TUDOR STREET (TUD'78)

The excavation at Tudor Street was one of three carried out in the vicinity of the site of Henry VIII's Bridewell Palace, the other two being at Bridewell Place (BRI'78) and Kingscote Street (KSC'77). Six oak timbers from Tudor Street were sent to Sheffield for tree-ring analysis (Table 1). The dating of the timbers from associated finds was vague but suggested that they had originated in the late medieval period. It was thought that some of the samples from the northern end of the site (piles 500, 501, 502) might be contemporary with the Palace's construction which took place in AD 1522. Timber 828 was a rubbing post associated with a substantial chalk foundation which was found at the southern end of the site. It was postulated that the foundation dated to the 15th century. Samples 574 and 588 were radially-split planks of unknown age. Although not directly related, they came from similar alignments. Tree-ring analysis was to prove that these two timbers belonged to a much earlier phase of building activity than originally suspected, since 574 dated to the late Saxon period.

Tree-ring analysis was undertaken on all six samples (for an explanation of the method and the techniques used in the Sheffield dendrochronology laboratory, see Hillam, 1979; Morgan, forthcoming). Details of the timbers are outlined in Table 1. Sample 828 had very narrow annual rings with little variation in width, so that its potential for tree-ring dating was limited. The remainder appeared suitable for dating purposes, although 501 and 502 had only short ring patterns.

The individual tree-ring curves were compared with each other. 501 and 502 crossmatched well and were obviously

contemporary (Figure 1); the timbers must have been hewn from trees which were c 80-90 years old when felled. None of the other curves appeared to match.

The ring patterns were then tested against dated reference chronologies from various regions of the British Isles and Germany. A computer program (Baillie & Pilcher, 1973) was used for this process. There was no apparent crossdating for the late medieval period. However, a high t-value was found for the comparison between TUD 574 and REF 6 (Fletcher, 1977) which, if correct, dated the Tudor Street sequence to AD 682-918. Cross-checks were made by testing TUD 574 against other reference curves from this earlier period. Other significant t-values were obtained which confirmed the Tudor Street-REF 6 match (Table 2). The London curve showed similarities with chronologies from several regions of the British Isles, including Dublin, Exeter and York, as well as REF 6 which is based on timbers from southern England (Figure 2).

The date of TUD 574 was much earlier than expected, the last ring of the sequence being equivalent to AD 918. As the timber contained no sapwood, an estimate of the terminus post quem was calculated for the felling date. Assuming that the number of sapwood rings in oak is 32 ± 9 (see Hillam, 1979), the tree from which the plank was split must have been felled after AD 941. This suggests that the structure, which contained plank 574, must have been built in the mid-10th century. The tree-ring result indicated that what had been uncovered in the excavation was in fact part of a late Saxon revetment.

Apart from the archaeological implications of the

dating, TUD 574 also proved to be of great importance to dendrochronology. At the moment, it is the only dated timber from England with rings extending back to the 7th century. Prior to this, the oldest timber was from the Lloyds Bank site in York (Morgan, unpublished); its ring pattern covered the period AD 778-956. Thus TUD 574 extended absolutely-dated tree-ring chronologies in England by c 100 years. It formed a link with earlier Saxon material and was the means by which the timbers from the Portchester and Old Windsor excavations were dated. Hence the construction of an English tree-ring chronology for the period AD 416-1216 was made possible mainly by the fortuitous appearance of TUD 574 (Hillam, in prep.). The timber played a similar role in dating Irish tree-ring curves (Baillie, pers. comm.), thus proving invaluable to both English and Irish dendrochronology. Its ring width values are given in Table 3.

No dating was found for the other Tudor Street curves; their ring widths are listed in Table 4.

References:

Baillie M.G.L. 1977, Dublin Medieval Dendrochronology. Tree Ring Bulletin 37, 13-20.

Baillie M.G.L. & Pilcher J.R. 1973, A simple crossdating program for tree-ring research. Tree Ring Bulletin 33, 7-14.

Fletcher J.M. 1977, Tree-ring chronologies for the 6th to 16th centuries for oaks of southern and eastern England. J. Archaeol. Science 4, 335-52.

Hillam J. 1979, Tree-rings and archaeology: some problems explained. J. Archaeol. Science 6, 271-8.

-------- 1980, A medieval oak tree-ring chronology from south-west England. Tree Ring Bulletin 40 (forthcoming).

Hillam J., An English tree-ring chronology, AD 416-1216 (in preparation).

Morgan R.A., Tree-ring dating of the medieval waterfronts at the Seal House site. In Schofield J., Excavations at Seal House, City of London, 1974-6. LAMAS special paper (forthcoming).

Jennifer Hillam, July 1980.

Legends to figures and tables:

Figure 1: Matching tree-ring curves from Tudor Street, 501 and 502.

Figure 2: Comparison of TUD 574 with dated chronologies from Exeter and southern England (REF 6) over the period AD 836-918.

Table 1: Details of the Tudor Street timbers; the sketches, illustrating the way in which the timbers were cut, are not drawn to scale.

Table 2: The results, represented by t-values, of computer comparisons between 574 and various dated tree-ring chronologies. A value greater than $t = 3.50$ is statistically significant.

Table 3: Ring width data for TUD 574, which dates to AD 682-918.

Table 4: Ring width data for all Tudor Street timbers, excluding TUD 574. The widths are in 0.1mm.

FIG. 1
TUDOR STREET

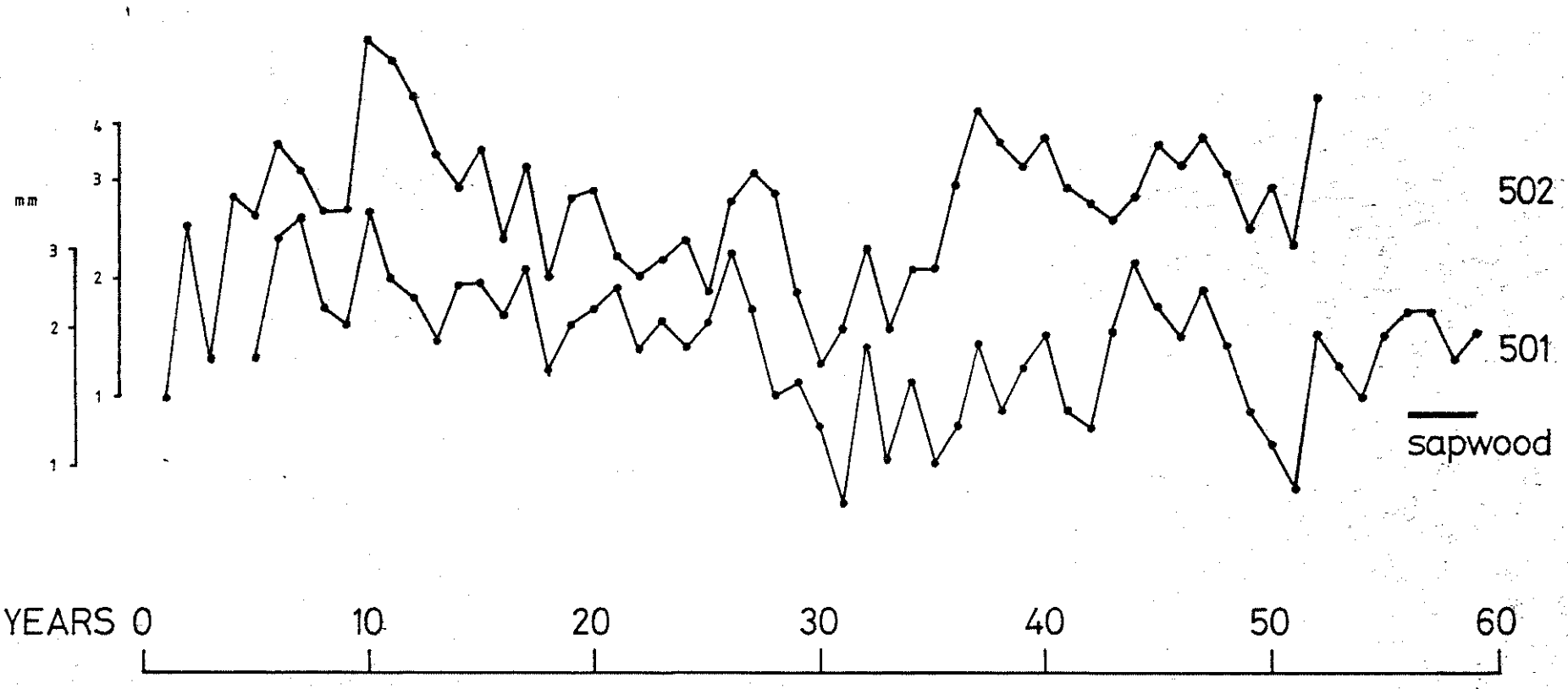
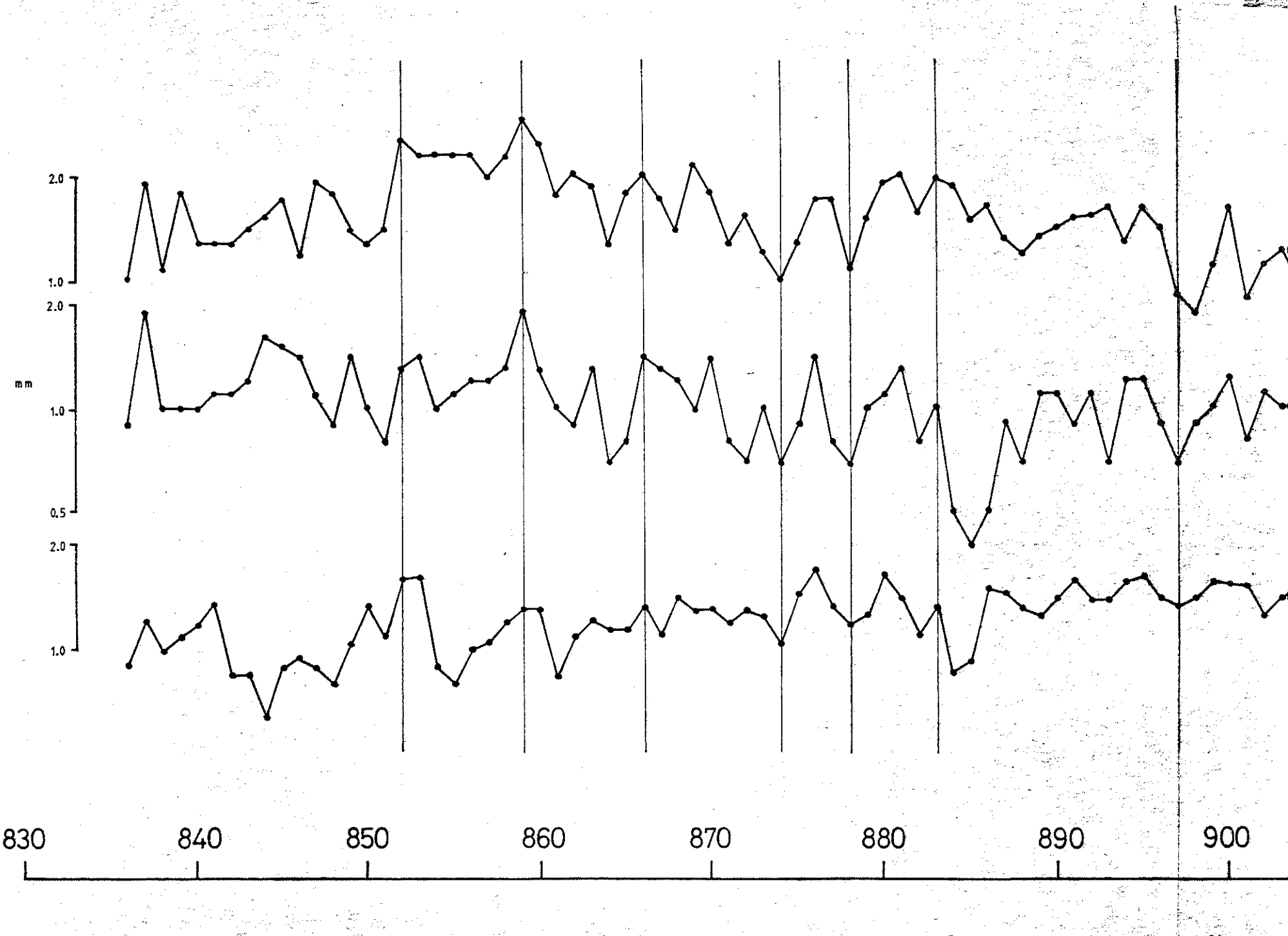
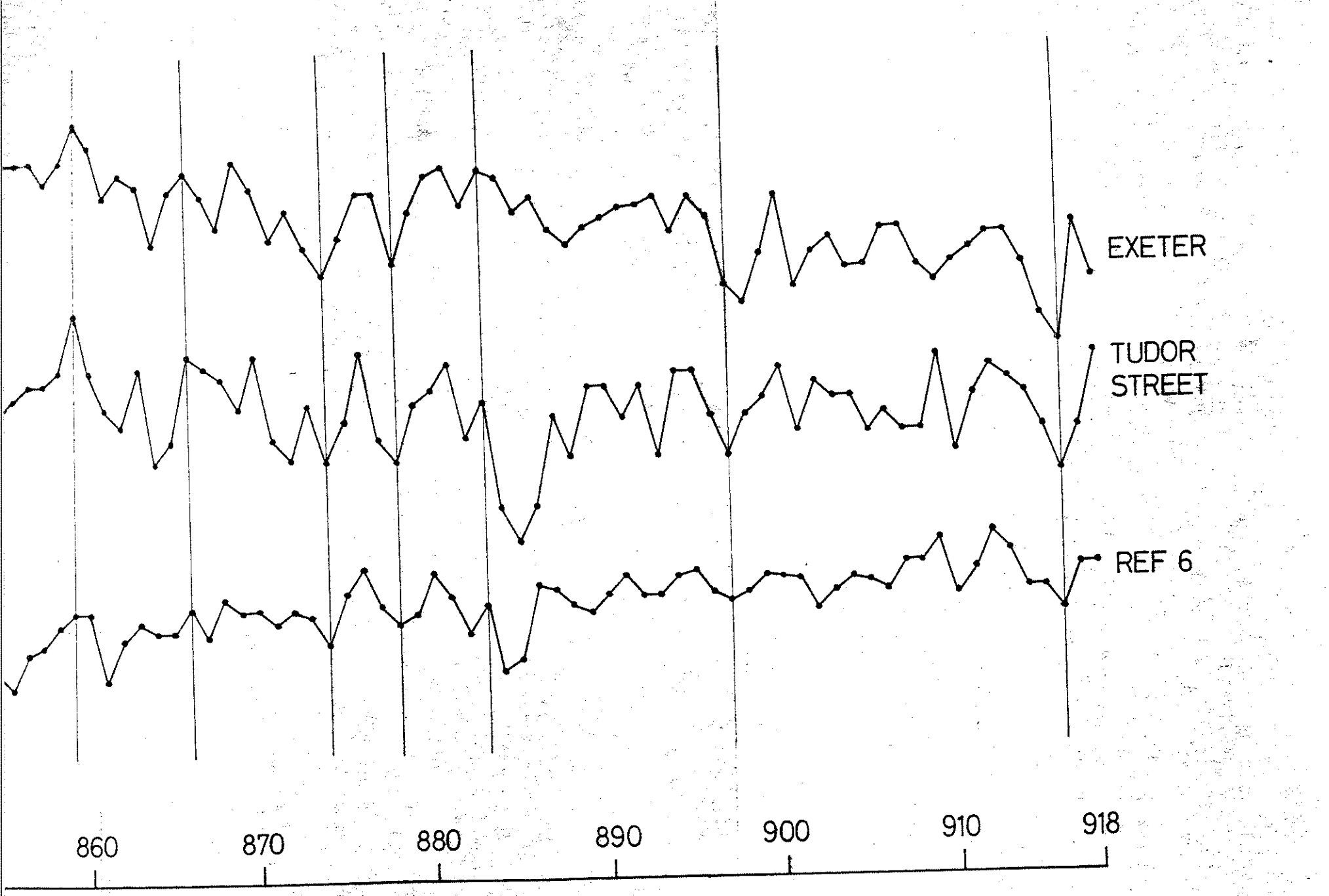


FIGURE 2




EXETER
TUDOR
STREET
REF 6
860
870
880
890
900
910
918

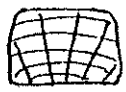
sample no.	no.of rings	sapwood rings	average width(mm)	sketch	dimensions (cm)
500	70	-	2.87		19 x 22
501	55	4	1.90		21 x 24
502	52	-	2.78		20 x 21-25
574	237	-	1.50		1-14 x 36
588	90	3	2.08		4-5 x 21-22
828	128	1	0.55		10 x 11

Table 1

chronology	t-value	years of overlap
Dublin (Baillie, 1977)	3.91	65
Exeter (Hillam, 1980)	4.00	109
REF 6 (Fletcher, 1977)	4.57	119
Schleswig, Germany (Eckstein, unpublished)	3.77	129
York, Lloyds Bank (Morgan, unpublished)	4.19	141

Table 2

years AD	ring widths in 0.1mm									
	0	1	2	3	4	5	6	7	8	9
682			15	24	13	17	20	21	23	14
690	25	23	16	28	33	26	18	25	22	20
700	26	21	31	22	25	21	24	26	17	18
710	27	34	26	22	32	44	32	30	34	25
720	32	23	20	36	27	26	24	42	23	26
730	22	24	17	18	22	17	11	18	12	8
740	15	9	13	11	13	14	14	11	11	5
750	13	18	20	17	15	17	12	14	18	18
760	12	14	19	7	8	13	18	16	20	11
770	18	21	15	21	15	8	6	10	14	12
780	16	24	20	10	15	14	12	17	15	14
790	13	17	13	11	5	12	12	10	10	18
800	12	16	14	11	11	14	11	7	6	12
810	10	17	10	15	12	17	17	14	19	13
820	11	10	12	14	24	15	18	13	15	13
830	20	16	13	10	17	11	9	19	10	10
840	10	11	11	12	16	15	14	11	9	14
850	10	8	13	14	10	11	12	12	13	19
860	13	10	9	13	7	8	14	13	12	10
870	14	8	7	10	7	9	14	8	7	10
880	11	13	8	10	5	4	5	9	7	11
890	11	9	11	7	12	12	9	7	9	10
900	12	8	11	10	10	8	9	8	8	13
910	7	10	12	11	10	8	6	8	13	

Table 3

TUD 500
(70 years)

38 31 39 69 63 46 54 49 43 39 43 47 36 38 43 32 33 42 33 18 22 17 29 22 20
28 30 32 36 54 41 41 33 25 37 36 32 39 30 19 28 36 29 22 18 15 19 29 21 31
29 14 13 10 18 13 26 14 22 18 14 13 14 11 14 16 15 12 10 9

TUD 501
(55 years)

17 32 34 22 20 36 25 23 19 25 25 21 27 16 20 22 24 18 20 18 20 29 22 14 15
12 8 18 10 15 10 12 18 13 16 19 13 12 19 27 22 19 24 18 13 11 9 19 16 14
19 21 21 17 19

TUD 502
(52 years)

10 24 12 28 25 36 31 26 26 61 55 46 34 29 35 23 32 18 27 28 20 19 20 22 17
27 31 28 17 12 14 21 14 19 19 29 42 36 33 37 29 27 25 28 36 33 36 31 24 29
22 45

TUD 588
(90 years)

13 17 31 29 26 32 18 16 25 23 26 17 11 22 33 39 23 19 19 41 39 21 30 34 30
17 25 17 25 24 22 14 20 18 17 22 28 24 29 19 28 27 13 27 31 19 19 14 11 22
29 27 16 28 26 18 16 12 15 16 17 17 18 16 12 23 17 18 20 15 9 23 16 15 23
14 20 7 16 16 19 13 11 15 20 16 21 15 18 16

TUD 828
(128 years)

7 10 8 6 6 6 4 3 2 4 4 6 5 6 9 8 5 6 9 6 7 6 4 5 5
5 7 5 8 6 6 5 7 5 7 5 5 9 8 5 7 5 8 5 11 8 7 6 7 8
5 7 5 4 6 3 4 6 4 4 6 4 7 5 3 5 4 7 6 6 5 6 4 4 3
5 3 4 4 3 4 3 4 3 5 3 5 3 4 7 5 9 7 9 9 7 6 4 8 5
4 4 6 4 6 6 4 4 6 5 4 6 4 5 5 6 4 4 4 3 4 4 5 5 7
8 6 6

Table 4