Ancient Monuments Laboratory
Report 83/89

IDENTIFICATION AND TREE-RING ANALYSIS OF TIMBERS FROM THE TOWERS B, STOUR STREET, CANTERBURY, KENT.

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Summary

Fourteen timbers of Roman and medieval date were identified and examined dendrochronologically. The timbers were mostly oak, but one Roman sample was alder, and two medieval ones were beech. Most of the timbers had insufficient rings for dating purposes, although one of the medieval timbers produced a terminus post quem for felling of 1164.

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IDENTIFICATION AND TREE-RING ANALYSIS OF TIMBERS FROM THE TOWERS B, STOUR STREET, CANTERBURY

Fourteen tree-ring samples were submitted from the Towers B in Canterbury for identification and, where suitable, tree-ring dating. Six were from the Roman levels, and eight were Saxon or medieval in date. All the Roman timbers had functioned as stakes. Two (121, 133) were cross member supports for drain planks, whilst the remainder (94, 99, 104, 120) were thought to be part of the drain for a road.

The Saxon and later medieval timbers were also stakes, with the exception of 51 which was a post. Six timbers (40, 41, 43, 48, 50, 68) were from the laced revetment for the river bank. 51 and 52 were either from the same revetment or, more likely, another structure.

Methods

The samples were prepared, measured and crossmatched following the methods outlined by Hillam (1985). The non-oak samples were identified by taking thin sections in three planes and examining them through a microscope (see, for example, Schweingruber 1978). Any samples with more than 30 rings were submitted for ring measurement.

Crossmatching was carried out following the procedures given in Baillie (1982), but using an Atari 1040St microcomputer with software written and developed by Ian Tyers of the Museum of London. The crossmatching programs are based on Baillie and Pilcher (1973) and Munro (1984).

For samples without bark or bark edge, estimation of felling dates can be made by using the sapwood estimate of 10-55 rings (Hillam et al 1987).

The ring width data of the measured oak samples are listed at the end of this report.

Results

1. The Roman timbers.

All the Roman samples were oak (*Quercus* spp), except for 104 which was alder (*Alnus glutinosa* (L) Gaertn). The rings of 104 were not clear enough for accurate measurement and the sample was rejected. It is unlikely that it would have dated because research into the dendrochronology of alder and other non-oak species is still in its early stages (eg Crone 1988; Groves & Hillam 1988).

Of the oak samples, three (99, 120, 121) had less than thirty rings and were rejected (Table 1). The remaining two samples were 94 with 42 rings, and 133 with 51, of which the outer 20 were sapwood. Visual comparison of the ring patterns from 94 and 133 showed a relatively good correlation when the start of 133 was offset by 13 years (Fig 1). However the overlap length for this potential match is only 30 years, and therefore the relative dating must be regarded as tentative. (If it were correct, it would indicate that the timbers were probably contemporary.)

The ring sequences of 94, 133 and an average of the two were tested against reference chronologies of known date, including some from Canterbury, but no consistent results were found.

2. The Saxon and medieval timbers.

Two of the samples were identified as beech (*Fagus sylvatica* L); the remainder were oak. 48 and 68 were rejected because of insufficient rings (Table 1).

The beech samples (50, 52) had 37 and 53 rings respectively. Their ring widths were measured but no crossmatching was found with each other or with any of the oak sequences.

The oak samples suitable for measurement (40, 41, 43, 51) had 125, 119, 52 and 57 rings respectively. The only sample with sapwood was 51 which had 17 sapwood rings and possibly bark edge.

No similarities were found between the oak sequences. When they were compared with dated reference chronologies, only 41 gave consistent results. It matched very well with reference chronologies from London when its ring sequence spanned the period AD1036-1154 (Table 2). It matched less well with chronologies from outside the London area, although it showed some similarity to chronologies from Germany and one from Nantwich in Cheshire.

Since it had no sapwood, a precise felling date for 41 cannot be given. It is likely to be missing at least 10 sapwood rings which gives a *terminus post quem* for felling of 1164. However it could have been felled some time later depending on how many heartwood rings were removed when it was shaped into a stake.

Tentative end dates of 1095 and 1128 were found for sample 40 but, since it is impossible to determine from the tree-rings which, if any, is correct, this ring sequence must remain undated.

Conclusion

Oak and alder timbers were identified from the Roman levels, whilst oak and beech were represented in the later periods. Short ring sequences made it impossible to date any of the Roman timbers, although a tentative link was found between 94 and 133. Short ring patterns were also a problem with the

medieval timbers but two had more than 100 rings. The ring sequence of one of these, a stake from the laced revetment, dated to 1036-1154 and was probably felled after 1164. The ring sequence matched very well with chronologies from London but less well with those from outside London.

Acknowledgements

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Table 1: Details of the tree-ring samples. Sketches are not to scale.

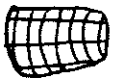
sample	species	total no of rings	sapwood rings	sketch	(mm) dimensions	comments
1. Roman						
94	oak	42	-		120 x 105	undated
99	oak	28	7		155 x 125	rejected
104	alder	-	-		130 x 130	rejected
120	oak	17	-		130 x 75	rejected
121	oak	15	-		125 x 120	rejected
133	oak	51	-		100 x 90	undated
2. Medieval						
40	oak	125	-		125 x 95	undated
41	oak	119	-		125 x 85	dated
43	oak	52	-		120 x 95	undated
48	oak	21	10		85 x 80	rejected; felled winter
50	beech	37	-		130 x 115	undated
51	oak	57	17		160 x 150	undated; bark edge?
52	beech	53	-		115 x 115	undated
68	oak	25	12		100 x 95	rejected

Table 2: Dating the ring sequence of 41 to 1036-1154. t values with dated reference chronologies (see Baillie & Pilcher 1973 for further details on t values in dendrochronology).

chronology	t value
England, London:	
Billingsgate (Hillam unpubl)	5.6
Chamberlains Wharf (Tyers pers comm)	3.8
City (Hillam unpubl)	6.0
Custom House XIII (Fletcher pers comm)	4.9
Fennings Wharf (Tyers pers comm)	3.8
Little Britain pit (Tyers pers comm)	3.5
Merton Priory (Tyers pers comm)	5.1
New Fresh Wharf (Hillam unpubl)	3.9
Pickfords Wharf building 2 (Tyers pers comm)	3.8
REF6 (Fletcher 1977)	5.0
Seal House Revetment I (Hillam unpubl)	3.1
Seal House Revetment II (Hillam unpubl)	4.1
Seal House Revetment III (Hillam unpubl)	6.7
Sunlight Wharf (Tyers pers comm)	4.7
Swan Lane (Groves pers comm)	5.3
Southwark (Tyers pers comm)	5.6
England, non-London:	
Nantwich (Leggett 1980)	3.2
Germany:	
Southern Germany (Becker 1981)	3.1
Weser & Leine (Delorme 1972)	3.2
Trier (Hollstein 1980)	3.3

Appendix

Ring Width Data.
(All widths are in units of 0.02mm, listed 10 rings to a line)

Towers B 40 (mean of two radii)
Raw data of 125 years length

24	17	16	35	23	18	27	21	27	32
33	28	38	33	29	24	36	48	46	57
42	29	39	46	37	19	36	37	35	30
38	46	77	65	45	28	45	56	54	64
46	44	54	52	62	74	66	75	58	77
61	77	69	36	44	55	59	58	39	96
75	32	24	29	44	65	50	42	31	44
58	65	42	52	25	40	65	45	48	33
37	29	28	32	40	39	34	55	43	41
32	33	39	37	22	31	65	56	50	47
30	52	34	39	35	30	28	31	25	18
26	39	33	36	38	60	56	43	56	62
70	89	73	87	113					

Towers B 41
Raw data of 119 years length
Dated AD1036 to AD1154

94	93	77	58	93	64	102	83	56	55
57	58	30	30	24	29	31	37	42	56
58	43	78	70	59	50	76	101	72	48
78	94	100	73	61	40	62	95	80	65
75	78	77	53	62	42	37	65	74	67
74	32	36	64	37	59	69	89	75	67
76	47	50	30	41	38	19	30	32	34
40	22	29	42	25	34	43	48	43	45
41	27	27	42	30	26	32	35	32	24
31	35	33	32	27	30	27	29	20	26
30	26	24	23	30	49	40	29	30	29
28	40	32	27	29	37	18	36	25	

Towers B 43
Raw data of 52 years length

118	93	83	101	70	46	54	68	36	69
103	68	49	67	140	97	84	85	169	157
154	220	189	300	92	152	224	79	43	33
44	46	106	149	95	116	67	68	95	69
118	62	93	90	62	69	39	43	46	73
56	62								

Towers B 51
Raw data of 57 years length

157 193 234 197 223 255 328 215 87 188
184 268 165 346 216 207 139 131 136 191
 81 123 155 112 120 124 177 92 60 139
116 89 197 100 113 139 122 139 203 213
272 110 92 144 204 221 70 194 122 110
 83 54 178 109 80 96 72

Towers B 94
Raw data of 42 years length

245 113 194 193 203 259 132 198 222 187
126 218 158 201 144 108 114 134 106 127
 89 141 77 161 138 134 135 207 116 92
114 76 73 149 93 189 118 151 184 127
120 145

Towers B 133
Raw data of 51 years length

208 205 123 102 95 142 120 139 96 159
152 231 186 168 142 220 110 71 120 73
 75 139 142 193 92 125 157 188 192 204
111 96 77 48 105 56 108 56 42 54
 92 49 86 48 63 99 86 91 42 60
 50