

Tree-ring Dating of Oak Timbers from Brampton Bierlow Hall,
South Yorkshire

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The samples (Table 1) were collected by Peter Ryder of the South Yorkshire Archaeological Unit during excavation of the Hall in 1982. They were examined at the HBMC Dendrochronology Laboratory at Sheffield in 1984.

Of the eleven samples, the two purlins from the wing (2,3) and the lower purlin from the west side of the hall (6) proved unsuitable for dating as they had less than 50 annual rings. The ring widths of the remaining samples were measured and represented as graphs, or tree-ring curves. (The ring widths are given in the Appendix.)

The ring patterns were compared with dated reference chronologies using a computer program (Baillie & Pilcher, 1973). This gives the degree of correlation between two ring sequences by calculating the value of Student's t for each position of overlap. A value over 3.5 indicates a match provided the accompanying visual match is acceptable (Baillie, 1982). Samples 9, 10 and 11 gave consistently high t -values with chronologies from Yorkshire (Hillam, unpubl) and the Welsh border (Siebenlist-Kerner, 1978). Their ring sequences date to 1423-1526, 1425-1530 and 1424-1536 respectively (Table 2). The three curves also match each other at these dates, so a Brampton Bierlow master curve was produced by averaging their ring widths (see Appendix). The master curve also matched well with various reference chronologies: for example, $t=6.8$ with Elland Old Hall (Hillam, unpubl), 6.2 with England (Baillie & Pilcher, pers comm) and 6.7 with Bishops' House (Morgan, 1977).

The unmatched sequences were compared with chronologies from Doncaster (Morgan, pers comm) and the Bishops'

House, Sheffield (Morgan, 1977), as well as those from Wales and Yorkshire. No match was found for samples 1, 4 or 8 but tentative matches were found for samples 5 and 7 when their outer rings were 1576 and 1523 respectively (Fig 1). Further comparisons with reference chronologies, plus examination of the visual agreements, confirmed the tentative matches. Although the t-values (Table 3) are not as high as those for samples 9, 10 and 11, they are consistently significant with at least three dated chronologies.

The dating of sample 5 is particularly important as this timber retains its full complement of sapwood rings at one edge. Its outer ring dates to AD 1576 so the timber must have been felled in late 1576 or early 1577. The other dated samples had no sapwood. The terminus post quem for their felling is 1550. However, the dates of their outer rings are relatively close to the date of the heartwood-sapwood transition of sample 5 which is 1546. It is possible therefore that their sapwood plus a few heartwood rings were removed during their conversion to purlins etc, and that they were felled at the same time as sample 5. Thus, although timbers from the wing block of Brampton Bierlow Hall could not be dated, some of the timbers from the hall block were felled in 1576 or 1577 or, in the case of 7, 9, 10 and 11, after 1550.

Acknowledgements

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References

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- Baillie MGL & Pilcher JR 1973 A simple crossdating program for tree-ring research. Tree Ring Bulletin 33, 7-14.
- Morgan RA 1977 Dendrochronological dating of a Yorkshire timber building. Vernacular Architecture 8, 809-14.
- Siebenlist-Kerner V 1978 The chronology, 1341-1636, for certain hillside oaks from Western England and Wales. In JM Fletcher (ed) Dendrochronology in Europe, BAR S51, 157-61.

Fig 1: Bar diagram showing the years spanned by the dated ring sequences.

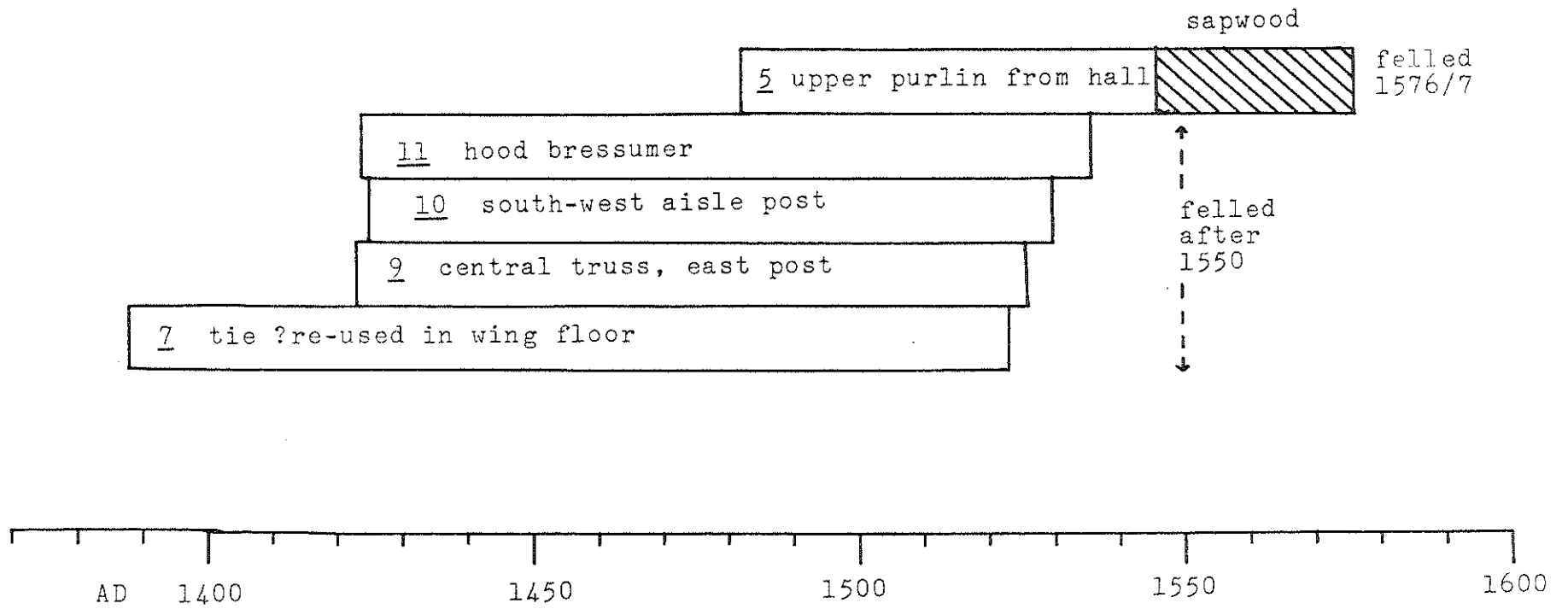


Table 1: Details of the timbers; those unsuitable for dating purposes are marked with an asterisk.

sample no	function	no of rings	sapwood rings
1	Aisle tie from north end of hall block	83	-
2*	Upper purlin from south side of wing, east end	-	-
3*	Lower purlin from north side of wing, west end	-	-
4	Upper purlin from east side of hall, north end	56	-
5	Upper purlin from west side of hall, north end.	95	31
6*	Lower purlin from west side of hall, north end	-	-
7	Tie ?re-used in wing floor	136	-
8	Wall-plate re-used in wing floor	57	1?
9	Central truss, east post	104	-
10	South-west aisle post	106	-
11	Hood bressumer	113	-

Table 2: Samples 9, 10 and 11 - tree-ring dates and summary of t-values.

sample no	date of ring sequence	felled	<u>t</u> -value with:	
			Yorkshire	Welsh border
9	1423-1526	after 1550	5.6	3.5
10	1425-1530	after 1550	5.5	5.6
11	1424-1536	after 1550	3.9	4.1
Brampton Bierlow master curve	1423-1536	-	6.0	5.9

Table 3: Dating of samples 5 and 7.

reference chronology	<u>t</u> -values	
	5 (1482-1576)	7 (1388-1523)
Britain (Baillie & Pilcher, pers comm)	4.0	3.2
England (")	3.4	3.0
Brampton master (this report)	2.1	3.6
Doncaster (Morgan, pers comm)	2.3	3.4
Welsh border (Siebenlist-Kerner, 1978)	3.7	3.1
Yorkshire (Hillam, unpubl)	2.6	2.5

Appendix: Ring width data in units of 0.02mm.

BRAMPTON BIERLOW

BREAN

AD 1423-1536

114

1 - 123 160 121 92 109 158 191 184 252 248

11 - 183 208 182 126 128 85 107 169 143 95

21 - 162 184 158 90 116 132 142 106 160 135

31 - 112 131 106 140 106 108 90 135 130 114

41 - 123 81 86 103 103 97 122 136 104 75

51 - 82 77 110 130 87 77 137 113 121 137

61 - 119 131 108 106 186 107 122 61 58 63

71 - 74 90 61 79 56 43 50 38 43 52

81 - 94 82 107 86 57 43 50 52 64 58

91 - 72 69 57 80 110 104 67 52 65 64

101 - 60 83 50 71 76 98 90 54 38 38

111 - 42 71 52 89

TREES INCLUDED ARE - BB9 BB10 BB11

BRAMPTON BIERLOW

BB1

83

1 - 140 212 323 317 292 301 341 245 333 315
11 - 362 327 323 270 280 51 44 38 50 67
21 - 102 107 177 223 182 213 257 195 170 184
31 - 53 47 56 67 100 132 94 87 83 97
41 - 99 143 113 141 110 126 132 119 109 40
51 - 53 41 61 53 49 68 59 74 76 85
61 - 60 38 31 36 44 56 75 82 85 62
71 - 103 97 84 108 99 101 39 28 52 50
81 - 83 64 107

COMMENT - NEAR PITH

BRAMPTON BIERLOW

BB4

56

1 - 119 137 133 93 111 230 137 181 279 223
11 - 197 167 108 146 174 133 214 154 154 128
21 - 135 116 142 167 196 183 170 162 166 172
31 - 160 126 136 162 148 150 113 144 157 148
41 - 125 40 60 39 70 72 115 154 137 166
51 - 144 134 107 183 181 223

COMMENT - NEAR PITH

BRAMPTON BIERLOW

BB5 AD 1482-1576

95

1 - 103 92 60 104 79 87 55 65 58 42
11 - 47 77 68 49 87 67 50 62 44 69
21 - 68 56 61 79 58 55 49 83 83 78
31 - 71 56 47 63 71 69 61 76 55 82
41 - 71 50 71 55 59 68 61 53 39 53
51 - 40 49 55 59 66 60 75 68 62 62

71 - 37 51 39 37 31 26 36 39 28 30
81 - 39 29 37 28 28 42 48 27 62 30
91 - 34 30 32 27 33

COMMENT - HS 65 - ?FELLED

BRAMPTON BIERLOW
BB7 AD 1388-1523
136

1 - 50 46 65 73 43 36 35 30 36 43
11 - 42 41 45 33 45 80 50 61 60 51
21 - 41 34 32 26 31 25 22 26 37 44
31 - 39 34 36 44 26 30 37 34 29 25
41 - 31 33 34 40 34 37 30 49 25 47
51 - 28 27 23 37 39 45 48 32 31 23
61 - 32 35 38 47 53 48 22 25 23 31
71 - 32 34 39 43 44 47 63 51 73 43
81 - 48 39 63 51 61 62 63 73 75 41
91 - 41 62 68 93 69 81 88 136 65 87
101 - 68 82 65 52 37 70 153 112 229 94
111 - 58 53 34 54 54 74 116 101 86 65
121 - 38 42 55 85 94 132 76 49 65 80
131 - 72 65 44 30 85 99

COMMENT - NEAR PITH

BRAMPTON BIERLOW
BB8
57

1 - 188 237 186 274 141 198 172 133 123 88
11 - 90 95 102 100 92 76 62 54 38 55
21 - 39 50 44 48 75 87 119 99 70 127
31 - 140 126 99 120 142 114 190 167 178 180
41 - 205 191 282 192 209 229 174 134 141 209
51 - 136 102 73 79 87 99 149

COMMENT - PITH - ?HS 57

BRAMPTON BIERLOW

BB9

AD 1423-1526

104

1 - 123 85 97 49 77 114 131 86 128 165
 11 - 110 112 144 77 116 92 108 112 99 80
 21 - 134 134 122 76 100 101 140 114 144 128
 31 - 121 124 115 141 110 95 60 74 72 80
 41 - 72 62 87 95 70 89 77 121 78 82
 51 - 60 41 33 42 39 44 60 70 87 100
 61 - 106 97 72 90 134 77 89 52 64 85
 71 - 73 68 42 76 56 50 66 46 38 51
 81 - 66 62 72 54 46 53 62 58 57 56
 91 - 73 67 58 78 90 56 59 69 89 74
 101 - 35 39 10 29

COMMENT -

BRAMPTON BIERLOW

BB10

AD 1425-1530

106

1 - 118 74 57 114 147 135 211 236 131 112
 11 - 85 49 65 45 61 96 125 85 158 196
 21 - 143 77 76 74 96 75 79 86 69 80
 31 - 72 102 66 86 96 132 117 132 151 87
 41 - 95 84 99 81 85 125 119 78 77 89
 51 - 113 83 93 67 137 98 100 108 98 128
 61 - 94 103 182 104 114 60 66 55 75 93
 71 - 101 114 89 42 36 34 48 54 69 83
 81 - 164 106 64 38 45 51 62 72 80 64
 91 - 62 70 156 138 105 59 83 93 115 158
 101 - 87 126 110 133 97 77

COMMENT -

BRAMPTON BIERLOW

BB11

AD 1424-1536

113

1 - 238 159 155 174 247 277 332 417 543 505
11 - 401 318 254 205 118 154 299 205 122 194
21 - 224 211 119 173 222 190 129 238 193 146
31 - 190 131 177 143 128 115 199 202 131 148
41 - 94 77 130 141 123 204 163 116 66 110
51 - 102 186 265 130 120 214 172 177 205 155
61 - 170 158 126 244 140 165 72 45 49 76
71 - 110 42 48 25 38 50 36 43 52 148
81 - 103 85 98 63 39 44 47 74 48 65
91 - 77 53 94 86 118 38 28 25 25 32
101 - 53 45 60 47 64 84 32 38 38 42
111 - 71 52 89

COMMENT - FITH