Ancient Monuments Laboratory
Report 41/87

TREE-RING ANALYSIS OF SAXON WELL TIMBERS FROM SCHOOL STREET, IPSWICH 1983-85.

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Summary

Timbers from a Saxon well, excavated at School Street, Ipswich, were sampled for tree-ring analysis. No reliable absolute dating was obtained and possible reasons for this are discussed.

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Tree-ring analysis of Saxon well timbers from School Street, Ipswich, 1983-85

Introduction

Oak timbers (Quercus spp) from a Saxon well, context 1668 (Figure 1), excavated at School Street, Ipswich (site code - IAS48Ø1), were sampled for tree-ring analysis. Three principle groups were represented:

a) timbers from the main ring of the shaft (1-7)

b) staves from inside the main ring (9, 10, 12, 20)

c) timber fragments within the shaft (8, 11, 13-19).

The aims of the study were to provide a felling date for the timbers and hence, a more precise construction date for the well.

Method

The samples were prepared and measured following the method given in Hillam (1985a). Samples with less than 30 rings, along with any that had unclear ring sequences, were not measured as they are not suitable for dating purposes.

The sequence of ring widths of each measured sample was represented as a graph. These ring sequences were compared, with each other and with dated reference chronologies, both visually and on a microcomputer. The computer program (Baillie & Pilcher 1973) measures the amount of similarity between two ring

sequences by calculating the value of Student's t for each position of overlap. Generally a t-value of 3.5 or over represents a match provided that the visual match is acceptable.

Following the completion of crossmatching and dating, the probable felling date must be estimated. If the bark or bark edge is present, the exact felling year can be given. However, the amount of sapwood in an oak tree is relatively constant. A recent study of oak sapwood data showed that 19 out of 20 samples from British trees had 10-55 sapwood rings (Hillam et al 1986). These 95% confidence limits are used to estimate felling dates in the absence of complete sapwood. In the total absence of sapwood, the addition of the minimum sapwood allowance (10 rings) to the date of the last measured heartwood ring produces a probable terminus post quem for felling.

Results

The number of rings present on the samples ranged from 6 to 108. The details of each sample are given in Appendices 1 and 2. All the timbers from the main ring of the shaft were rejected as they had insufficient rings and the rings were also badly distorted by the presence of knots. None of the timbers suitable for measuring had retained sapwood.

Three samples (9, 10 and 12), all staves from inside the main ring, crossmatched (Figure 2). A 77 year long master curve, M1

(Table 1), was constructed by combining the data from these sequences. No other reliable crossmatches were obtained so all remaining ring sequences, and the master curve M1, were compared with dated reference chronologies from the Saxon period. As this proved unsuccessful they were also tested against reference chronologies spanning the periods before and after the expected date. However no conclusive results were obtained. Details of all reference chronologies used in this study are given in Appendix 3.

Discussion

It is difficult to estimate the size and age of trees used to provide the well timbers with any accuracy. The samples from the main shaft are very knotty and distorted and the remaining timbers were mostly radially split planks with neither pith nor sapwood present so the amount of missing wood is unknown. The average ring widths vary from 0.68mm to 2.22mm. Generally trees with very narrow rings are from woodland where competition was severe, whereas trees with wider rings usually originate from more open contexts where less competition was experienced (Bartholin 1978).

The high t-values (all over 10.0) obtained for the matches between samples 9, 10 and 12 suggest that these staves were split from the same tree. The master curve therefore probably only represents a single tree. A relative felling date of after

87 (arbitrary) is obtained for the ring sequences from the three staves (Figure 2).

Although the majority of tree-ring chronologies for the historic period can be dated, it is not so for individual ring sequences (Hillam 1986). Timbers from East Anglia have proved particularly difficult in the past (see for example Hillam 1985b). Due to the lack of similarity between most of the measured sequences from School Street it was necessary to treat all timbers as individuals. The dating of individual timbers is also dependent on the availability of local reference chronologies. An additional problem was the shortness of the ring sequences. Although tentative dates were obtained for some of the sequences, it was not possible to confirm these.

Conclusion

Absolute dating of the timbers is at present unlikely but may be achieved in the future when more reference chronologies for the Ipswich area are available. The problems of dating timbers from East Anglia are once again highlighted as are the problems associated with short sequences and single timbers. The results indicate the need for extensive work to be carried out on timbers from this area and also on the reliability of dating single timbers, particularly those with less than 100 rings.

Acknowledgements :

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References

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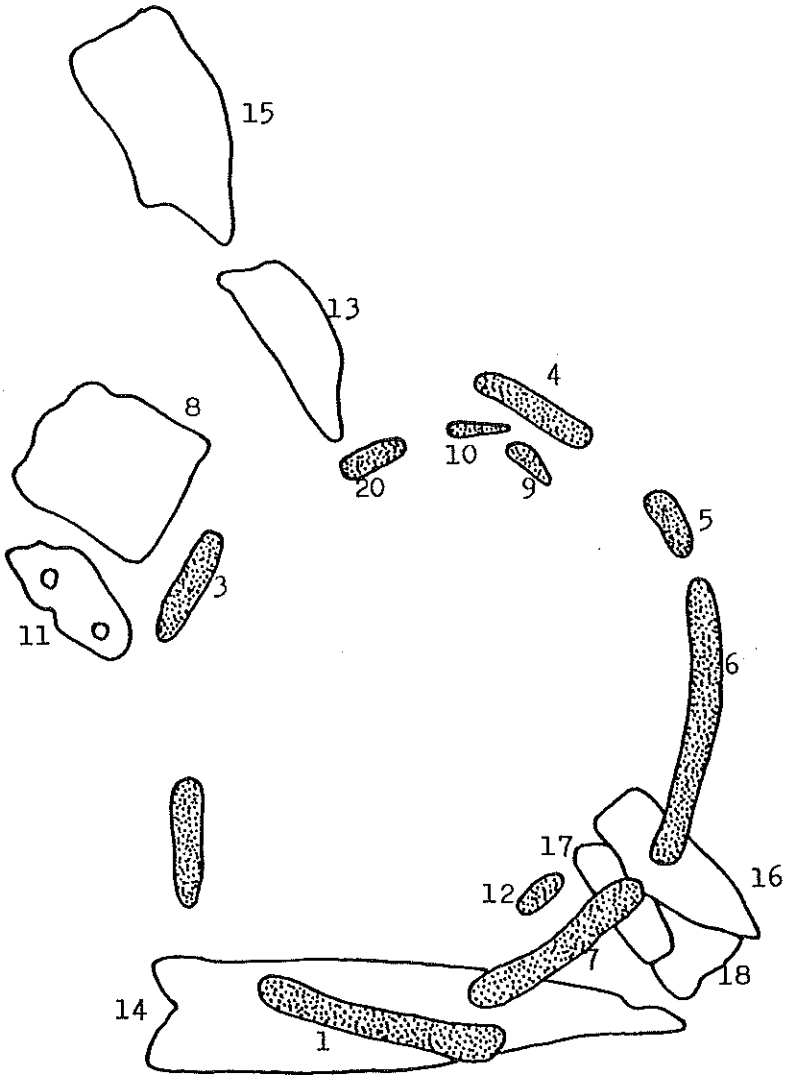


Figure 1: Diagram showing the positions of the timbers in well 1668.

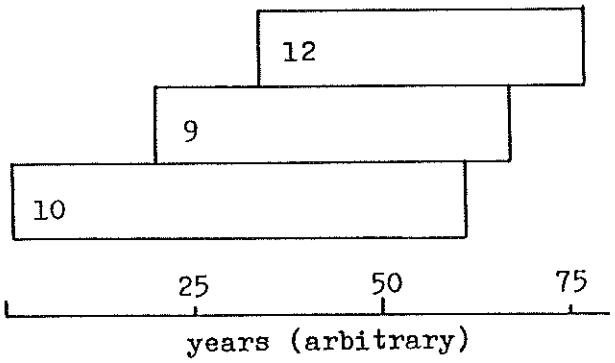


Figure 2: Bar diagram showing the relationship between the matching ring sequences from well F1668.

Table 1: Ring widths, in units of 0.02mm, of the School Street master, M1; three matching sequences are included.

IPSWICH SCHOOL STREET
M1
77

1	-	158	117	109	80	112	117	114	145	78	114
11	-	103	79	90	105	99	99	81	92	113	100
21	-	126	87	101	115	99	87	90	51	51	99
31	-	81	82	76	68	83	129	90	100	62	65
41	-	61	96	101	99	68	71	88	95	55	57
51	-	77	78	65	94	77	59	57	81	74	88
61	-	69	54	78	93	83	70	120	129	97	71
71	-	46	75	76	61	83	89	60			

TREES INCLUDED ARE - IAS10 IAS9 IAS12

APPENDIX 1

Details of the samples and results

Sample - sample number

Rings - total number of rings

Sapwood - sapwood rings present or not

Av.width - average ring width in mm

Dimensions - maximum dimensions of the cross-section in mm

\+ - rings present but not measured

APPENDIX 1 - DETAILS OF THE SAMPLES AND RESULTS

SAMPLE	RINGS	SAPWOOD	AV WIDTH	DIMENSIONS	RESULT	COMMENT
1	c20	-	-	500x80	rejected	very knotty
2	6	-	-	115x25	rejected	-
3.1	20	y	-	175x70	rejected	-
3.2	23	-	-	55x20	rejected	-
4.1	c25	-	-	190x40	rejected	very knotty
4.2	c29	-	-	155x50	rejected	very knotty
5	22	-	-	75x30	rejected	-
6	c20	y	-	440x90	rejected	very knotty
7.1	28	-	-	260x90	rejected	-
7.2	c25	-	-	480x60	rejected	very knotty
8	-	-	-	-	rejected	fragmented
9	48	-	1.79	95x20	undated	-
10	61	-	1.54	100x20	undated	-
12	44	-	1.79	85x25	undated	-
13	44	-	2.22	100x25	undated	-
14.1	c32	-	-	100x30	rejected	-
14.2	108	-	0.91	105x80	undated	-
15	56+	-	1.76	155x40	undated	+40 rings
16	76	-	1.10	90x15	undated	-
17	73+	-	0.68	60x15	undated	+6 rings
18	78	-	1.78	145x20	undated	-
19	46	-	0.87	50x30	undated	-
20	39	-	1.61	70x25	undated	-

APPENDIX 2

Cross-sectional sketches

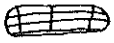
These are not drawn to scale, and are intended as a rough guide to the way in which the timbers were cut or split. Shading represents sapwood.

Appendix 2

1 

2 

3.1 

3.2 

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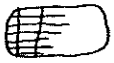
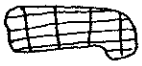
4.2 

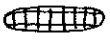
5 

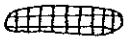
6 

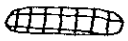
7.1 

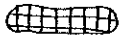
7.2 

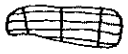
8 fragmented

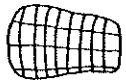
9 

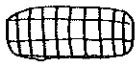
10 

12 

13 

14.1 

14.2 

15 

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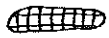
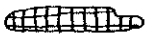
17 

18 

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APPENDIX 3

Details of reference chronologies

chronology	date span	reference
Brandon	417-597	Groves & Hillam 1986
Carlisle Saxon	441-770	Baillie & Pilcher pers comm
City Medieval	682-1159	SDL unpublished
East Midlands	882-1976	Nottingham Group pers comm
England	404-1981	Baillie & Pilcher pers comm
Germany Munich area	370BC-AD1969	Becker 1981
Germany Trier area	400BC-AD1965	Hollstein 1980
Hamwic	458-710	Hillam 1984
Ipswich Smart St	499-682	Groves 1987
Ireland Nth Mills	358-894	Baillie pers comm
Ireland Sth Mills	261-881	Baillie pers comm
Mersea Strood	445-661	Hillam 1981
Odell	473-623	Hillam 1981
Ref8	416-737	Fletcher 1977
Tamworth	404-825	Baillie pers comm

(SDL - Sheffield Dendrochronology Laboratory)