WATLING COURT (WAT'78)

                    Five oak timbers were examined dendrochronologically

at Sheffield. All were squared piles which had been driven

through the backfill of pit |2314|. They had been dated

archaeologically to the late 1st century AD. In the

dendrochronology laboratory, sections from the five piles were

cleaned and their annual rings measured. (A fuller description

of the methods and techniques employed in the Sheffield laboratory

can be found elsewhere; for example; Hillam,1979; Morgan,

forthcoming.) The samples contained between 70 and 180 rings

(Table 1). The ring widths were plotted as tree-ring graphs to

illustrate visually the year-to-year variation in width. The

graphs, or tree-ring curves, were compared one against the

other in order to find similarities in the ring patterns. All

but 2427 crossmatched (Figure 1) so that it was possible to

produce a site master curve of 167 years (Table 2). The sapwood

had been removed from most of the timbers when the wood was hewn

into squared piles. However, the presence of seven sapwood rings

on 2415 meant that the felling date of the Watling Court timbers

could be estimated quite accurately. Assuming the number of

sapwood rings in oak to be 32 ± 9 (for further discussion, see

Hillam, 1979), the felling date is 192 ± 9 years on the arbitrary

scale (Figure 1). This was derived by adding 32 ± 9 onto the date

of the heartwood-sapwood transition from 2415.

                    In order to obtain absolute dates for the Watling

Court sequence, the site master would have to be synchronised

with a dated chronology. In England, no absolutely-dated

curves extend back before AD 416 (Hillam, in prep.). Attempts

are being made to crossmatch floating Roman chronologies

with dated sequences from Ireland and Germany, but no reliable
dating has yet been found. Relative dating was possible and the
Watling Court curve was compared with other tree-ring sequences
from Roman London. The master matched well with these (Figure 2);
in particular, it showed a high degree of similarity with the
chronology from the Thames Street Tunnel site (Figure 3). A
computer comparison between Watling Court and Thames Street
Tunnel gave a t-value of 10.56; statistically, this is very
highly significant. The Watling Court master also crossdated
with the Milk Street curve ($t = 4.02$) and with Morgan's
sequence from New Fresh Wharf/Seal House ($t = 5.48$). These
results firmly dated the Watling Street curve in relation to
other Roman timbers from London.

Historical and archaeological evidence suggests
that the felling date for the Watling Court timbers is $\underline{c}$ AD
100. This can be   used to provide dates for other Roman sites
in London until the tree-ring sequences can be   absolutely-
dated by dendrochronology (Figure 2).

Sample 2427 did not crossmatch with the Watling
Court master curve or with any other Roman sequence. Its ring
widths are set out in Table 3, along with the ring width data
for the individual curves which make up the Watling Court
chronology.

References:

Hillam J. 1979, Tree-rings and archaeology: some problems
     explained. J. Archaeol. Science 6, 271-8.
-------- , 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., <u>Excavations at Seal House, City of London, 1974-6</u>. LAMAS special paper (forthcoming).

Jennifer Hillam, July 1980.

Legends to tables and figures

Table 1:   Details of the Watling Court timbers; the sketches

of the cross-sections are not to scale.

Table 2:   The 67-year Watling Court master curve; n represents

the number of samples per decade.

Table 3:   Ring width data of the individual Watling Court

tree-ring curves; the widths are in 0.1mm.

Figure 1:   Bar diagram showing the relative positions of the

matching Watling Court tree-ring curves. The blocks

represent the time spanned by the rings of the

individual curves.

Figure 2:   Relationship between the Roman tree-ring chronologies

from sites in London. The time spanned by each

sequence is represented by a block. Estimated felling

dates are indicated by arrows. The time scale is in

approximate calender years, based on the assumption

that the Watling Court timbers were felled in c AD

100.

Figure 3:   Comparison of a section of the Watling Court curve

with the corresponding section of the Thames Street

Tunnel sequence. The agreement between them gave a
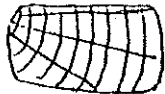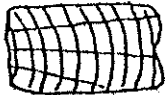
t-value of 10.56.

sample no.	no. of rings	sapwood rings	average width (mm)	sketch	dimensions (cm)
2413	70	–	3.03		19 x 12-13
2415	143	7	1.19		18 x 13
2417	116	–	1.72		20 x 18-19
2427	180	–	0.94		18 x 13
2431	121	–	1.55		18 x 14

Table 1

years	\multicolumn{10}{c}{ring widths in 0.1mm}	n
	0	1	2	3	4	5	6	7	8	9	n
0		15.0	14.0	21.0	19.0	25.0	19.0	22.0	15.0	11.0	1
10	15.0	17.0	13.0	15.0	11.0	10.0	15.0	16.0	20.0	12.0	1
20	11.0	13.0	11.0	20.0	10.0	14.5	13.0	11.5	16.0	16.0	2
30	20.5	16.0	19.0	15.0	14.5	17.5	11.5	17.5	20.5	21.7	2
40	18.0	19.3	12.7	15.0	14.7	17.3	17.0	13.3	12.0	19.3	3
50	13.0	12.7	12.7	14.7	14.3	18.3	14.7	10.7	16.7	16.3	3
60	18.3	20.7	20.0	11.7	15.7	14.0	18.0	17.7	15.0	18.3	3
70	14.0	18.3	16.0	19.0	13.3	14.7	12.3	15.0	12.0	8.7	3
80	11.7	15.0	15.0	12.3	17.3	20.0	18.0	15.0	12.3	16.3	3
90	15.0	13.3	17.0	21.3	18.5	15.8	22.8	23.3	15.8	17.5	4
100	11.3	15.0	20.3	14.5	19.8	23.3	19.3	19.0	18.0	15.8	4
110	15.8	19.8	22.3	22.0	15.3	17.3	19.5	18.3	15.3	19.7	4
120	15.3	17.7	13.3	14.7	12.7	21.3	17.0	18.3	20.3	22.7	3
130	30.0	31.0	28.0	26.3	29.7	15.7	23.3	28.7	23.0	21.0	3
140	12.7	12.0	14.7	15.0	17.3	17.0	11.3	13.7	21.6	21.6	3
150	16.3	22.3	28.7	21.0	22.0	15.0	10.5	12.0	16.0	12.0	3
160	9.0	10.0	12.0	10.0	15.0	10.0	9.0	6.0			1

Table 2

WAT 2413
70 years
```
32 20 16 20 18 24 27 33 23 21 32 34 19 24 17 26 31 22 33 41 28 24 22 19 23
32 41 37 22 23 25 20 18 29 19 24 16 25 22 33 23 31 37 50 62 53 36 30 41 19
45 54 43 30 19 17 25 28 30 32 21 24 43 42 35 48 64 47 41 26
```

WAT 2415
143 years
```
15 12 13 17 15 23 19 22 17 17 23 13 21 27 35 26 23 18 23 16 23 16 13 11 15
11 11  9  9  8  6  8  6 11  9 11  9  9  9 11  9 10 13  8 13 11 14 11 11 11
12 11 15 14  9 12 15 12 13 15 17 15 10 10 12  9  7  9 15 18 14 18 15 13 12
 8 11 17 14 10 11 13 11 10  8  9 10 13 14  9  9  9  9  7  9 11 13  9  8  6
 8  5  8 10  7  9 10 12 10  9  6  8 12 10 13  8  8 10  7 10  8  5  8 11 12
 7 10  8  6  8  7  8 11 17 14  9 10 12 10 15 10  9  6
```

WAT 2417
116 years
```
15 14 21 19 25 19 22 15 11 15 17 13 15 11 10 15 16 20 12 11 13 11 20 10 14
14 10 15 17 18 13 16 13 12 12 10 14 14 16 10 16 10 12 10  9 14 11 11 16 12
12 16 20 18 27 21 14 20 27 24 29 22 14 21 17 22 17 16 19 16 15 18 21 13 20
17 21 14 10 13 18 20 14 23 25 21 17 13 17 22 13 22 25 22 18 26 26 19 24 15
17 24 15 26 25 16 23 24 18 17 23 25 20 16 18 21
```

WAT 2427
180 years
```
13 10  8  8 12 14 15 12 11  8  8  8  6  8 11 11  9  8 10 10 12 10 13 16 11
 7  8  8  6 11  5  9 12  9 12  8  9 10 12 15 12 10 13 14 13 11  9 11  9 11
18 13 16 22 17 13 10  8  9 11 13 15 14 13 10 11 12 12 14 18 13 11 14 15 11
14 15 12 10 10 14 11 10  6  8  5  7  8  9 12 11 10  9  8 11  8 11  8  9 11
 8  7  9  8  8  6  5  8  4  8  7  5  6  5  5  5  6  6  4  7  6  4  7  7
 9  8  7  8  7  6  5  6  7  9  7  5  8  6 10  9  7 10  8  9  7  8 11 13  8
10  7 12  9  8  5  9 11  8  4  8 13 13 13 10 11  8  9  7  4  5  7  7  7  9
 7  6  6  8  7
```

WAT 2431
121 years
```
14 18 19 10 10 18 20 21 16 14 27 16 15 13 15 17 22 15 12 19 13 20 24 29 12
15 16 22 23 21 23 15 26 19 25 16 12  9  9  8  7 10 12 13 10 14 18 15 13 10
16 11  9 10 12 11 10 15 18 12 10  5  6  9  7 10 16 20 18 16 18 14 14 10 17
14 19 23 26 21 21 16 16 15 11 10 23 23 16 14 11 19 30 36 39 39 22 17 20 16
20 11 11  9 10 12 11  8  9 11 11  7  9 14 10 15 12 13 13 15 10
```
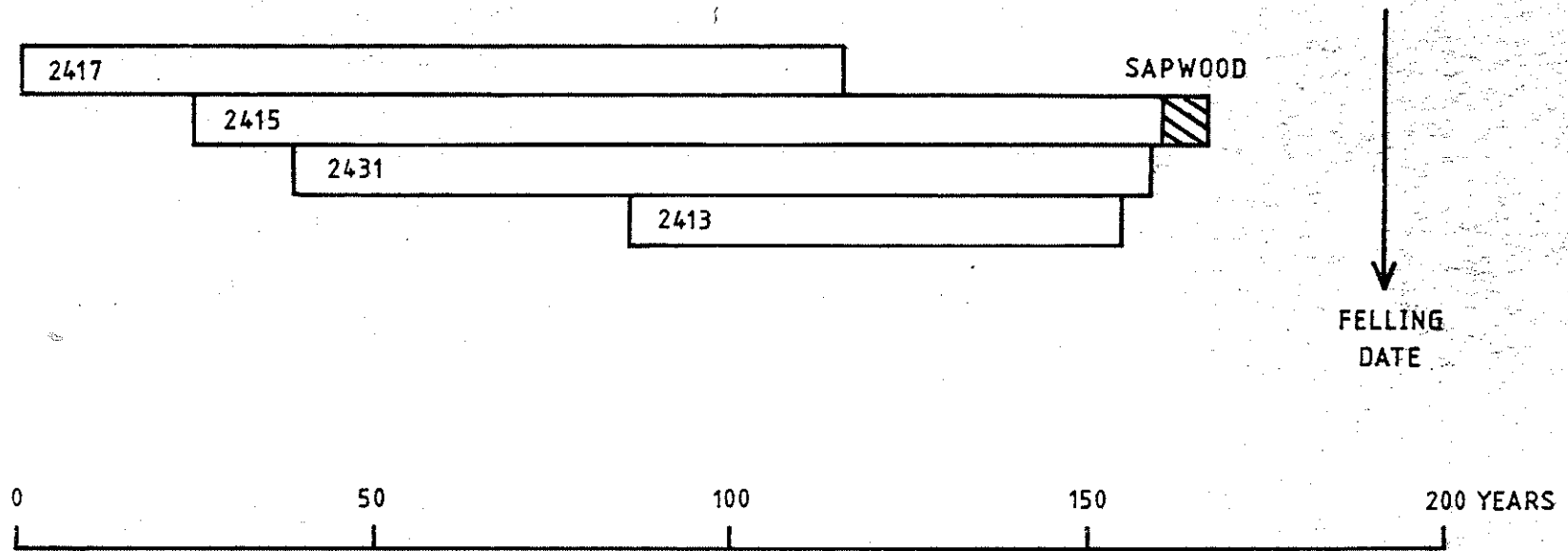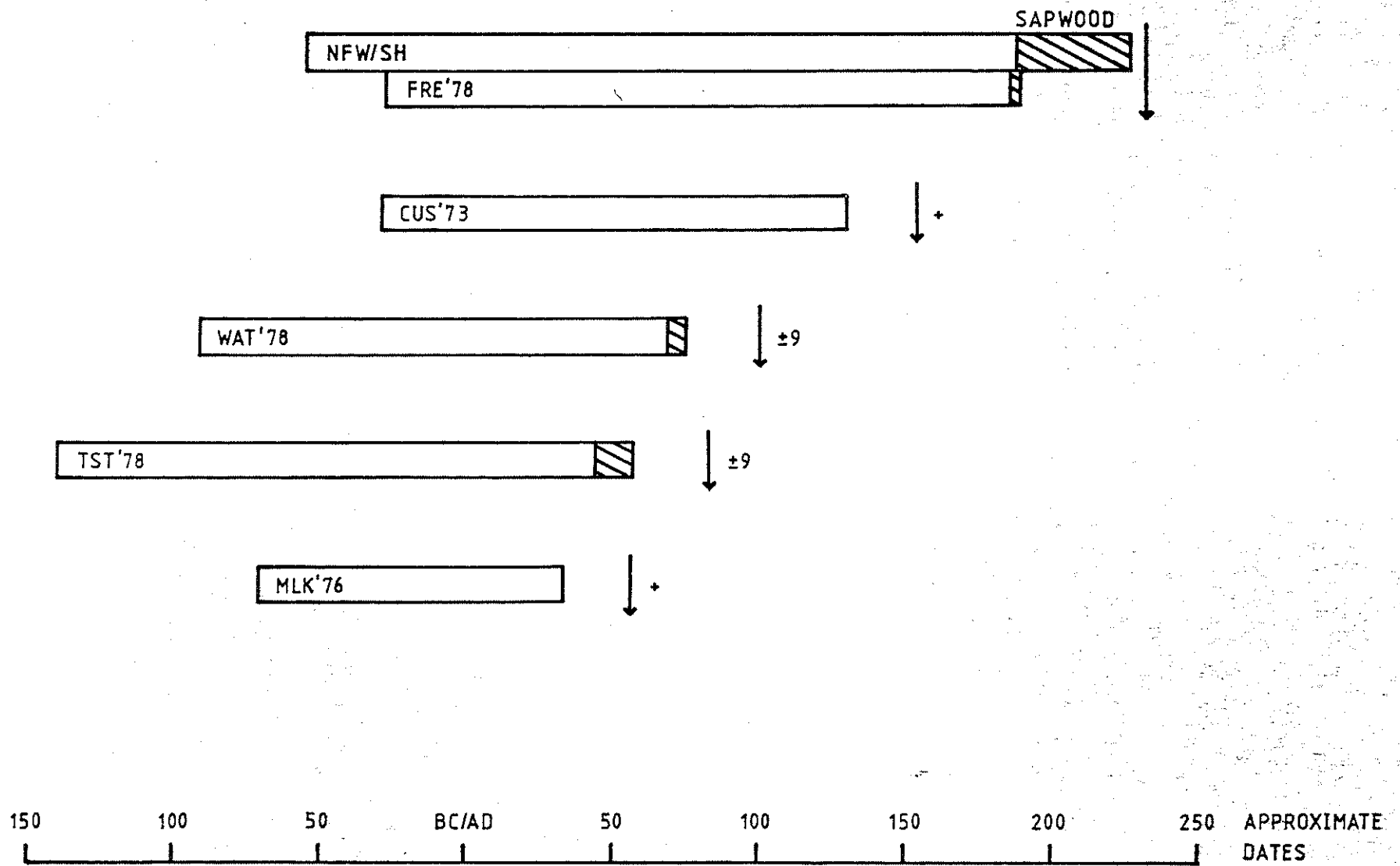
Table 3

2417

2415

SAPWOOD

2431

2413

FELLING
DATE

0   50   100   150   200 YEARS

FIGURE 1

FIGURE 2

13 - FIG.3