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Reculver Towers
Reculver Lane
Reculver
Kent

Tree-ring Analysis of an Oak Lintel

Martin Bridge

Discovery, Innovation and Science in the Historic Environment

Research Report Series no. 7/2022

Front Cover: Reculver Towers in Kent (cropped) © Historic England Archive DP114289

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SUMMARY
An oak lintel in the masonry wall of the towers was sampled producing a 78-ring core, plus some unmeasured additional rings, which failed to date. The crisp appearance of the beam, however, along with metal (stainless steel?) bars embedded in the masonry above the lintel indicated that the timber was probably of twentieth-century origin.

CONTRIBUTORS
Martin Bridge

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ARCHIVE LOCATION
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The Engine House
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INTRODUCTION

The Reculver Towers are the twin towers of a now lost medieval church that sit on a promontory dominating the skyline of Herne Bay (Fig 1), and act as a navigation marker for ships off the north Kent coast. They were built in the twelfth century, and are a Scheduled Monument (List Entry Number: 1018784 here). During a programme of repairs and stabilisation an oak lintel (Fig 2) of uncertain historical origin was identified in a blocked archway, which raised questions over the lintel's date, its structural condition and whether it should be retained *in situ* or needed to be replaced. A dendrochronological investigation was therefore requested by the English Heritage Senior Properties Curator Roy Porter, and the Historic England Senior Structural Engineer, Stephen Parris in order to address these issues.

METHODOLOGY

An assessment of the timber for dendrochronological study was undertaken in August 2021 to determine if the oak (*Quercus* spp) lintel had more than 50 rings and any traces of sapwood. After assessment, and discussion with the structural engineer, it was decided to core using a 16mm auger attached to a battery-operated electric drill. The core was labelled and returned to the laboratory for subsequent analysis.

The core was polished on a belt sander using 80 to 400 grit abrasive paper to allow the ring boundaries to be clearly distinguished. The tree-ring sequence was then measured to an accuracy of 0.01mm, using a specially constructed system utilising a binocular microscope with the sample mounted on a travelling stage with a linear transducer linked to a PC, which recorded the ring widths into a dataset. The software used in measuring and subsequent analysis was written by Ian Tyers (2004). Cross-matching was attempted by a process of qualified statistical comparison by computer, supported by visual checks. The ring-width series was compared for statistical cross-matching, using a variant of the Belfast CROS program (Baillie and Pilcher 1973). Ring sequences were plotted on the computer monitor to allow visual comparisons to be made between sequences. This method provides a measure of quality control in identifying any potential errors in the measurements when the samples cross-match.

In comparing one sample or site master against other samples or chronologies, *t*-values over 3.5 are considered significant, although in reality it is common to find demonstrably spurious *t*-values of 4 and 5 because more than one matching position is indicated. For this reason, dendrochronologists prefer to see some *t*-value ranges of 5, 6, and higher, and for these to be well replicated from different, independent chronologies with both local and regional chronologies well represented, except where imported timbers are identified.

Ascribing felling dates and date ranges

Once a tree-ring sequence has been firmly dated in time, a felling date, or date range, is ascribed where possible. With samples which have sapwood complete to

the underside of, or including bark, this process is relatively straightforward. Depending on the completeness of the final ring (ie if it has only the spring vessels or early wood formed, or the latewood or summer growth) a precise felling date and season can be given. If the sapwood is partially missing, or if only a heartwood/sapwood transition boundary survives, then an estimated felling date range can be given for each sample. The number of sapwood rings can be estimated by using an empirically derived sapwood estimate with a given confidence limit. If no sapwood or heartwood/sapwood boundary survives then the minimum number of sapwood rings from the appropriate sapwood estimate is added to the last measured ring to give a *terminus post quem* (*tpq*) or felled-after date.

A review of the geographical distribution of dated sapwood data from historic timbers has shown that a sapwood estimate relevant to the region of origin should be used in interpretation, which in this area is 9–41 rings (Miles 1997). It must be emphasised that dendrochronology can only date when a tree has been felled, not when the timber was used to construct the structure or object under study.

RESULTS AND DISCUSSION

The lintel measured approximately 3m in length by 135mm high. During coring the outer rings, approximately 25mm, got detached and, due to the irregular break, these were not measured. The main part of the core (Fig 3) had 78 rings, with a mean ring width of under 1mm. The ring-width series (see Appendix) was compared with a wide range of historical and modern chronologies from the British Isles and elsewhere in Europe but no consistent matching was found, leaving the series undated.

A number of observations were made, however, which indicate a late date for the timber. The first of which is its rather un-weathered appearance, which, given its exposed position on a west-facing wall beside the sea where it would have experienced repeated wet-dry cycles and temperature fluctuations, suggests a relatively recent date. In addition, it should be noted that medieval craftsmen understood basic timber technology and often used faster-grown timber (which this was not), which in oak is structurally stronger, in positions of load-bearing. Finally, perhaps the most compelling evidence is the presence of a number of metal bars, thought to be stainless steel, which were seen inset in the masonry supported by this lintel. These factors all lead to the conclusion that it is likely that the timber is of twentieth-century origin.

REFERENCES

Baillie, M G L, and Pilcher, J R, 1973 A simple cross-dating program for tree-ring research, *Tree Ring Bulletin*, **33**, 7–14

Miles, D H, 1997 The interpretation, presentation, and use of tree-ring dates, *Vernacular Architect*, **28**, 40–56

Tyers, I, 2004 *Dendro for Windows Program Guide* ,3rd edn, ARCUS Report, **500b**

TABLE

Table 1. Details:of tree-ring sample taken from Reculver Towers, Kent

Sample No	Location	No rings	Sapwood	Mean ring width (mm)	Mean sensitivity
reculver	Lintel in blocked entranceway to west gable	78	-	0.996	0.19

FIGURES

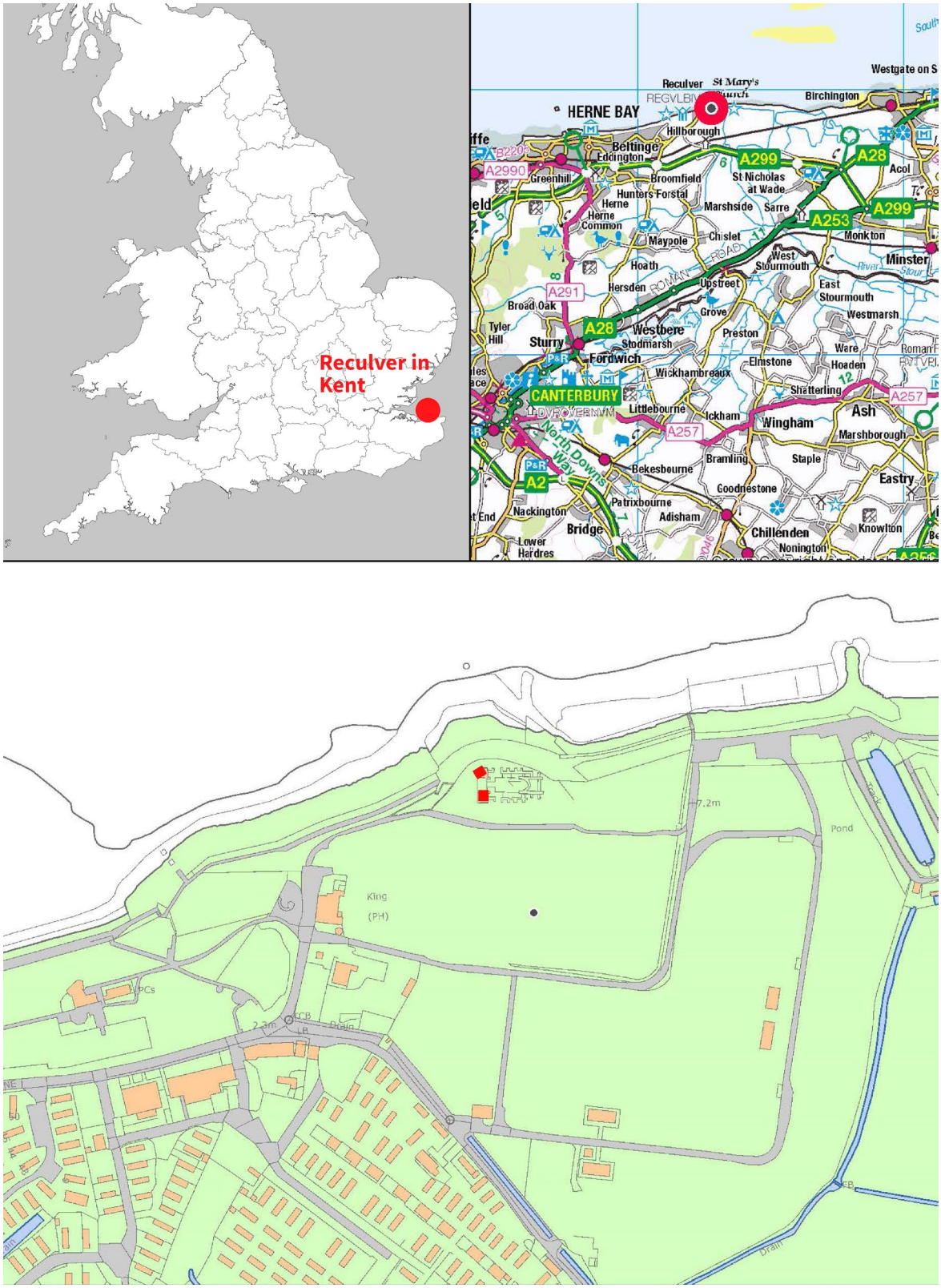

Figure 1: Maps to show the location of Reculver Towers in Kent marked in red. Scale: top right 1:250,000, bottom 1:200 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100024900

Figure 2: View along the lintel (photograph Martin Bridge)

Figure 3: Scan of the core, showing the narrow rings, and the detached outer section (not measured)(scan Martin Bridge)

APPENDIX

Ring width values (0.01mm) for the measured sequence

73	89	136	128	145	120	125	96	77	107
97	108	101	92	134	101	81	98	86	150
135	137	115	135	92	94	122	94	84	79
61	68	75	106	89	123	127	87	80	91
65	82	88	127	112	78	88	101	130	94
123	166	160	112	112	86	72	51	81	118
116	106	79	62	64	70	102	86	95	90
62	87	87	95	99	89	112	83		

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