Ancient Monuments Laboratory
Report 4/2000

TREE-RING ANALYSIS OF TIMBERS FROM BROCKLEY HILL FARMHOUSE, STANMORE, MIDDLESEX

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Summary

This building-at-risk is thought on typological grounds to be of sixteenth-century origin. It consists of a storied hall range and cross-wing, both with clasped-purlin roofs. It was hoped that the dendrochronological investigation would be able to distinguish whether or not the two main elements of the building were contemporaneous. The number of rings in the timbers could rarely be determined before sampling as they were often either painted or largely obscured within walls. Most timbers were found to be from very fast-grown oaks, felled before they were fifty years old. Two longer ring-width sequences were very sensitive and could not be dated.

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Introduction

Brockley Hill Farmhouse (NGR TQ 173944: Fig 1) is a building-at-risk (English Heritage 1998). It is undergoing extensive repair, and the dendrochronological investigation outlined here was requested by Richard Bond (English Heritage) in order to inform these repairs. The property has a lobby-entry type plan, with a storied hall and cross-wing, both having a clasped-purlin roof. The physical evidence was at first interpreted as suggesting that both hall range and cross-wing could be of the same construction date (most likely sixteenth-century), but if correct, this would make it unusual for the period, and potentially of great interest. It is also possible that the cross-wing at the north end is as much as a century older than the present hall range. There are seventeenth- and eighteenth-century alterations which were not part of this investigation. Dendrochronology was therefore used in an attempt to test whether or not the two elements were contemporaneous.

Methodology

The site was visited in May 1999, when the timbers were assessed for their potential use in dendrochronological study. The locations sampled are illustrated in Figures 2 and 3.

Core samples were obtained 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. Only samples with more than 45-50 rings were measured and used in subsequent analyses as sequences with fewer than this number of rings rarely give reliable crossmatching. 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 meaned to form an internal site mean sequence 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

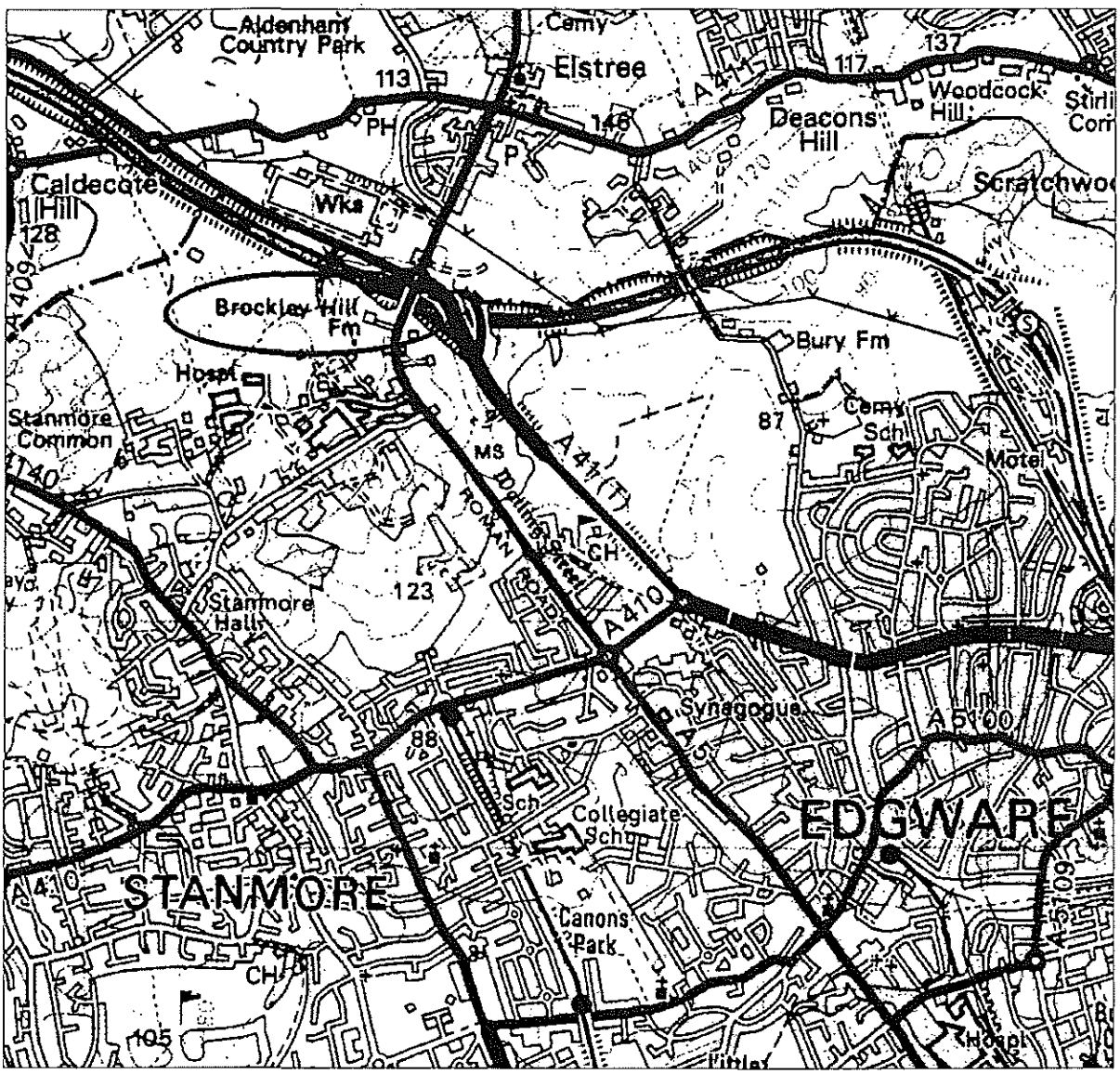

Figure 1: Map to show the general location of Brockley Hall Farmhouse, Middlesex

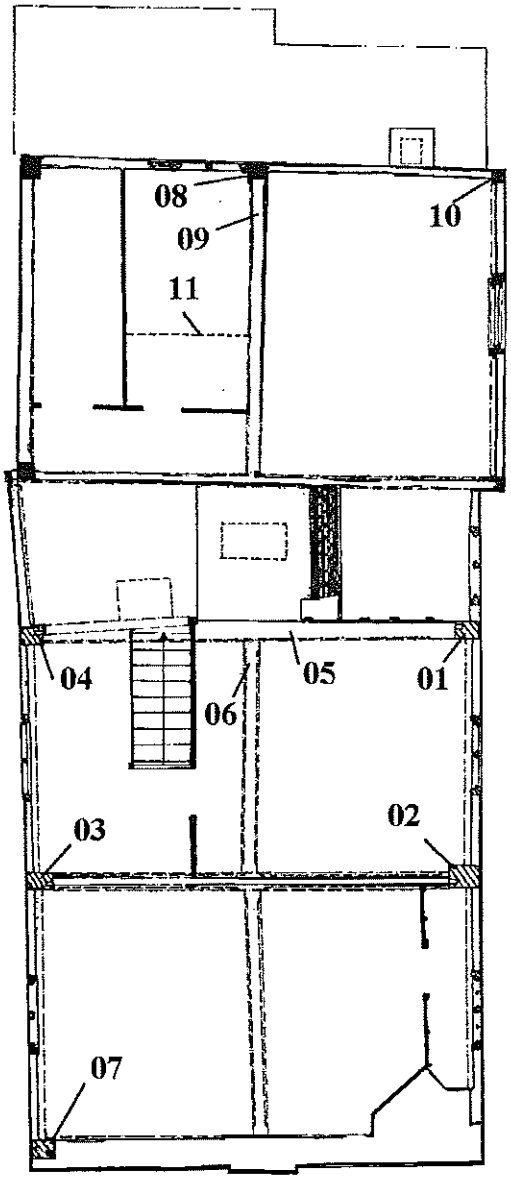

Figure 2: Plan of the first floor of Brockley Hill Farmhouse, showing the locations of the timbers sampled for dendrochronology

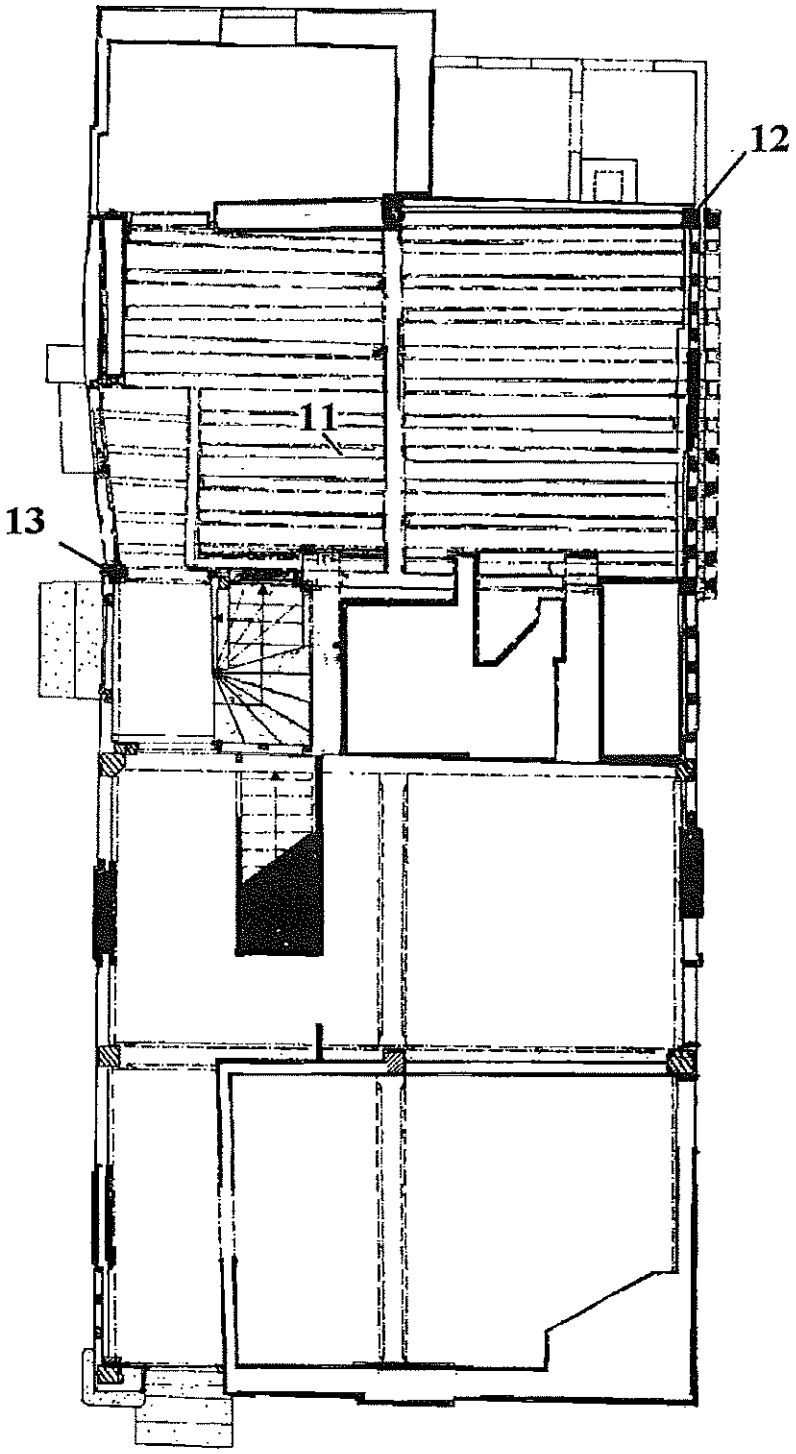

Figure 3: Plan of the ground floor of Brockley Hill Farmhouse, showing the locations of the timbers sampled for dendrochronology

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 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.). As the information in Table 1 illustrates, most of the samples were from very fast-grown oaks, many cores getting close to the pith and incorporating the heartwood-sapwood interface in less than fifty years. Some of the timbers in the building appeared to have been re-used, these were avoided as far as possible when sampling. In most cases it was not possible to determine the likely number of rings in a timber prior to sampling either because the timbers were painted, or largely obscured within walls.

Table 1: Oak (*Quercus* spp.) timbers sampled from the Brockley Hall Farmhouse, Stanmore, Middlesex. h/s = heartwood-sapwood boundary

Sample No	Origin of core	Total No of years	Sapwood details
BKH01	Post, third from south on east side	21	h/s
BKH02	Post in mid-truss of hall range, east wall	99	3
BKH03	Post in mid-truss of hall range, west wall	37	-
BKH04	Post, third from south on west side	55	h/s
BKH05	North tie beam of hall range	21	-
BKH06	Northern ceiling beam, hall range	29	1
BKH07	Post, southern end of hall range, west side	60	8 (complete)
BKH08	Central post, north wall of cross-wing	25	h/s
BKH09	North-south ceiling beam, cross-wing	21	h/s
BKH10	Outer east post, north wall of cross-wing	*c*35	-
BKH11	Ground floor ceiling joist, cross-wing	*c*40	-
BKH12	Inner east post, north wall of cross-wing	44	h/s
BKH13	South-west post, cross-wing	25	h/s

Sample BKH04 had a number of very narrow rings at the start of the sequence, and its sequence was not further investigated. Samples BKH02 and BKH07 did not crossmatch with

each other. They were compared individually with a range of reference data. Some statistically significant matches were found, but these were dismissed on viewing the plots. The ring-width data for these two samples is shown in Table 3.

Interpretation and Discussion

A number of the samples were of approximately the same age, and may perhaps have come from a plantation-type environment or young secondary woodland. These timbers were particularly fast-grown. The two sequences with more than 50 rings which were compared to reference data were very sensitive ie their year-to-year ring-width changes were large, the widths range from 0.27 to 5.59mm in BKH02, and 0.59 to 5.99mm in BKH07. It is not surprising that they did not give consistent crossmatching with other chronologies.

It is not possible to date the samples, nor to determine whether or not the cross-wing and present hall range were contemporaneous.

Acknowledgements

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Table 3: Ring-width data for samples BKH02 and BKH07

Year	ring widths (0.01mm)									
BKH02										
1	144	95	59	97	114	122	135	89	65	36
	27	61	55	82	53	56	84	87	130	84
	56	63	70	66	68	61	58	40	82	185
	126	157	159	277	268	290	229	324	269	205
	328	168	318	325	496	335	530	403	171	242
51	450	349	285	315	188	194	388	249	287	161
	243	555	371	561	559	506	488	360	159	103
	90	151	172	189	209	125	168	175	117	92
	176	278	249	314	257	504	399	272	442	531
	295	240	199	394	141	489	220	129	253	
BKH07										
1	409	206	319	201	291	243	161	245	206	350
	512	278	255	438	427	334	238	306	351	492
	441	370	307	336	295	296	292	281	252	217
	381	280	88	53	100	99	146	243	312	364
	241	310	599	379	467	159	104	316	400	347
51	364	262	514	443	439	337	199	141	197	181