Cecelia Street, Ipswich (IAS 5001) - Tree-ring analysis

by Jennifer Hillam, August 1979.

Small sections of oak timbers from a post-and-plank structure were sent to the DoE dendrochronology laboratory at Sheffield for tree-ring analysis. The timbers had been used to revet an inlet by the Greyfriars order sometime during the medieval period. The object of the examination was to date the wooden structure by firstly crossmatching the ring patterns from individual timbers to produce a site mean curve and then to crossdate this curve with a tree-ring chronology of known date.

The samples were deep-frozen to give a firmer surface on which to work. The consolidated cross-sections were then cleaned with a surform plane so that each annual ring could be clearly seen. The ring widths were measured under a low-power binocular microscope using a travelling stage connected electronically to a digital panelmeter which indicated the widths in 0.1mm. The varying wide and narrow rings which made up the tree-ring sequence were represented graphically against time on transparent semi-logarithmic recorder paper.

Several samples had to be rejected because of insufficient rings: at least 50 rings are required for reliable dating. The details of all the samples are set out in Table 1; although those not rejected appeared small in cross-section, they did in fact contain numerous narrow rings. The ring patterns of up to 184 rings were very sensitive with average widths of between 0.7 and 3mm.This implies that the timber was taken from trees growing in fairly crowded conditions under a certain amount of stress. Such timbers are theoretically ideal for tree-ring dating since they are usually responding to some limiting factor.
However, when the curves were compared visually by

sliding one graph over another, only two sequences appeared to be synchronous (0082 and 0117). As a further check, all the tree-ring curves were compared together by computer using the Belfast CROS - program specially designed for tree-ring analysis (Baillie & Filcher, 1973). This confirmed that 0082 and 0117 matched but it did not identify any other positive correlations. Thus, it was not possible to produce a mean curve for lAS 5001. Instead the individual curves were compared, again by computer, with any available reference chronologies which covered all, or part of, the period AD cl000-dated 1500. These included dated tree-ring sequences from many parts of the British Isles plus some from Germany. Several tentative crossmatches were found but none were sufficiently reliable as to be acceptable.

The lack of success in dating the structure was partly due to the absence of a site mean curve since it is always more difficult to date individual ring curves than it is to date a mean curve whose ring pattern is more representative of overall climatic trends rather than local differences. Why the individual sequences are so disimilar is not known. For a wooden structure such as this, trees were usually felled as required and used almost immediately since seasoning would not be necessary. One would then expect to find close agreement between the samples; this occurred, for example, with the planks from the Chapel Lane revetment at Hull (Hillam, 1979). Little tree-ring work has been done in East Anglia so it is not yet known what problems are involved. However, many difficulties have been encountered with other lowland sites in southern and eastern Britain: at Coppergate in York, a site mean was produced only after more than 50 samples had been examined. Since these problems are less common in 'highland' regions to the north and west, it seems that tree growth in the lowland area is much more complex making it less easy to identify common growth trends. It appears that Ipswich is also conforming to this pattern;

thus at present, no dating is possible using dendrochronology, although results at a later date cannot be ruled out especially if further timbers from Ipswich are examined. No samples were submitted for radiocarbon analysis as the required amount of dating material was not available.

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

Hillam J. 1979, Tree-ring analysis of medieval revetment timbers from Hull. East Riding Archaeologist (Hull Old Town Report Series)(forthcoming).

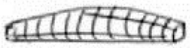
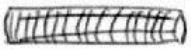
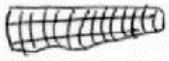
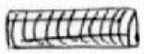
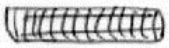
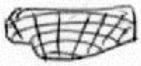
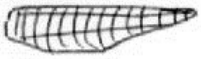
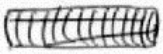
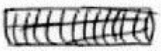
NO.	No.of rings	Sapwood	Average width(mm)	sketch	Dimensions (cm)
0060	70	-	1.50		2 x 12,5
*0081	41	-	3.17		l-2 x 13.5
0082	182	-	1.10		3 x 22
0083	70	3	0.76		1.5-3 x 7
0084	184	-	0.71		1-3 x 13.5
0093	124	-	1.10		3 x 15
0094	66	-	2.35		3.5 x 17.5
*0095	24	-	3.38		3-5 x 13
*0098	15-16	11	2.53		radius 4-5
0111	132	-	1.28		2-4 x 18
*0113	21	21	0.71- 5.48		radius 1.5-11.5
0116	c100 (very narrow at outside)	-	1.56		3 x 18.5
0117	98	-	1.79		2.5 x 19

Table 1: Details of samples from Cecelia Street (lAS 5001). Sketches indicate the way in which the timber was split but are not drawn to scale. Samples not used for tree-ring analysis are marked by asterisks.