36

522

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LAUNCESTON CASTLE: TREE-RING ANALYSIS.

Jennifer Hillam

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Summary

Tree-ring analysis of two timbers from a posthole of the Norman hall at Launceston Castle produced a terminus post quem for felling of 1025 for one of the timbers; the other had insufficient rings for reliable tree-ring dating. The study represents the first tree-ring work to be carried out on Cornish timber and the results are encouraging.

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Launceston Castle: tree-ring analysis

INTRODUCTION

Two oak timbers from the 1978 excavations at Launceston Castle in Cornwall were examined at the Sheffield Dendrochronology Laboratory in 1986. Both timbers were from a posthole belonging to the Norman hall, thought to date to circa 1068. The analysis was undertaken in an attempt to provide tree-ring dates for the timbers.

THE TIMBERS

They were examined following the method given by Hillam (1985). The first sample (24.01/2224) was very small and proved to contain only 42 annual growth rings (Table 1). Single ring sequences of less than 50 rings are unlikely to provide absolute tree-ring dates, but the rings of 2224 were measured so that the ring pattern could be compared with that from the larger timber (24/2207). This timber had over 207 rings, the inner rings being too narrow to measure accurately. It must have been cut from a tree of diameter greater than 1m, and aged well over 300 years, since it represents only a portion of the original tree trunk (Table 1). 2224 comes from a much smaller tree, but size and age are impossible to estimate because of the smallness of the sample.

Neither of the timbers retained any sapwood. This is the outer part of a tree, which in oak is relatively easy to identify and is important in the estimation of felling dates. In the absence of sapwood, the minimum number of missing sapwood rings (10 years) is added to the date of the last measured heartwood ring to give a terminus post quem for felling (Hillam et al 1986).

Two radii were measured along 2207 and the resulting ring width values averaged to produce a single tree-ring curve. Normally only one radius is measured on oak samples, but an exception was made in this case since it is a single timber from an area where little tree-ring research has been carried out. By taking an average of two radii, it was hoped to accentuate the climatic signal at the expense of local growth conditions.

DATING

There was no similarity between the ring patterns of the two timbers, but this may be because of the shortness of the 2224 ring pattern rather than lack of contemporaneity between the two timbers. No further work was carried out on 2224 but the 2207 ring sequence was tested against dated chronologies from Bristol, Exeter, London and Dublin. From the results of tree-ring work on timbers from Exeter (eg Hillam 1980), these chronologies seemed most likely to match the Launceston sequence.

Consistently high values of correlation, given as Student's t-values, were obtained for 2207 when its ring sequence spanned the years AD 819-1025 (Table 2), although the result for Dublin was not as high as the other chronologies. Generally, t-values greater or equal to 3.5 indicate the crossmatching of ring sequences if the visual matching is accetable. This proved the case with 2207: the graph of its ring pattern was very similar to the dated curves from Bristol, Exeter and London over the period 819-1025.

The Dublin chronology, which had matched extremely well with sequences from Trichay Street, Exeter (Hillam 1980), matched less well but adequately with Launceston.

There can be no doubt about the dating of the ring sequence to 819-1025, and therefore the timber must have been felled some time after 1035. This is not inconsistent with the construction date of circa 1068 for the Norman hall.

CONCLUSION

Timber 2224 is undatable because of insufficient rings, but the 2207 ring sequence (Table 3) dates to 819-1025, and has a date of felling some time after 1035. Although it was not possible to provide a more precise felling date because of lack of sapwood rings, the result is encouraging from a dendrochronological point of view because it suggests that timbers from Cornwall can be dated relatively easily.

ACKNOWLEDGEMENTS

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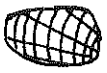
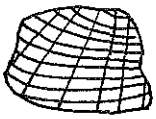
sample no	AML no	no of rings	average ring width(mm)	sketch	maximum dimensions (mm)
24.01/2224	7821905	42	0.97		50 x 40
24/2207	7821906	+207	1.35		360 x 290

Table 1: Details of the tree-ring samples. Sketches are not to scale; "+" indicates the presence of unmeasured rings. Neither sample had sapwood.

chronology	t-value
Bristol, Dundas Wharf (Nicholson 1985)	4.7
Dublin (Baillie 1977)	3.4
Exeter, Goldsmith Street (Morgan 1984)	4.9
Exeter, Trichay Street (Hillam 1980)	5.5
London, City (Hillam unpubl)	5.4

Table 2: Dating 2207. Results of comparisons with dated tree-ring chronologies for the period 819-1025.

LAUNCESTON
LAUNCESTON 2207
207

1	- 41	25	24	41	65	49	47	90	64	50
11	- 67	52	33	43	66	68	77	48	94	55
21	- 41	59	40	42	42	62	91	53	90	67
31	- 137	199	113	126	103	37	35	74	124	108
41	- 103	136	107	102	92	114	141	104	153	125
51	- 130	89	105	70	65	83	70	75	41	52
61	- 83	101	87	70	105	86	66	87	78	78
71	- 77	96	75	66	53	84	78	72	59	49
81	- 74	71	44	69	58	52	92	62	84	74
91	- 73	60	55	79	66	48	47	53	102	98
101	- 95	90	77	101	83	43	67	55	70	85
111	- 81	73	58	42	35	55	55	86	121	86
121	- 61	51	45	39	39	56	70	60	69	65
131	- 55	74	56	75	63	54	28	27	54	63
141	- 64	64	78	96	91	67	37	73	62	51
151	- 63	85	71	72	56	33	61	48	87	72
161	- 87	85	45	54	60	44	69	50	35	29
171	- 72	31	39	41	47	48	58	60	62	51
181	- 55	43	37	40	34	40	34	50	44	52
191	- 55	65	69	66	54	48	65	51	39	52
201	- 30	20	33	51	79	80	130			

MEAN OF TWO RADII - DATES TO AD 819-1025

TABLE 3: RING WIDTH DATA FOR 2207 IN UNITS OF 0.02MM