TREE-RING ANALYSIS OF FOUR OAK TIMBERS FROM PAUL STREET, EXETER (PS'82)

by Jennifer Hillam (Jan 1984)

The four oak timbers (Quercus sp.) were examined in the DoE Dendrochronology Laboratory in 1982. They were round posts with diameters of 165-200mm. Two of them (F438, F441) were unworked, and had their full complement of sapwood rings (Table 1). They had been felled in winter or early spring, since their outermost rings were complete. Sapwood was also present on the other two samples (F439, F440), but the timbers had been trimmed slightly.

The samples had 75-87 annual growth rings, the average widths of which were between 0.96 and 1.41mm. The ring widths were represented as graphs so that the ring patterns could be tested against each other for similarities. (Fig 1)
They all crossmatched, but the graphs of F439 and F441 were almost identical, suggesting that the two timbers came from the same tree. A site master (Table 2) was constructed from the ring patterns of F438, F439/441 and F440. F439/441 were included as one sequence so as not to bias the master curve.

The 89-year master was compared with dated Roman chronologies from London, Ireland and Germany. There were no similarities between Exeter and Germany (Becker, 1981; Hollstein, 1980), but a visual match was found with London which dated the Exeter sequence to AD 12-100. The computer comparison (Baillie & Pilcher, 1973) between Exeter and London (Hillam, Morgan & Tyers, unpubl.) gave a t-value of 4.4, whilst that between Exeter and Ireland gave 4.7 (Baillie, pers.comm.). A value greater than 3.5 indicates

a match, provided that the visual match is acceptable.

Because the last ring of the Exeter sequence represents the year in which the timbers were felled, the felling date must be either late AD100 or early AD101, depending on whether the timbers were cut in winter or early spring. Construction would probably have followed almost immediately.
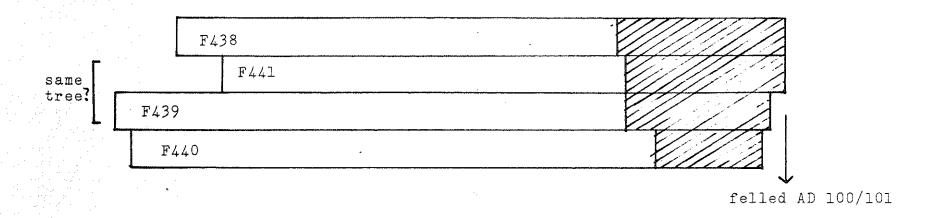
Acknowledgements

References

Baillie MGL & Pilcher JR 1973   A simple crossdating program for tree-ring research, Tree Ring Bulletin 33, 7-14.

Becker B 1981   Fällungsdaten Römischer Bauhölzer, Fundberichte aus Baden-Württemberg 6, 369-86.

Hollstein E 1980   Mitteleuropaische Eichenchronologie, Mainz.

Fig 1: Bar diagram showing the relative positions of the Paul Street ring sequences. Sapwood is represented by hatching; heartwood is white.
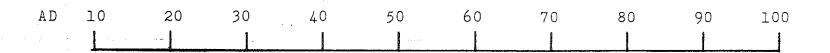
Table 1: Details of the timbers. Sketches are not to scale;
fw - felled winter or early spring.

sample no	total no of rings	sapwood rings	average width(mm)	sketch	diameter (mm)
F438	81	23 fw	0.96		165-175
F439	87	20	1.19		200
F440	84	15	1.22		200
F441	75	22 fw	1.41		190-200

Table 2: Paul Street master curve, AD 12-100

year AD	ring widths (0.1mm)									
	0	1	2	3	4	5	6	7	8	9
12			13	14	16	19	21	22	18	20
20	22	15	17	17	16	10	15	19	18	20
30	12	19	13	15	16	13	13	16	20	17
40	10	9	12	12	10	9	9	11	13	9
50	12	12	8	9	7	11	10	5	3	6
60	9	10	10	11	7	8	5	5	7	9
70	10	10	12	10	15	12	11	8	10	14
80	16	13	10	8	5	4	10	13	18	17
90	16	10	8	8	5	8	9	13	7	9
100	7									