

for this variation is discussed below. It is illustrated in Figure 2 where the crosses suggest the earliest possible felling dates for all the samples.

#### C14 dating of the riverside wall

At present, there are no absolutely dated tree-ring chronologies in the British Isles extending back beyond *c* AD 800 by which to date floating chronologies. A German curve does go back to 717 BC but this has not yet been fully published<sup>7</sup>. When the Blackfriars material was examined, the probability of dating the relatively short curves by dendrochronology was felt to be low. Thus samples were submitted to the Harwell laboratory for C14 measurements. The position of the samples at known time intervals and their results are depicted in Figure 2; they indicate that the piles were felled around 330-350 (uncalibrated radiocarbon years).

The subsequent analysis of the timbers from New Fresh Wharf and the Tower showed that the construction date might in fact be slightly later. The youngest timber is NFW 375; the tree from which it originated must still have been growing until at least year 144 on the arbitrary scale (Figure 2). This is about 20 years later than the felling date suggested by the Blackfriars samples and makes the construction date of the wall *c* AD 350 - 370. Calibration would bring this value nearer to AD 400 but, since radiocarbon dates have inherent statistical errors (the standard error is  $\pm 70$  for Blackfriars), the date would not be inconsistent with the well documented Theodosian Reconstruction which followed the *barbarica conspiratio* of AD 367<sup>8</sup>.

The alternative theory is that the wall was not completed at the same time, with that at Blackfriars being constructed before the New Fresh Wharf and Tower sections. This could be postulated from the block diagram in Figure 2. However, in view of the variations between the outer years at all three sites, it is thought to be unlikely. Archaeologically, the theory does not have any support: at Blackfriars, there is much evidence of re-use of large slabs of sculptured stone for the wall's construction as though there was pressure to

finish this stretch of wall as soon as possible. This did not occur at the other two sites. Furthermore, since the raids were coming up the Thames, it would be more logical for construction to start at the Tower end of the wall<sup>9</sup>.

It was estimated that 750 piles were required for the foundations of the *c* 40m section of wall at Blackfriars<sup>10</sup>. The construction of the one mile length from Blackfriars to the Tower (Figure 1) then would involve a vast number of piles. The substrate is such that the oak piles would be needed over most of this stretch so that many thousands of timber posts would have had to be found. This would suggest exploitation of the surrounding woodland on a huge scale. To compensate, it is possible that the timber was felled and accumulated for use over a period of perhaps 20 years i.e. the Romans were either stockpiling or reusing the timber themselves or they acquired a large supply of stockpiled wood. This is the only explanation which accounts for the widely fluctuating outer years, although it is not in accord with what has up till now been regarded as the usual Roman practice of using freshly felled timber<sup>11</sup>.

#### The timber

Table 1 summarises the information from the timber at the three sites. The average ring widths are almost the same and indicate that the trees put on a *c* 2mm (1/12in) annual increment of new wood. The implication is that the trees came from similar types of woodland, if not from the same one. It is not possible to judge from the short ring patterns whether or not the trees used at each site came from the same source, but the good agreement between Blackfriars and all the New Fresh Wharf samples suggests that they at least were brought from the same woodland. The annual rings are of average width indicating that the trees must have been subject to some competition from other trees, but that they were not densely crowded. The woodland must have been fairly typical of the Roman period since most wood samples from that time exhibit similar average ring widths<sup>12</sup>.

7 E. Hollstein, "Jahrringchronologische Datierung von Eichenhölzern ohne Waldkante," *Bonner Jahrbuch* 165, (1965) 12-27.

8 *Op. cit.* fn 1.

9 G. Parnell, *pers. comm.*

10 *Op. cit.* fn. 1.

11 e.g. *op. cit.* fn. 7; 13.

12 J. Hillam, unpublished.

## Local Societies - amendments

THE EIGHTH LIST of amendments to the list of local societies published in Vol. 2, No. 9, is as follows:

**Greater London Industrial Archaeological Society.** Membership Secretary: Mrs Lyn Holliday, 17 Dudley Road, Walton-on-Thames, Surrey, KT12 2JT.

**City of London Archaeological Society:** Sec. Mrs. C. Thomas, 113a North View Road, London, N8.

**Orpington & District Archaeological Society:** Sec. B. J. Bull, 36 Walden Road, Chislehurst, Kent.