This gives an earliest possible date range for the paintings, which were anyway thought to be rather later than this range.

Keywords

Dendrochronology
Standing Building

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Introduction

This late medieval timber-framed structure (NGR SU 912633; Fig 1) has been much altered externally, and is now used as an office. It is thought to embody the remains of a galleried coaching inn which would have stood on what was then the main road between London and the south west, and an earlier, possibly fourteenth-century, aisled hall (Gray 1997). During building works in AD 1997, a number of post-Reformation wall paintings were discovered covering two walls of a once large room (Figs 2 and 3). Each painted wall is potentially part of a different phase of the building. Dendrochronological analysis of the timbers of these two walls was requested by English Heritage to inform the ongoing work on the building and contribute to a reconsideration of its listed grading (currently grade II). If the west wall could be proved to be of fourteenth-century origin, the base colour wash is thought to have been applied soon after construction, and its survival would mark a significant finding.

Methodology

The site was visited in May AD 2001. The timbers were assessed for their potential use in dendrochronological study. Oak timbers with more than 50 rings, traces of sapwood, and accessibility were the main considerations in the initial assessment. Those timbers judged to be potentially useful were cored using a 15mm auger attached to an electric drill. The cores were glued to wooden laths, labelled, and stored for subsequent analysis.

The cores were prepared for measuring by sanding using an electric belt-sander with progressively finer grit papers down to 400 grit. Any further preparation necessary, eg where bands of narrow rings occurred, was done manually. Suitable samples had their tree-ring sequences measured to an accuracy of 0.01 mm using a specially constructed system utilizing a binocular microscope with the sample mounted on a travelling stage with a linear transducer linked to a PC. The software used in measuring and subsequent analysis was written by Ian Tyers (1999).

Ring sequences were plotted to allow visual comparisons to be made between sequences on a light table. This activity also acts as a measure of quality control in identifying any errors in the measurements when the samples crossmatch. Statistical comparisons were made using Student's *t*-test (Baillie and Pilcher 1973; Munro 1984). The *t*-values quoted below were derived from the original CROS program (Baillie and Pilcher 1973). Those *t*-values in excess of 3.5 are taken to be indicative of acceptable matching positions provided that they are supported by satisfactory visual matches, and give consistent matching positions.

When crossmatching between samples is found, their ring-width sequences are meant to form an internal 'working' site mean sequence. Other samples may then be incorporated after comparison with this 'working' master until a final site sequence is established, which is then compared with a number of reference chronologies (multi-site chronologies from a region) and dated individual site masters in an attempt to date it. Individual long series which are not included in the site mean(s) are also compared with the database to see if they can be dated.

The dates thus obtained represent the time of formation of the rings available on each sample. Interpretation of these dates then has to be undertaken to relate these findings to the construction date of the phase under investigation. An important aspect of this interpretation is the estimate of the number of sapwood rings missing. In this instance, the sapwood estimates are based on those proposed for this area by Miles (1997), in which 95% of samples are likely

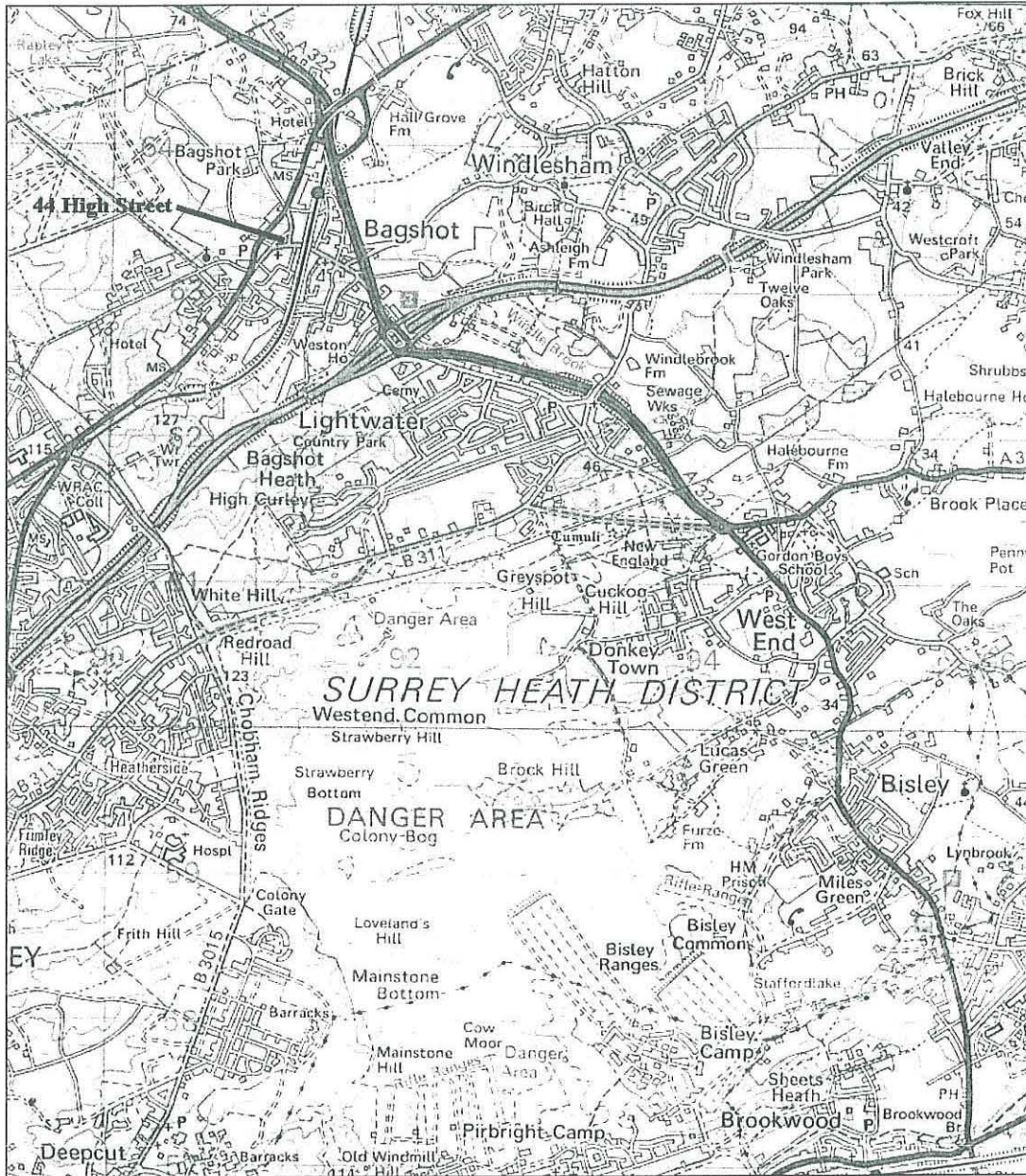


Figure 1: Map to show the general location of 44 High Street, Bagshot

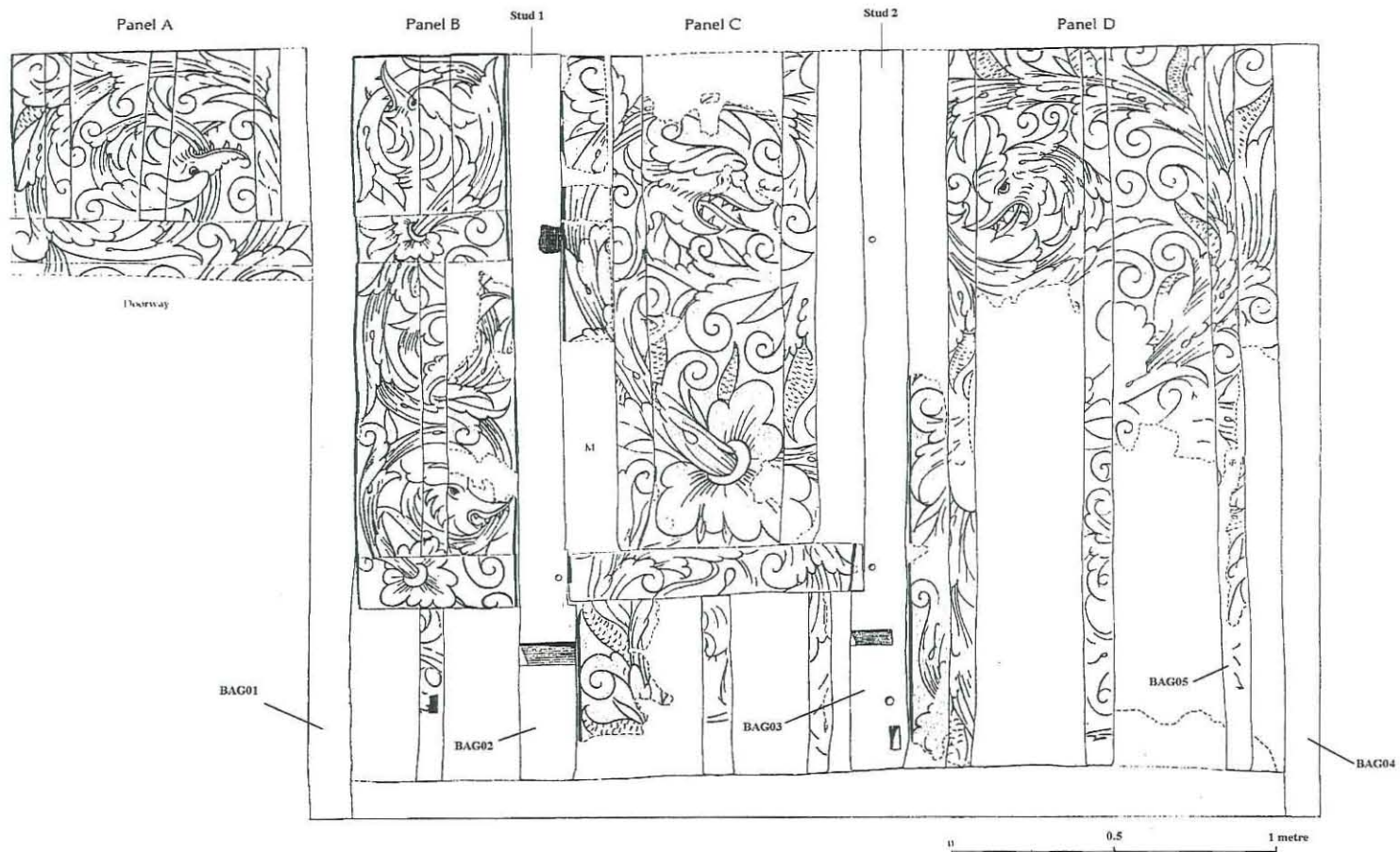


Figure 2: South wall elevation showing the locations of samples taken for dendrochronology (adapted from an original by David Williams)

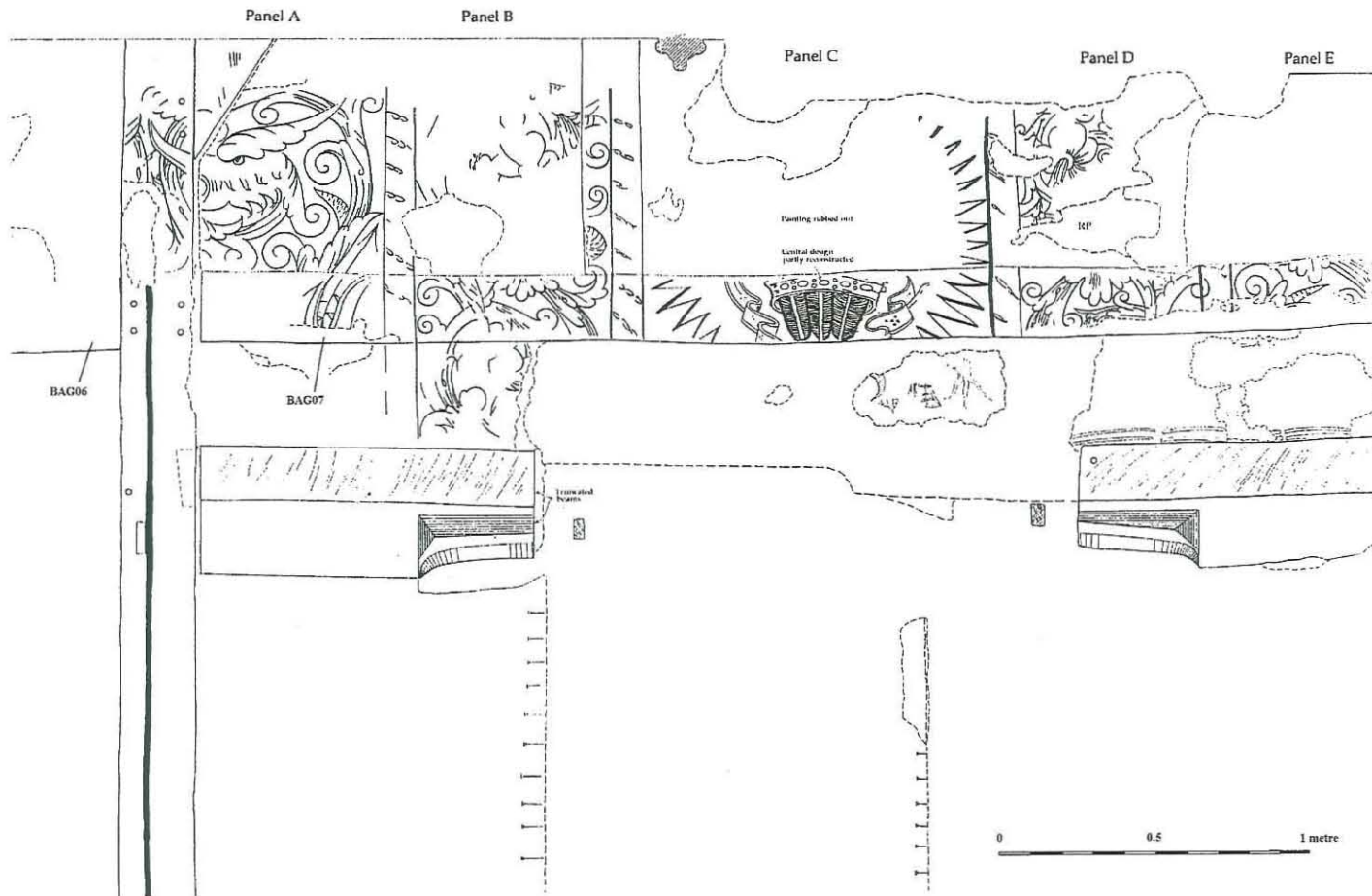


Figure 3: West wall elevation showing the locations of samples taken for dendrochronology (adapted from an original by David Williams)

to have from 9 to 41 sapwood rings. Where bark is present on the sample the exact date of felling of the tree used may be determined.

The dates derived for the felling of the trees used in construction do not necessarily relate directly to the date of construction of the building. However, evidence suggests that, except in the re-use of timbers, construction in most historical periods took place within a very few years after felling (Salzman 1952; Hollstein 1965).

Results

All the timbers sampled were oak (*Quercus* spp). It was noted at the time of sampling, in discussion with the assembled experts looking at the paintings, that studs 1 and 2 (Fig 2) have mortices for a cross-piece between them that has subsequently been removed, apparently before the painting was executed. Any date for the timbers in this wall would therefore represent a date after which the paintings must have been carried out.

Timbers in the two walls and the roof structure were assessed as being somewhat marginal in their use for dendrochronology, as most clearly had too few rings and few traces of sapwood. A total of only seven timbers were sampled, the majority coming from the south wall of the painted room. Details of the timbers sampled are given in Table 1 and illustrated in Figures 2 and 3. Only two samples were taken from the west wall (thought to be of fourteenth-century origin), these being the most promising looking timbers. One (BAG07) had insufficient rings to warrant further analysis, and BAG06 had only 51 rings and did not date.

None of the three measured sequences crossmatched with each other, and when each was individually compared with a range of regional and site master chronologies, only BAG04 gave any consistent matches (Table 2) dating it to the period AD 1390-1477.

The data for sample BAG04 are presented in Table 3.

Interpretation and Discussion

The initial assessment of the building suggested that although many of the timbers were quite large, they were of fast-grown oak with few rings. This was difficult to determine with any accuracy because most of the timbers were covered in painting, although the roof timbers were also inspected and gave the same impression. It was decided that the most promising timbers should be sampled in order to confirm the initial assessment. Only three timbers contained more than 50 rings, the longest (88 years) containing both pith and sapwood, typifying the use of young trees in the construction of the frames. This timber, a corner post to the south wall, dated. Whilst one has to be necessarily cautious in dating a whole phase on the basis of a single timber, the structural integrity of this major timber is not in doubt. Its most likely felling date range (AD 1487-1517) suggests a slightly earlier date for the construction of this wall than was thought on stylistic grounds.

It does give a date range after the which the paintings must have been executed, although this is of little help since the paintings were anyway assumed to be post-Dissolution in origin.

Table 1: Oak (*Quercus* spp.) timbers sampled from 44 High Street, Bagshot, Surrey. h/s = heartwood-sapwood boundary

Sample number	Origin of core	Total no of years	Average growth rate (mm yr ⁻¹)	Sapwood details	Date of sequence AD	Felling date of timber AD
BAG01	Post in south wall, now door post	<50	unmeasured	-	unknown	undated
BAG02	Stud 1, south wall	<50	unmeasured	-	unknown	undated
BAG03	Stud 2, south wall	61	2.08	h/s	unknown	undated
BAG04	South-west corner post	88	1.59	1	1390-1477	1485-1517
BAG05	Stud, south wall	<50	unmeasured	-	unknown	undated
BAG06	Mid-rail, south end of west wall	51	3.03	10	unknown	undated
BAG07	Mid-Rail, north end of west wall	<50	unmeasured	-	unknown	undated

Table 2: Dating of the oak sample BAG04

Dated reference or site master chronology	BAG04	
	AD 1390 - 1477	
	<i>t</i> -value	Overlap (yrs)
Feb2000 (Bridge unpubl)	4.6	88
London1175 (Tyers pers comm)	4.6	88
Hants97 (Miles pers comm)	4.4	88
Winchester Great Hall, Hampshire (Bridge 2000)	5.3	62
Newdigate1, Surrey (Bridge 1998)	4.6	88
Field Place Barn, Sussex (Bridge 1993)	4.5	76
Sherborne Abbey Nave, Dorset (Bridge 1983; 1993)	4.5	85
Goleigh, Hampshire (Miles and Worthington 1997)	4.4	76

Acknowledgements

I would like to thank the paintings expert, Tom Organ, and the local English Heritage inspector, David Brock for their useful on-site discussion. The owners of the building, Richard Heath Architects Ltd allowed access to the building. The work was funded by English Heritage.

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