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Tree-Ring Analysis of Timbers from Six Buildings in Winchelsea, East Sussex

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Summary

As part of a major programme of multidisciplinary studies of the town nearing their end, six timber-framed buildings were chosen for dendrochronological study. Each had been identified on stylistic grounds as containing a phase of construction from the late-fifteenth or early-sixteenth centuries. As urban structures often do not conform to basic forms and styles used elsewhere, independent precise dating evidence for these structures was sought.

Many of the timbers encountered were from relatively fast-grown oak trees yielding unsuitable short sequences. One property, Old Castle House, was not sampled as insufficient timbers with enough rings were identified. Wren Cottage yielded short sequences which could not be dated, and the Court Hall contained slightly longer sequences which also remain undated. Periteau House yielded yet longer sequences, mostly around 80+ years, but these too could not be consistently crossmatched against dated reference material. The main structure of 2-3 Friars Road was found to have been constructed from timbers most likely felled in the period AD 1482-99. The structure of 11-12 High Street was made from timbers most likely felled in the period AD 1477 – 1501. The two dated site chronologies did not match each other, and both gave strongest matches against material from the Hereford and Worcester area, suggesting that the timbers may have been imported from this region

Keywords

Dendrochronology Standing Building

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Introduction

A multidisciplinary study of Winchelsea (Fig 1), its development, and particularly its buildings, is currently nearing the end of a major phase of study and is close to publication. One important aspect of this study is the identification of a phase of building in the town towards the end of the fifteenth or early part of the sixteenth centuries. This phase has been identified by stylistic- dating within several buildings, although the plan forms and features of urban timber-framed buildings often show anomalies, making precise dating problematic. To understand the developmental history of the town in more detail, more precise dates for these structures are desirable.

Six buildings (Fig 2) with interesting features from this period were selected by David Martin (Archaeology South-East) for possible dendrochronological investigation, and the work was commissioned by English Heritage. Each is dealt with in a separate section below, following a general methodology, applicable to each site. The sampling and results are discussed for each building in turn. A brief overall discussion of the results is then presented.

Methodology

The sites were visited in September and October AD 2003. Oak timbers with more than 50 rings, traces of sapwood, and accessibility were the main considerations in the initial assessment. Those timbers judged to be potentially useful were cored using a 15mm auger attached to an electric drill. The cores were glued to wooden laths, labelled, and stored for subsequent analysis.

The cores were prepared for measuring by sanding using an electric belt-sander with progressively finer grit papers down to 400 grit. Any further preparation necessary, eg where bands of narrow rings occurred, was done manually. Suitable samples had their tree-ring sequences measured to an accuracy of 0.01 mm 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. This sometimes includes samples with less than 50, but more than 40 rings, which may crossmatch with other, longer series from the same site. The software used in measuring and subsequent analysis was written by Ian Tyers (1999).

Ring sequences were plotted to allow visual comparisons to be made between sequences on a light table. This activity also acts as a measure of quality control in identifying any errors in the measurements when the samples crossmatch. Statistical comparisons were made using Student's *t*-test (Baillie and Pilcher 1973; Munro 1984). The *t*-values quoted below were derived from the original CROS program (Baillie and Pilcher 1973). Those *t*-values in excess of 3.5 are taken to be indicative of acceptable matching positions provided that they are supported by satisfactory visual matches, and give consistent matching positions.

When crossmatching between samples is found, their ring-width sequences are meaned to form an internal 'working' site mean sequence. Other samples may then be incorporated after comparison with this 'working' master until a final site sequence is established, which is then compared with a number of reference chronologies (multi-site chronologies from a region) and dated individual site masters in an attempt to date



Figure 1: Map showing the general area of Winchelsea



- 1 2/3 Friars Road
- 2 Periteau House
- 3 Wren Cottage
- 4 11/12 High Street
- 5 Old Castle House
- 6 Court Hall

Figure 2: Map of Winchelsea, showing the locations of the six buildings investigated in this study

© Crown Copyright and database right 2013. All rights reserved. Ordnance Survey Licence number 100024900 it. Individual long series which are not included in the site mean(s) are also compared with the database to see if they can be dated.

The dates thus obtained represent the time of formation of the rings available on each sample. Interpretation of these dates then has to be undertaken to relate these findings to the construction date of the phase under investigation. An important aspect of this interpretation is the estimate of the number of sapwood rings missing. In this instance, the sapwood estimates are based on those proposed for this area by Miles (1997), in which 95% of samples are likely to have from 9 to 41 sapwood rings. Where bark is present on the sample the exact date of felling of the tree used may be determined.

The dates derived for the felling of the trees used in construction do not necessarily relate directly to the date of construction of the building. However, evidence suggests that, except in the re-use of timbers, construction in most historical periods took place within a very few years after felling (Salzman 1952; Hollstein 1965).

2-3 Friars Road, Winchelsea

Built as separate dwellings, 2-3 Friars Road (NGR TQ 9050 1725: Fig 2) is now used as a single house, and indeed has very recently incorporated 1 Friars Road as well. The main area of interest for dating was the structure of number 2, which supports a medieval crownpost roof. The building is described by Martin (2000a) and it is thought that the building may have originally extended either to the north or to the south, although he notes that urban dwellings often adopt atypical plan forms. The surviving section, which is continuously jettied to the front (east side), was two rooms deep at ground floor level, despite the roof being parallel to the road. Martin considers this primary structure to be dated to about AD 1500 on stylistic evidence. Sampling was carried out after on-site discussion with David Martin as to which timbers might yield the most useful information, and which had sufficient rings. These mainly included the floor joists and major framing timbers, most of the roof timbers being later replacements.

Results

All the timbers sampled were of oak (*Quercus* spp.). Sample locations are described in Table WFR1 and illustrated in Figures WFR 1 and 2.



Figure WFR1: Longitudinal section of 2-3 Friars Road, Winchelsea, showing the locations of some of the timbers sampled for dendrochronology, adapted from a drawing supplied by David Martin



TRUSS B-B

Figure WFR2: Drawing of truss B-B, 2-3 Friars Road, Winchelsea, showing the locations of samples taken for dendrochronology, adapted from a drawing supplied by David Martin

Crossmatching between six of the samples is shown in Table WFR2. These six timbers were combined into a single site chronology, FRIARSRD, which was dated to AD 1352-1475 by comparison with a range of regional multi-site, and individual site chronologies, the best results being shown in Table WFR3. The data for this site chronology are given in Table WFR4.

One timber (WFR07) had few rings and could not be crossmatched satisfactorily. Two other timbers (WFR 04 and 09) had sufficient rings, but did not give consistent matches, either with other timbers at this site, or with independent reference material.

| Sample number | Origin of core | Total no of years | Average growth rate (mm yr ⁻¹) | Sapwood details | Date of sequence AD | Felling date of timber AD |
|------------------|------------------------|-------------------------|---|--------------------------------------|---------------------------|------------------------------|
| WFR01 | Floor joist 3 | 65 | 1.80 | h/s (+ 7 sap) | 1396 - 1460 | 1469 – 1501 |
| WFR02 | Floor joist 4 | 96 | 1.00 | h/s | 1363 - 1458 | 1467 – 99 |
| WFR03 | Floor joist 5 | 102 | 1.20 | h/s (+ 21 sap) | 1357 - 1458 | 1479 - 99 |
| WFR04 | Floor joist 6 | 63 | 1.10 | - | undated | unknown |
| WFR05 | Floor joist 2 | 111 (+11) | 1.08 | h/s at end of additional rings | 1351 - 1461 | after 1481* |
| WFR06 | Floor joist 1 | 83 | 1.67 | h/s | 1376 - 1458 | 1467 - 99 |
| WFR07 | Rear post on truss B-B | 45 | 3.12 | h/s | undated | unknown |
| WFR08 | Tie B-B | 97 | 1.11 | 9 | 1379 - 1475 | 1475 – 1507 |
| WFR09 | Next tie to north | 57 | 1.69 | h/s? | undated | unknown |

Table WFR1: Oak (*Quercus* spp.) timbers sampled from 2-3 Friars Road, Winchelsea; h/s represents the heartwood-sapwood boundary, figures in brackets represent additional unmeasured rings

* although the h/s boundary is recognised at the end of the additional rings, since these are detached from the main core it is not possible to say whether more rings might have been lost. Adding the minimum likely number of rings of sapwood therefore gives the earliest likely felling date of AD 1481, but no range is quoted because of the uncertainty over possible missing rings

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Table WFR2: Crossmatching between the dated samples from 2-3 Friars Road, Winchelsea.

| | | | | <i>t</i> - valu | es |
|-----------|-------|-------|-------|-----------------|-------|
| Sample no | WFR02 | WFR03 | WFR05 | WFR06 | WFR08 |
| WFR01 | 4.6 | 3.0 | 2.9 | 4.1 | |
| WFR02 | | 8.8 | | 5.7 | - |
| WFR03 | | | 3.6 | 5.4 | 5.1 |
| WFR05 | | | | 3.3 | |
| WFR06 | | 1 | | | 3.9 |

A – indicates no significant match obtained (t < 3.0)

Table WFR3: Dating of the oak site chronology FRIARSRD

| | | FRIA | RSRD |
|--|--------------------------|---------|------------------|
| | | AD 13 | 51-1475 |
| Dated reference or site master chronology | Dates spanned (AD) | t value | Overlap (yrs) |
| Kent (Laxton and Litton 1989) | 1158-1540 | 6.6 | 125 |
| London (Tyers pers comm) | 413-1728 | 6.3 | 125 |
| Southern England (Bridge 1988) | 1083-1589 | 6.2 | 125 |
| Hants02 (Miles pers comm) | 443-1972 | 4.9 | 125 |
| Hightown, Hereford (Boswijk and Tyers 1997) | 1302-1489 | 6.3 | 125 |
| Cressett, Shropshire (Miles and Haddon-Reece 1994) | 1298-1498 | 6.1 | 125 |
| Wick, Worcestershire (Bridge 1983) | 1257-1496 | 5.7 | 125 |
| Cann Hall, Essex (Tyers 1998) | 1301-1511 | 5.6 | 125 |
| Windsor Castle Kitchen (Hillam and Groves 1996) | 1331-1573 | 5.6 | 125 |
| Cathedral Barn, Hereford (Tyers 1996) | 1359-1491 | 5.5 | 117 |
| Mary Rose 'original' (Bridge and Dobbs 1996) | 1334-1503 | 5.5 | 125 |
| Iviedcot, Hampshire (Miles and Worthington 2000) | 1386-1454 | 5.5 | 69 |
| Halden, Kent (Bridge 1987) | 1299-1462 | 5.4 | 112 |
| Shapwick1, Somerset (Miles and Haddon-Reece 1996) | 1268-1488 | 5.3 | 125 |
| Areley Kings, Worcestershire (Bridge unpubl) | 1365-1535 | 5.3 | 111 |
| Muchelney, Somerset (Bridge 2002a) | 1148-1498 | 5.2 | 125 |
| Heref_FC, Hereford (Tyers 1996) | 1313-1617 | 5.2 | 125 |



Figure WFR3: Bar diagram showing the relative positions of overlap of the dated timbers from 2-3 Friars Road, Winchelsea, along with their interpreted likely felling dates. Narrow bars represent additional unmeasured rings, hatching denotes sapwood

Interpretation and Discussion

The tree ring sequence from the tie beam matches the sequences from the joists well (Table WFR2), implying that it is from the same group of timbers. The post (WFR07) has different characteristics, being fast-grown, and may have been specifically chosen for its role here, which requires a strong timber. Posts found elsewhere in the other Winchelsea buildings also appear to utilise fast-grown oaks.

Sample WFR05 had the heartwood-sapwood boundary on the outer edge of the detached heartwood section of 11 rings. As it was not possible to be certain that no rings were missing between this detached section and the main core, the likely felling date has been given as after the earliest likely date, rather than quoting a likely range of dates. The heartwood-sapwood boundary date could actually be later than AD 1481, and therefore later than the boundary dates of the other timbers.

Combining the likely felling dates for all the dated timbers allows the derivation of a most likely felling period for the batch of timbers used in this construction of *c*.AD 1482-99. This is in line with the date determined on stylistic grounds, but makes it more likely that this is a late-fifteenth century building than an early-sixteenth century one.

There is perhaps a tendency for the site master chronology to match more with sites well to the west, for example in Herefordshire, Worcestershire and Somerset, rather than closer sites, although some good matches were found with sites in Hampshire, Berkshire, Essex, and Kent. The source of the timbers in the *Mary Rose* chronology (Table WFR3) is itself uncertain.

 Table WFR4: Ring width data for the dated site chronology from 2-3 Friars Road,

 Winchelsea, AD 1351 - 1475

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| | rin | g wid | lths (| 0.01 | mm) | | | | | | | n | 0 0 | oft | tre | es | | | undu |
|-----|-----|-------|--------|------|-----|-----|-----|-----|-----|---|---|---|-----|-----|-----|----|---|---|------|
| | | | | | | | | | | | | | | | | _ | _ | _ | _ |
| 251 | 190 | 203 | 176 | 107 | 84 | 134 | 112 | 131 | 131 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 134 | 133 | 151 | 173 | 122 | 136 | 106 | 84 | 125 | 120 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 87 | 102 | 97 | 90 | 109 | 138 | 133 | 176 | 162 | 160 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 |
| 150 | 150 | 124 | 112 | 137 | 149 | 168 | 169 | 117 | 123 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 102 | 123 | 122 | 80 | 76 | 146 | 152 | 181 | 151 | 141 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 |
| 160 | 132 | 158 | 145 | 143 | 154 | 143 | 183 | 135 | 126 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 129 | 112 | 108 | 92 | 75 | 68 | 85 | 94 | 81 | 121 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 129 | .91 | 114 | 105 | 103 | 95 | 93 | 99 | 110 | 138 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 132 | 200 | 135 | 130 | 186 | 117 | 133 | 113 | 107 | 127 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 135 | 136 | 120 | 92 | 87 | 87 | 119 | 122 | 133 | 126 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 127 | 114 | 116 | 129 | 137 | 137 | 129 | 133 | 119 | 162 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 3 | 3 |
| 133 | 121 | 123 | 103 | 119 | 122 | 91 | 84 | 114 | 142 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 127 | 140 | 119 | 140 | 206 | | | | | | 1 | 1 | 1 | 1 | 1 | | | | | |

Periteau House, High Street

The present building (NGR TQ 9055 1742; Fig 2) appears externally to be a two-storey eighteenth-century house, and this is how it is listed. However, Martin (1993) has identified seven phases, and shown that this was originally a three-storey house, with two tiers of jettying on both elevations facing the roads on the junction on which it sits. It is the date of this primary construction which is of interest, and stylistically this has been put as c AD 1500. The present roof appears to contain some original timbers, although these appear to be re-used in their present positions, and because of their uncertain origin, the roof was not sampled.

Results and Discussion

All the timbers sampled were of oak (*Quercus* spp.). Sample locations are described in Table PTU1 and illustrated in Figures PTU 1 and 2.



Figure PTU1: Cross-section of Periteau House, High Street, Winchelsea, showing the timbers sampled for dendrochronology, adapted from a drawing supplied by David Martin



Figure PTU2: First-floor plan of Periteau House, High Street, Winchelsea, indicating the positions of timbers sampled for dendrochronology, adapted from a drawing supplied by David Martin

PTU01 and 02 crossmatched with each other (t = 6.0) to give a 98-year long sequence, PTU12m. No others gave consistent crossmatching. Neither PTU12m, or any of the other individual sequences gave consistent matches against dated reference material, and they all therefore remain undated. The data for the mean series are given in Table PTU2.

| Sample number | Origin of core | Total no of years | Average growth rate (mm yr ⁻¹) | Sapwood details | Date of sequence AD |
|------------------|--|-------------------------|--|--------------------|---------------------------|
| PTU01 | First floor front bedroom, south door jamb | 83 | 1.42 | 1 (+11C) | undated |
| PTU02 | First floor front bedroom, north door jamb | 93 | 1.49 | - | undated |
| PTU03 | First floor front bedroom, rail above doorhead | <40 | unmeasured | - | undated |
| PTU04 | First floor bedroom, south post | 49 | 2.40 | h/s (+5) | undated |
| PTU05 | North post in stairway | 65 | 2.57 | - | undated |
| PTU06 | Tie from 05 | <40 | unmeasured | - | undated |
| PTU07 | Post in ground floor stud wall | 47 | 3.02 | - | undated |
| PTU08 | Sill to ground floor stud wall | 79 | 1.74 | - | undated |

Table PTU1: Oak (*Quercus* spp.) timbers sampled from Periteau House, High Street, Winchelsea; h/s represents the heartwood-sapwood boundary, figures in brackets represent additional unmeasured rings, and C represents complete sapwood

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| | | | | | | | | | | | _ | | | | | | | | **** |
|-----|-----|------|-------|-------|-------|-----|-----|-----|-----|------|---|---|-----|----|-----|----|---|---|------|
| | | ring | y wid | ths (| 0.01n | nm) | | | | | | n | 0 0 | of | tre | es | | | |
| | | | | | | | | | | | | | | | | | | | |
| 114 | 131 | 111 | 92 | 87 | 133 | 308 | 177 | 149 | 216 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 209 | 212 | 216 | 223 | 352 | 178 | 110 | 114 | 181 | 289 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| 249 | 329 | 348 | 263 | 207 | 236 | 162 | 203 | 167 | 265 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 263 | 231 | 191 | 162 | 153 | 137 | 131 | 138 | 173 | 270 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 326 | 330 | 232 | 195 | 152 | 137 | 132 | 145 | 122 | 208 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 191 | 186 | 163 | 138 | 161 | 169 | 120 | 110 | 121 | 86 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 98 | 97 | 83 | 74 | 79 | 73 | 91 | 80 | 80 | 100 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 79 | 130 | 102 | 85 | 110 | 115 | 93 | 93 | 111 | 89 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 87 | 51 | 73 | 80 | 63 | 79 | 70 | 66 | 55 | 46 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 51 | 58 | 61 | 55 | 67 | 49 | 39 | 55 | | | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | | |

 Table PTU2: Ring width data for the mean sequence PTU12m from Periteau House,

 High Street, Winchelsea

Wren Cottage, High Street

Wren Cottage (NGR TQ 9057 1739; Fig 2) was originally built as a two-bay structure, comprising a single room on each storey (Martin 1985). The gabled roof is of crownpost construction with the collars halved to the sides of the rafters. Stylistically, the primary construction is thought to date to the late-fifteenth or early-sixteenth centuries.

Results and Discussion

All the timbers sampled were of oak (*Quercus* spp.). Sample locations are described in Table WWR1 and illustrated in Figures WWR 1 and 2.



Figure WWR1: Sectional drawing of the roof of Wren Cottage, High Street, Winchelsea, with the adjoining properties, showing the locations of timbers sampled for dendrochronology, adapted from a drawing supplied by David Martin



Figure WWR2: Plan of Wren Cottage, High Street, Winchelsea, showing the locations of timbers sampled for dendrochronology, adapted from a drawing supplied by David Martin

Although several of the timbers in the roof looked as if they might yield suitable dendrochronological sequences, on coring they were found to contain fewer rings than had been hoped, and once the most promising timbers had been cored and found to contain insufficient rings, no further roof timbers were investigated.

The sequences were rather shorter than would normally be fully analysed, but given that other structures of similar date in the town were being analysed, it was felt that it may be worth measuring these samples to see if they gave any strong matches with local material. Two of these rather short sequences appeared to match each other (WWR 03 and 07, t = 4.6 with 45 years overlap) but this short overlap could not be

confirmed as the combined 53-year long sequence WWR37m (Table WWR2) failed to date against reference material. The structure remains undated.

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Table WWR1: Oak (*Quercus* spp.) timbers sampled from Wren Cottage, High Street, Winchelsea; h/s represents the heartwood-sapwood boundary

| Sample number | Origin of core | Total no of years | Average growth rate (mm yr ⁻¹) | Sapwood details | Date of sequence AD |
|------------------|---------------------------------|-------------------------|--|--------------------|---------------------------|
| WWR01 | Roof, east end crown post | 43 | 1.83 | h/s | undated |
| WWR02 | Roof, east tie | <40 | unmeasured | h/s | undated |
| WWR03 | Roof, central crown post | 48 | 3.29 | h/s? | undated |
| WWR04 | Roof, east collar rafter | <40 | unmeasured | h/s | undated |
| WWR05 | Roof, common rafter 10 south | <40 | unmeasured | h/s | undated |
| WWR06 | North east corner post | 45 | 3.10 | h/s | undated |
| WWR07 | South east corner post | 50 | 2.07 | - | undated |
| WWR08 | North central post | <40 | unmeasured | - | undated |

Table WWR2: Ring width data for sequence WWR37m, Wren Cottage, High Street, Winchelsea

| | ring widths (0.01mm) | | | | | | | | no of trees | | | | | | | | | | |
|-----|----------------------|-----|-----|-----|-----|-----|-----|-----|-----------------|---|---|---|---|---|---|---|---|---|---|
| 368 | 289 | 228 | 311 | 325 | 384 | 527 | 323 | 256 | 349 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| 290 | 312 | 267 | 303 | 254 | 158 | 147 | 224 | 217 | 215 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 232 | 261 | 263 | 221 | 182 | 199 | 275 | 256 | 223 | 364 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 310 | 319 | 234 | 250 | 256 | 226 | 151 | 213 | 194 | 175 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 345 | 302 | 230 | 144 | 187 | 119 | 162 | 235 | 377 | 443 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 468 | 490 | 490 | | | | | | | | 1 | 1 | 1 | | | | | | | |

11-12 High Street

This building (NGR TQ 9058 1739; Fig 2), immediately to the east of Wren Cottage, was originally built as a long (16.55m) four-bay continuously-jettied structure. It is now divided into two properties under different ownership, and it is thought that it may have been built as more than one unit. The primary construction is thought to date to the late-fifteenth or early sixteenth centuries on stylistic grounds (Martin 2000b), though the building is listed as seventeenth-century or earlier. The roof is of crownpost construction with halved on collars and short, relatively slender braces. Timbers in the roof were mostly unsuitable for dendrochronology, being either inaccessible, having too few rings, or being replacement timbers. After on-site discussion with David Martin, it was mostly timbers from the main structural framing that were sampled.

Results and Discussion

All the timbers sampled were of oak (*Quercus* spp.). Sample locations are described in Table WHS1 and illustrated in Figures WHS 1 and 2. The sequences were found to contain fewer rings than hoped for. No acceptable matching was found between the individual series. A single series, WHS09, gave consistent matches with a range of reference data, dating it to the period AD 1417-69. This sample had no sapwood, and the most likely date for its felling is therefore after AD 1478. This does not really add much to the information on dating the structure, although it is of interest that this very short sequence, like the site chronology from Friars Road, again appears to date well against material from the west, rather than counties such as Hampshire and Oxfordshire which are closer, and well represented in the reference material.



Figure WHS1: First-floor plan of 11-12 High Street, Winchelsea, showing the locations of timbers sampled for dendrochronology, adapted from a drawing supplied by David Martin



Figure WHS2: Cross-sections of two trusses shown on Figure WHS1, showing the timbers sampled for dendrochronology, adapted from a drawing supplied by David Martin

Table WHS1: Oak (Quercus spp.) timbers sampled from 11-12 High Street, Winchelsea; h/s represents the heartwood-sapwood boundary

.

| Sample number | Origin of core | Total no of years | Average growth rate (mm yr ⁻¹) | Sapwood details | Date of sequence AD | Felling date of timber AD |
|------------------|--|-------------------------|--|--------------------|---------------------------|---------------------------------|
| 11 High S | treet, 'Tea Tree' teashop | | L | L | I | L |
| WHS01 | South west corner post of west room, first floor | 43 | 3.25 | 8 | undated | unknown |
| WHS02 | South wallplate between 01 and 03 | 46 | 2.09 | h/s | undated | unknown |
| WHS03 | South east corner post of west room, first floor | <40 | unmeasured | - | undated | unknown |
| WHS04 | North west corner post of west room, first floor | 40 | 2.89 | h/s | undated | unknown |
| 12 High S | treet, the Old Post Office | | · | | · | |
| WHS05 | South east corner post | <40 | unmeasured | - | undated | unknown |
| WHS06 | East wallplate | 43 | 1.94 | h/s | undated | unknown |
| WHS07 | North post, truss C-C | 41 | 2.67 | 5 | undated | unknown |
| WHS08 | Tie beam | 57 | 2.18 | - | undated | unknown |
| WHS09 | Girding beam on truss C-C | 53 | 1.92 | - | 1417 - 69 | after 1478 |

| | | WF | 1809 |
|--|--------------------------|-----------------|------------------|
| | | AD 14 | 417 - 69 |
| Dated reference or site master chronology | Dates spanned (AD) | <i>t</i> -value | Overlap (yrs) |
| East Midlands (Laxton and Litton 1988) | 882-1981 | 4.4 | 53 |
| London1175 (Tyers pers comm) | 413-1728 | 4.3 | 53 |
| Peel Hall, Greater Manchester (Leggett 1980) | 1378-1481 | 7.3 | 53 |
| Farleigh2, Somerset (Bridge 2002b) | 1430-1591 | 6.2 | 53 |
| Vowchurch, Herefordshire (Nayling 2000) | 1364-1602 | 5.2 | 53 |
| Badesley6, Warwickshire (Miles and Worthington 2002) | 1411-1534 | 5.2 | 53 |
| Cathedral Barn, Hereford (Tyers 1996) | 1359-1491 | 5.1 | 53 |
| Crowle Court Barn, Worcestershire (Hillam 1997) | 1412-96 | 5.0 | 53 |
| Areley Kings, Worcester (Bridge unpubl) | 1365-1535 | 5.0 | 53 |
| Hightown, Hereford (Boswijk and Tyers 1997) | 1302-1489 | 4.9 | 53 |
| Vcrscls1, Somerset (Miles and Worthington 2000) | 1345-1465 | 4.9 | 49 |
| Oldfield, Shropshire (Miles and Haddon-Reece 1994) | 1404-1572 | 4.7 | 53 |
| Newdigate1, Surrey (Bridge 1998) | 1261-1483 | 4.6 | 53 |

Table WHS2: Dating of the oak ring sequence WHS09

Table WHS2: Ring width data for the series WHS09, from 11-12 High Street, Winchelsea

| ring widths | (0.01mm) |
|---------------------|---------------------|
| | |
| 312 380 248 307 346 | 315 334 229 216 212 |
| 176 223 195 210 180 | 284 146 104 120 101 |
| 114 112 108 91 105 | 97 117 130 70 122 |
| 148 208 232 251 337 | 276 248 178 208 238 |
| 207 210 168 236 165 | 189 178 106 97 144 |
| 140 165 126 | |

Old Castle House, Castle Street (also known as The Castle Inn)

This timber-framed building (NGR TQ 9053 1747: Fig 2) was refronted in the eighteenth century, but retains a vaulted cellar of about AD 1300 beneath it. There are fragmentary remains of a rebuild dated to the late-fifteenth or early-sixteenth centuries on stylistic grounds (Martin 1987). These comprise part the first floor and part of a cross partition.

These remains were closely inspected in order to ascertain the likelihood of being able to obtain a dendrochronological date. As elsewhere in the town, many of the timbers were seen to have come from relatively fast-grown trees. One or two of the joists of the first floor may contain around 50 rings, but there were not sufficient timbers with this many rings and sapwood to make dating a likely prospect, and it was decided that no sampling should be undertaken on this building.

Court Hall, High Street

The Court Hall (NGR TQ 9045 1742; Fig 2) is a two-storey building of stone and rubble construction. It is a grade I listed building that is thought to have been constructed in the late-thirteenth or very early-fourteenth century (Martin 1999). The floor joists may date to this original construction phase, but they were not the subject of this investigation. The building has undergone several changes; amongst these are re-roofing which appears, on stylistic grounds, to have been carried out in the fifteenth, or early-sixteenth centuries.

The roof is of four bays, of crownpost construction, with the two western bays being longer than the two eastern bays. Each pair of rafters has a collar, and they incorporate soulaces and ashlar pieces. The two middle crownposts have thin, rectangular section four-way headbraces.

The building became the Town Hall in AD 1557, and the upper room was converted for use as a court room in AD 1666.

Results and Discussion

The positions of the timbers sampled are illustrated in Figure WCH1, and details of the sample locations are given, along with other basic information, in Table WCH1. All the timbers sampled were of oak (*Quercus* spp.). Table WCH2 shows the level of crossmatching between three of the samples, and Table WCH3 gives the data for the resulting, undated, site chronology.

The ring series were all quite short, and it is not too surprising that neither the individual series, or the resulting site chronology gave consistent matching against other Winchelsea sites or the extensive reference data. The roof therefore remains undated.



Figure WCH1: Longitudinal section of the Court House, High Street, Winchelsea, showing the labelling of the trusses from west to east and the positions of timbers sampled for dendrochronology, adapted from an original drawing by Martin (1999)

Table WCH1: Oak (*Quercus* spp.) timbers sampled from Court Hall, High Street, Winchelsea; h/s represents the heartwood-sapwood boundary

| Sample number | Origin of core | Total no of years | Average growth rate (mm yr ⁻¹) | Sapwood details | Date of sequence AD |
|------------------|-----------------------------------|----------------------|--|--------------------|---------------------------|
| WCH01 | Tie D | 66 | 2.34 | 8 | undated |
| WCH02 | Tie E | <40 | unmeasured | | undated |
| WCH03 | Common rafter 4 south, bay D-E | <40 | unmeasured | - | undated |
| WCH04 | Common rafter 3 south, bay D-E | 50 | 2.47 | h/s | undated |
| WCH05 | Tie C | 60 | 1.31 | h/s | undated |
| WCH06 | Tie B | 61 | 3.12 | 1 | undated |
| WCH07 | Tie A | 45 | 2.29 | h/s | undated |
| WCH08 | Ashlar piece 6 south, bay B-C | 50 | 1.97 | - | undated |
| WCH09 | Common rafter 5 south, bay B-C | 60 | 1.94 | h/s | undated |

Table WCH2: Crossmatching between measured series from the Court Hall, High Street, Winchelsea

| | t - values | | | | | | | |
|--------|------------|-------|--|--|--|--|--|--|
| SAMPLE | WCH08 | WCH09 | | | | | | |
| WCH04 | 7.0 | 3.8 | | | | | | |
| WCH08 | | 4.3 | | | | | | |

Table WCH3: Ring width data for the undated site chronology WCH489M

| ring widths (0.01mm) | | | | | | | | | | no of trees | | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---|---|---|---|---|---|---|---|---|
| 242 | 231 | 414 | 308 | 236 | 273 | 300 | 269 | 297 | 268 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| 277 | 281 | 214 | 183 | 219 | 230 | 216 | 274 | 207 | 199 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 182 | 181 | 121 | 163 | 148 | 173 | 155 | 127 | 133 | 198 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 109 | 102 | 169 | 206 | 195 | 166 | 179 | 172 | 249 | 191 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 244 | 207 | 281 | 302 | 240 | 272 | 233 | 203 | 241 | 181 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 222 | 256 | 268 | 208 | 211 | 192 | 190 | 183 | 165 | 147 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| 130 | 113 | 180 | | | | | | | | 1 | 1 | 1 | | | | | | | |

General Discussion

Although all five of the buildings from which ring data were obtained were thought to be broadly contemporaneous, no matching was found between sites. The sequences obtained are rather short, the trees having grown to usable size relatively quickly, and the phases investigated could be separated by several decades, so this is perhaps not significant. The few site chronologies or individual dated sequences produced for each site did not match data from other sites significantly.

The single dated phase obtained (Friars Road) indicates that the building phase is more likely to be dated to the end of the fifteenth century, rather than the beginning of the sixteenth, but how true this is of the other properties, could not be determined.

The dated site chronology and the single dated timber from 11-12 High Street, both gave some of their strongest matches against reference material from quite far north and west of Winchelsea – particularly from Hereford and Worcester (Tables WFR3 and WHS2). There are several data sets from areas closer to Winchelsea, particularly Hampshire, the next county west from Sussex. It is very difficult to provenance timber on the basis of tree ring sequences alone (Bridge 2000), and these short sequences do also give matches with more local sites. The lack of matching between the individual sites in this study, thought to be broadly contemporaneous, may also indicate different origins for the timbers, but again, with such short sequences and the possibility that they do not actually overlap, it is difficult to draw much information from this.

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