HULL, MONKGATE (MG76)

Tree-ring analysis

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Ten timbers from Monkgate were examined at Sheffield in 1979 with a view to producing accurate dates by dendrochronology. Details of the timbers are set out in the attached Table. In group MG76A, 431 was a halved log of oak (*Quercus* sp.), whilst the others were samples of conifers: one plank, 433, and two stakes, 683 and 686. The samples from MG76B were oak except for 825 which was beech (*Fagus sylvatica*).

Samples 431, 941 and 989 were rejected for dating purposes because they had less than 50 annual growth rings. Very short ring sequences cannot be dated with any reliability. (For general information on tree-ring dating, see Baillie, 1982, and Hillam, 1979.) The ring widths of the remaining samples were measured and plotted as graphs.

The oak timbers

The oak ring patterns (740, 791, 945) were compared one against the other but did not appear to match. They were then tested against dated reference chronologies from Britain and Germany. No crossdating was found for 791 and 945 but the 740 sequence showed good agreement with the German chronologies over the period AD 1459-1530. The crossdating was found using the Belfast

computer program (Baillie & Pilcher, 1973) which calculates the degree of correlation - expressed as Student's t - for each position of overlap; values greater than t = 3.5 indicate matching provided the accompanying visual match is acceptable. The agreement values for 740 were: t = 3.88 with the Munich area of Germany (Huber & Giertz-Siebenlist, 1969), 4.22 with the Trier chronology for the area west of the Rhine (Hollstein, 1965) and 3.63 with a chronology from northern Germany (Delorme, 1972). 740 showed poor correlation with British chronologies for the period AD 1459-1530 which suggests that the timber grew in Germany and was imported into Hull after felling. An exact felling date cannot be given since the outer sapwood zone had been removed. The number of sapwood rings in oak is relatively constant at 20-40 rings so the terminus post quem for the felling of 740 is AD 1550.

The conifer timbers

Tree-ring dating of archaeological timbers in Britain is restricted to oak at present as only that species is found in sufficient quantities to facilitate the construction of long reference chronologies. On the Continent, research work has been carried out on various coniferous species, and some tree-ring chronologies have been produced, such as an 1100-year chronology from fir timbers (Abies) in southern Germany (Becker & Giertz-Siebenlist, 1970).

Small samples from the three Monkgate conifers were sent to the Ancient Monuments Laboratory in London for identification so that their ring patterns could be compared with the appropriate reference chronology. The

results of the identification have not yet been received.

The individual ring patterns were compared against each other but no crossmatching was found. However the use of coniferous timber for tree-ring dating is more difficult than that of oak. Oaks are known to produce one growth ring each year whereas conifers occasionally produce double rings or fail to produce a ring.

There was no matching between the oak and fir sequences but this might not be expected. Oak and fir ring patterns have been synchronised (Becker & Giertz-Siebenlist, 1970) but the Hull samples need not be fir.

The beech timber

Beech is not very commonly found on English archaeological sites. Apart from Hull, other samples sent to the Sheffield laboratory have come from Bristol (Hillam, unpubl.) and Exeter (Morgan, pers. comm.). As these places are all ports, the beech timbers may have been imported from the Continent where beech is more frequently found, and where tree-ring chronologies for this species are available (e.g. Hollstein, 1973 a & b; Jazewitsch, 1953; Klein & Bauch, 1982).

The 825 ring pattern was tested against all available beech chronologies but no similarities were found. It was also compared, but without success, with various oak chronologies since Hollstein (1973a) suggests that the two species show similar growth patterns. Hollstein also noted that beech was like conifers in that it sometimes does not produce an annual ring; this could account for the lack of crossdating.

The ring width data from all the Monkgate samples with more than 50 rings are appended to this report for future reference.

Acknowledgements

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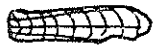
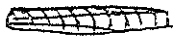
SUMMARY OF TREE-RING ANALYSIS

no.	type	species	no. of rings	average width(mm)	sketch	dimensions (cm)	date of ring sequence
MG76A							
431 1117	log	oak	31	1.90		13 x 6	-
433 1117	plank	conifer	73	2.03		28 x 8	-
683 1159	stake	conifer	113	0.79		8.5 x 6.5	-
686 174	stake	conifer	56	1.73		9-10 x 8	-
MG76B							
740 1381	riveted plank	oak	72	1.46		11.5 x 2.5	AD 1459-1530
791 1440	barrel stave	oak	132	1.10		15 x 0.5	-
825 1493	fragment of plank	beech	107	1.58		20 x 2-4.5	-
941 1634	stake with carved notch	oak	39, includes 2 sapwood	1.60		11 x 10	-
945 1381	post	oak	70	0.90		12 x 11	-
989 1442	barrel stave	oak	38	4.08		16 x 1-2	-

HULL
MG 825 - sample no.
107 - no. of rings

15 17 16 10 16 26 20 13 14 18 11 9 16 23 30 23 24 22 15 15 21 15 18 20 16
20 15 14 17 9 17 22 18 7 16 16 17 12 22 16 22 32 17 24 30 30 14 8 9 21
22 25 23 18 11 9 15 12 10 11 7 11 9 12 13 5 11 21 18 15 9 14 22 23 7
8 17 25 31 17 23 15 23 11 18 21 12 19 6 7 13 6 10 4 9 11 14 12 14 16
8 14 16 15 11 7 12

HULL
MG740
72
17 15 15 12 18 12 21 17 14 18 12 18 14 21 18 21 20 16 15 15 19 18 16 13 13
15 12 14 18 18 16 14 16 15 11 13 14 17 14 10 14 12 14 12 8 7 11 15 11 15
18 10 17 13 18 10 13 15 15 15 18 13 15 13 11 15 17 12 10 11 13 16

HULL
MG 791
132
14 21 17 20 14 25 17 21 28 15 16 19 25 17 16 19 8 14 20 15 14 13 9 11 16
13 5 8 11 6 11 13 14 14 16 19 14 13 18 14 16 20 16 12 9 4 10 8 13 9
10 12 4 7 13 16 19 14 13 14 16 7 5 4 8 7 10 8 10 13 11 10 8 11 10
12 9 10 9 6 12 10 9 8 9 9 13 7 10 4 9 6 11 8 7 10 7 5 5 5
6 8 7 5 7 10 11 7 10 5 7 7 8 9 6 9 7 12 8 7 8 9 9 9 11
6 11 7 9 6 8 8

HULL
MG 945
70
19 11 7 6 7 8 6 10 9 9 7 7 14 15 8 12 10 10 19 35 25 17 5 7 11
6 6 5 6 7 11 9 7 6 4 6 5 4 6 4 7 13 15 4 7 11 10 7 10 8
16 14 10 6 6 3 8 5 9 11 11 9 6 6 5 4 3 4 4 5

HULL
MG 433
73
47 35 30 25 27 39 36 40 38 54 39 39 39 47 38 27 31 29 28 30 37 34 30 28 23
23 23 24 22 20 16 22 20 16 19 17 13 17 17 16 18 12 11 6 5 9 15 14 11 9
8 11 12 7 6 9 10 12 12 11 11 14 13 13 12 10 7 5 9 5 6 10 8

HULL
MG 683
113
10 11 11 9 14 22 18 9 7 10 11 13 11 12 11 9 6 6 11 9 10 9 9 8 13
16 11 9 11 12 9 7 13 9 12 15 11 8 11 18 18 16 12 16 9 6 7 8 9 7
4 7 8 6 4 3 5 4 7 5 7 7 9 6 5 6 10 5 4 8 8 5 6 5 7
12 15 6 6 5 4 5 4 3 2 6 5 5 3 4 5 3 3 4 4 5 7 8 5 7
6 5 4 4 5 7 7 5 4 5 4 3 2

HULL
MG 686
56
9 43 43 32 26 31 32 31 15 15 19 25 11 10 24 17 27 21 18 12 14 8 6 12 4
7 7 10 11 12 14 11 5 8 6 11 5 7 6 3 7 7 5 2 6 15 9 8 5 8
10 17 15 9 13 12