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Scientific Dating

The Throne Hereford Road Weobley Herefordshire

Tree-ring Dating of Timbers

Martin Bridge

Discovery, Innovation and Science in the Historic Environment

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Front Cover: The Throne, Weobley in Herefordshire. Photograph Martin Bridge.

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THE THRONE
HEREFORD ROAD
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HEREFORDSHIRE

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SUMMARY
Five potential phases identified in a survey of the building were investigated by dendrochronology. In total, 35 timbers were sampled, with many timbers exhibiting narrow bands of rings, making them undatable.

The cross-wing bays at the north end yielded only one sample that dated, which came from a tree felled in the winter of AD 1467/68. In the jettied range, a queen strut provides a felling date in *c*. AD 1477–80 with the remaining five timbers encompassing this felling date range. It seems likely, therefore, that this phase was constructed shortly after felling in the period *c*. AD 1477–80. The south range had three samples that were dated, one was from a tree felled in the spring of AD 1560, the other two samples having likely felling date ranges in agreement with this date. It seems likely, therefore, that this phase was constructed in AD 1560 or within a year or two after this date. The porch had two samples that were dated. One had a derived felling date range of *c*. AD 1572–5. Whilst caution needs to be expressed in dating a whole phase on the result of a single timber, this suggests that the porch was built after the south range.

CONTRIBUTORS
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CONTENTS

INTRODUCTION

This Grade II*-listed timber-framed house (LEN 1081899 here) is found on the corner of High Street and Hereford Road in the historic town of Weobley (Fig. 1). It is thought to be largely sixteenth century in origin, being extended in the early seventeenth century, with some later alterations. In the seventeenth century the house was an inn, known as The Unicorn, but following a visit from Charles II, it was renamed The Crown, and subsequently, probably in the nineteenth century The Throne (James 2012 unpubl).

Dendrochronological dating was requested by John Yates (Inspector of Historic Buildings and Areas) in order to provide precise dates for the construction of the building and its subsequent extension to inform listed building consent.

At the time of the assessment and subsequent sampling, preliminary research by Duncan James (Architecture and Building historian), had established five major phases of construction, though some of the sequencing was a little unclear, for example the date of the two-storeyed porch in relation to the east extension of the cross-wing was a matter of some speculation. The five phases, illustrated in Figure 2, are the cross-wing, bays 1 and 2, thought to be the earliest phase remaining; the jettied range, bays 5 and 6 representing the second phase; the south range, bays 7 and 8 representing the third phase; an extension to the primary cross-wing, bays 3 and 4, of uncertain relationship to the other phases; and finally the porch. The trusses show variations in each of these phases, and the following notes are taken from Duncan James's report (2012 unpubl).

Phase 1 (bays 1 and 2)

These two bays are the earliest parts of the building and must have related to a lost open hall range that formerly occupied the site of bays 5 and 6. The jettied west front has been underbuilt in brick and the majority of the south side rebuilt in brick. The first-floor level in bay 1 has also been lowered and the floor level on the ground floor, including part of bay 2, dropped by 24 inches (61cm) creating a shallow cellar with direct access from the street. The roof truss T1 has a slightly cambered tiebeam, and king and queen struts below the collar. A significant difference between the two parts of the cross-wing range is that bays 1 and 2 are single-pegged at all the post/stud to rail/beam joints, whereas on bays 3 and 4 these joints are all double pegged. Both bays have a single tier of purlins, which are threaded through the principal trusses at T1, T2, T3, and T5, but clasped where they pass through the intermediate collar truss T4.

Phase A (bays 3 and 4)

In common with bays 1 and 2, the majority of the primary framing on this elevation is still in place (Fig. 3). The two bays form a single, separate and later build than bays 1 and 2. The framing abuts the east end of bay 2 and, although there are separate wall posts set up parallel with the posts under T5, there is no truss above, since the purlins over bay 3 rest on T5. Both bays had diagonal braces in the upper corners although these are now missing on bay 3. Truss T6 is faced up to the east

and has a collar with a central stud below. There are raceknife-cut assembly marks on the east face in the form of circles and semi-circles. The north principal rafter in the truss appears to be primary, and it has a windbrace slot with the cut-off remains of the brace still in place. The south principal rafter is of small section and may be a later insertion. The purlins in bay 4 are later insertions. Truss T7 has a collar with queen struts below. The principal rafter on the north side is a reused timber with a rectangular, pegged hole for a threaded purlin, but in too low a position for the present roof. The south-side principal rafter has a windbrace slot. Both principal rafters have particularly deep purlin trenches that may have been modified (i.e. cut out of) housing for threaded purlins. As mentioned above, the tiebeam also appears to be a replacement, suggesting that the truss has been extensively rebuilt. The infill to the truss is dressed up to look like late sixteenth-century quadrant bracing in imitation of the porch decoration, although the frame is earlier in date.

Phase 2 (bays 5 and 6)

The roof of Bay 5 is divided into two bays by an open tiebeam truss, T9. Bay 6 has truss T11 in the roof creating a narrow chimneystack bay at the south end. It should be noted that there is a 12 in (30.5 cm) gap between the principal posts at the south end of bay 6 and the principal posts for T12 at the north end of the south range (bays 7, 8, and 9). This gap has been infilled in various *ad hoc* ways. The roof structure between trusses T8 to T11 and up to the line of the first principal posts, over the main jettied range of bays 5 and 6 is all of one phase. There are two tiers of trenched purlins and a square ridge purlin set on the diagonal. There are six common rafters on each side between T10 and T11. The roof has straight windbraces wide between the purlins, rising from the principal rafters and lapped into the backs of the upper tier of purlins. The area south of T11 (occupied by the chimneystack) does not have windbraces. The trusses are all of similar form with a collar, and queen struts below. They are all faced up to the north and have cambered collars and cambered tiebeams. The timbers are all trestle-sawn, with neat parallel snap-offs.

Phase 3 (bays 7 and 8)

This two-storey, timber-framed range of three bays is laid out parallel to the road, and at a slightly different orientation than the main jettied range (bays 5 and 6). This is perhaps the most impressive part of the building due to its ground-floor ceiling which, with its deeply coffered counter-change design of twelve panels, dominates the room. The first floor of bay 7 is curious, in particular for the *ad hoc* nature of the construction of truss T12 on the north side of the bay, and the nailed-on arrangement of the framing below the tiebeam. The truss, in stark contrast to the coeval, neatly made trusses T14, T15, and T16, is partially constructed from re-used timber with seemingly little attempt to rise to the standard seen elsewhere in the range. It may be that the truss has for some reason been reconstructed, possibly due to structural failure although the tiebeam is primary, as are the storey posts and diagonal braces that rise from the posts to the soffit of the tiebeam. The form of the truss is different to those elsewhere in the range with massive V-struts rising from the tiebeam to the principals and a collar. The V-struts and other timbers are nailed on in a wholly unorthodox way. Installed across the middle of bay 7 is a later roof

truss, T13, which is clearly designed to reinforce the roof structure. It is probably of early nineteenth-century date. It has a king post with raking struts springing from shoulders near the bottom of the post to meet the principal rafters at upper purlin level. Two additional raking struts rise from the tiebeam to meet the principal rafters at lower purlin level. The top of the king post is flared. There is a ridge purlin. The principal rafters are trenched to house the purlins. All joints are single pegged except the king post/tiebeam joint and the principal rafter to tiebeam joints.

The Porch

The porch is a two-storey timber-framed structure built onto the back of the jettied range, against the east side of bay 6 (Fig. 4). At one stage in the history of The Throne it served to mark the principal entry to the building. On the ground floor the porch was jettied and open on both north and east elevations. The first floor is decorated with chevron bracing on these elevations. On three sides the porch has been underbuilt in brick. The dominant external decorative feature is the chevron bracing, which also shows in the interior. A more subtle, internal decorative device is the broach stop, used on the ends of chamfered beams where there are in excess of twenty examples. The west end truss T18 is a closed truss with raking struts rising from the cambered tiebeam to meet the principal rafters. The lower edge of the tiebeam has a wide chamfer and, as on T17, has broach stops at each end. Curiously, one of the raking struts in the truss is 'let in' to the principal rafter although it may also be mortised. This suggests that it is a later addition; however, the three semi-circular assembly marks where the raking struts meet the tiebeam indicate that the arrangement is primary.

METHODOLOGY

Fieldwork for the present study was carried out in March 2012, following an initial assessment of the potential for dating some weeks beforehand. In the initial assessment, accessible oak (*Quercus* spp) timbers with more than 50 rings and where possible traces of sapwood were sought, although slightly shorter sequences are sometimes sampled if little other material is available. Those timbers judged to be potentially useful were cored using a 16mm auger attached to an electric drill. The cores were glued to wooden laths, labelled, and stored for subsequent analysis.

The cores were polished on a belt sander using 80 to 400 grit abrasive paper to allow the ring boundaries to be clearly distinguished. The samples had their tree-ring sequences 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 (2004a). Cross-matching was attempted by a combination of qualified statistical comparison by computer and visual matching. The ring-width series were 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. Where two individual samples match together with a *t*-value of 10 or above, and visually exhibit exceptionally similar ring patterns, they may have originated from the same parent tree. Same-tree matches can also be identified through the external characteristics of the timber itself, such as knots and shake patterns. Lower *t*-values however do not preclude same tree derivation.

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. epending 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 11–41 rings (Miles 1997a). 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 INTERPRETATION

Thirty-five samples, details of which are given in Table 1, were taken from oak timbers in five recognised phases of construction. The locations of the samples are illustrated in Figures 2–13. Some of these areas had relatively few samples taken either because few timbers had enough rings for dendrochronological analysis, or because it was found during sampling that the timbers contained bands of very narrow rings that would hamper reliable measurement and hence significantly reduce the chances of successful dating. Six samples had less than the 40 rings required for secure dating by ring-width dendrochronology and were not measured. The data for the 29 measured tree-ring series, of which 12 were successfully dated,

are given in the Appendix. The relative positions of overlap of all the dated timbers are shown in Figure 14, along with their actual or interpreted felling dates.

Cross-wing, bays 1 and 2 (Phase 1)

Six samples were taken from this part of the house which, stylistically, is identified as the earliest part of the complex (James 2012 unpubl). These included four timbers in the roof and two posts in the cellar area (Figs 2 and 5). Although assessed as a phase with very few suitable timbers and hence reduced dating potential, it was agreed that sampling of the timbers thought to have most rings should be undertaken. The timbers in the cellar had been lime-washed many times, and it was not possible to gauge the number of rings before sampling. Only three of the six samples taken were suitable for measuring, the others having too few rings, and these samples failed to match each other. Despite two samples having well over 50 rings, none could be dated against the available reference material, and this phase remains undated.

Jettied range, bays 5 and 6 (Phase 2)

Ten samples were taken from collars, principal rafters, queen struts, a purlin, a tiebeam, a wallplate, and a ground-floor fireplace lintel (Figs 2 and 6–9). In addition, a post (ttwx) at first-floor level beside truss 18, thought to be a remnant of a former structure was also sampled (Fig 2). One sample, from a tiebeam, was found to have too few rings for further analysis. Cross-matching among the remaining ten samples (Table 2) revealed that samples ttw16 and ttw18 were potentially derived from the same tree, and a combined series ttw1618m was used in subsequent analysis. In all, six individual samples (five series) matched each other, and were combined into a single 149-year mean ring-width series, THRONE1. This was subsequently dated to the period AD 1319–1467, the strongest matches being shown in Table 3a. The relative positions of the dated series from this phase are shown, along with their interpreted likely felling date ranges in Figure 14.

South range, bays 7 and 8 (Phase 3)

The samples from this range (Figs 2 and 10–12) represent a variety of structural elements and mostly contain good numbers of rings. Eight samples were taken, and all were measured. Three of the sequences do however show periodic bands of very narrow rings which were difficult to distinguish reliably and can result in the production of spuriously high *t*-values. Thus, whilst there were some potential matches between samples identified, these were, with one exception, not supported by individual dating of the series against the reference material, and are therefore considered unreliable. Sample ttw22 showed severe distortion to its innermost rings and in addition the outermost *c*. 20 heartwood rings were unmeasurable, thus the measured series comprised the central 123 years (ttw22o). This ring sequence was found to date to the period AD 1328–1510, the dating evidence being presented in Table 3b. Taking into account the additional approximately 20 heartwood rings out to the heartwood/sapwood boundary that could not be measured, its felling date is *c*. AD 1541–71. Samples ttw23 and ttw28 matched each other (t = 5.4 with 84

years overlap), the individual components also dating well independently against reference chronologies. The dating evidence for the 111-year combined series (ttw2328m) is presented in Table 3c, the series dating to AD 1449–1559.

Cross-wing (Phase A)

Six timbers were sampled (Figs 2–3), there being fewer rings in some of the timbers in this phase than had been initially thought. The two series with fewer than 40 rings were not measured. Whilst four of the timbers contained more than 50 rings, no cross-matching was found between them, and neither did they match any other series from the site, or the reference material. Only one series was eventually dated by individual comparison with the reference chronologies, the 128-year series for ttw33, an intermediate post in the north wall (Table 3d).

Porch

Only four timbers were sampled from this construction phase (Figs 4 and 13), many of the timbers proving to have fewer than required minimum numbers of rings. All four series were found to be suitable candidates for dating and were measured. Two samples were dated from this phase, a tiebeam (ttw41) and a large ground-floor ceiling beam (ttw44). The two series did give a significant match against each other (t = 3.6 with 70 years overlap), but as this match was rather weak, the series were dated independently, the dating evidence being presented in Tables 3e and 3f.

DISCUSSION

The number of dated timbers is fewer than anticipated, mostly as a result of the large number of timbers that contained bands of very narrow rings that will have adversely affected their dating potential. No dates have been obtained for the earliest construction phase. Nevertheless, important information has been gained through dating four phases of construction within the site (Figure 14).

The timbers from the jettied range (phase 2) appear to form a single group most likely felled at the same time. One timber retained complete sapwood, but this became detached during coring so, as it is possible that a small number of rings were lost between the heartwood/sapwood boundary and the remaining sapwood, a range of *c*. AD 1477–80 is given for this timber. The other dated timbers all have likely felling date ranges that encompass this date range (Table 1; Fig 14), or in the case of one timber, a *terminus post quem* date for felling that is also compatible, and hence it appears likely that all of these timbers were felled in *c*. AD 1477–80.

The south range (phase 3) was dated by sample ttw23, which retained complete sapwood, and was felled in the spring of AD 1560. The other two dated samples from this phase have felling dates in broad agreement with this date suggesting that they are likely to have been felled at the same, or a similar, time (Table 1; Fig 14).

Bays 3 and 4 in the cross-wing (phase A) has a single timber dated which retained complete sapwood, and was from a tree felled in the winter of AD 1467/68.

For the porch, the ceiling beam has a felling date of after AD 1510, whilst the core from the tiebeam retained one sapwood ring, with a further 16 rings of sapwood to the bark edge being detached from the core. As one cannot be certain that no other rings had been lost between the rings on the core and the detached sapwood, a narrow felling date range of *c*. AD 1572–75 is given for this timber with the ceiling beam appearing likely to be felled at a similar time.

The matches shown in Tables 3a–f show similarities with sites over a wide geographical area, but most are within the English–Welsh border area, and the dated timbers are likely to be of relatively local origin, although the number of trees that date individually suggests that they may have come from multiple sources within that area.

James (2012 unpubl) explains how this dating programme has been useful, not only in terms of increasing the depth of study into the construction of this complex, but also its value in understanding the development of timber-framing within the county.

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TABLES

Table 1: Details of the samples taken from The Throne, Weobley

Sample number	Timber and location	Total number of rings	Mean ring-width (mm)	Dates Spanning (AD)	h/s boundary (AD)	Sapwood rings	Mean sensitivity	Felling date / date range (AD)
Cross-wing, bays 1 and 2 (phase 1)								
ttw01	South principal rafter, truss 2	<40	NM	-	-	3	-	-
ttw02	South common rafter, 2nd east of truss 2	43	2.41		-	15¼C	0.25	-
ttw03	South principal rafter, truss 3	95	1.03		-	36	0.16	-
ttw04	South common rafter, 1st east of truss 2	70	2.06		-	4	0.24	-
ttw05	North post truss 3 (in cellar)	<40	NM		-	h/s	-	-
ttw06	South post truss 3 (in cellar)	<40	NM		-	h/s	-	-
Jettied Range, bays 5 and 6 (phase 2)								
ttw11	Collar, truss 8	62 +7 NM	2.56	1395–1456	-	-	0.12	after 1474
ttw12	Tiebeam, truss 8	<40	NM	-	-	h/s	-	-
ttw13	East upper purlin, south of truss 8	95	1.17	1370–1464	1464	h/s	0.17	1475–1505
ttw14	Collar, truss 9	68	2.59	1400–67	1467	h/s	0.14	1478–1508
ttw15	West principal rafter, truss 10	54	2.54	-	-	13	0.18	-
ttw16	East queen strut, truss 10	122	1.36	1337–1458	1458	h/s	0.18	1469–99
ttw17	East principal rafter, truss 11	46	2.85	-	-	-	0.18	-
ttw18	West queen strut, truss 11	141	1.32	1319–1459	1459	h/s (+18C NM)	0.20	*c* 1477–80
ttw19	West wallplate, between trusses 10 and 11	81	1.63	1384–1464	1464	h/s	0.14	1475–1505
ttw20	Ground floor fireplace lintel, bay 5	77	3.58	-	-	2	0.21	-
ttwx	Post at first floor beside truss 18	63	2.18	-	-	h/s	0.14	-

Table 1 continued

Sample number	Timber and position	Total number of rings	Mean ring width (mm)	Dates spanning (AD)	h/s boundary (AD)	Sapwood rings	Mean sensitivity	Felling date /date range (AD)
South Range, bays 7 and 8 (phase 3)								
ttw21	West post, truss 12	48	2.65	-	-	-	0.23	-
ttw22	West principal rafter, truss 14	123 +*c*20 NM	1.54	1388–1510	*c*1530	- (+*c*20h/s NM)	0.18	*c* 1541–71
ttw23	Tiebeam, truss 14	111	2.11	1449–1559	1532	27¼C	0.24	spring 1560
ttw24	West post, truss 14	96	1.95	-	-	21¼C	0.25	-
ttw25	East post, truss 14	110	1.93	-	-	20C	0.25	-
ttw26	West post, truss 15	174	1.21	-	-	12 (+9 NM)	0.16	-
ttw27	Girding beam, truss 14	126	1.59	-	-	?h/s	0.26	-
ttw28	East beam in ceiling, near south cross beam	84	2.00	1472–1555	1549	6	0.22	1560–90
Cross-wing, bays 3 and 4 (phase A)								
ttw31	North post, truss 6	<40	NM	-	-	h/s	-	-
ttw32	Tiebeam, truss 6	72	2.06	-	-	7	0.31	-
ttw33	East intermediate post, bay 3 north	128	0.76	1340–1467	1433	34C	0.21	winter 1467/8
ttw34	West intermediate post, bay 3 north	128	0.94	-	-	33C	0.16	-
ttw35	Ground floor girding beam, truss 6	<40	NM	-	-	h/s	-	-
ttw36	Intermediate post, bay 4 north	82	2.55	-	-	1	0.17	-
Porch								
ttw41	Tie, truss 17	141	1.05	1416–1556	1555	1 (+16C NM)	0.13	*c* 1572–75
ttw42	Mid-rail, north wall, west panel	64	2.51	-	-	h/s	0.22	-
ttw43	Central west-east beam, ground-floor ceiling	97	1.13	-	-	-	0.12	-
ttw44	North west-east beam, ground floor ceiling	70	1.48	1430–99	-	-	0.14	after 1510

NM = not measured; h/s = heartwood/sapwood boundary; C = complete sapwood, winter felled; ¼C = complete sapwood, felled the following spring

Table 2: Cross-matching between the dated series that make up the site master THRONE1, from the jettied range, bays 5 and 6. t-*values above 3.5 are significant*

	t-values				
Sample	ttw13	ttw14	ttw16	ttw18	ttw19
ttw11	2.3	6.1	3.5	4.8	1.2
ttw13		4.5	5.1	4.8	3.3
ttw14			4.0	3.6	3.5
ttw16				10.8	3.1
ttw18					3.3

Table 3a: Dating evidence for the site master sequence THRONE1, AD 1319–1467, regional chronology file names in bold

Source region:	Chronology name:	Publication reference:	File name:	Span of chronology (AD)	Overlap (years)	*t*-value
Radnorshire	Old Burfa, Evenjobb	Miles and Worthington 1998	OLDBRFA1	1347–1500	121	8.1
Radnorshire	Old Impton, Norton	Miles and Worthington 1998	OLDIMTN1	1391–1471	77	7.8
Wales	Welsh Master Chronology	Miles 1997b unpubl	**WALES97**	404–1981	149	7.5
Shropshire	Shropshire Master Chronology	Miles 1995 unpubl	**SALOP95**	881–1745	149	7.5
Montgomeryshire	Neuadd Cynhinfa, Pontrobert	Miles and Haddon-Reece 1996	neu4	1409–1572	59	7.3
Denbighshire	Glas Hirfryn	Bridge *et al* 2014	GHN	1404–1557	64	7.3
Herefordshire	The Shop & Cottage, Weobley	Tyers 2007	WEOB_BS	1308–1445	127	7.2
Worcestershire	St Cuthbert's, Wick	Bridge 1983	WICK	1255–1496	149	7.2
Herefordshire	Farmer's Club, Hereford	Tyers 1996	HEREFC	1313–1617	149	7.1
Shropshire	Coats Farm, Rushbury	Miles and Haddon-Reece 1996	COATSFM	1346–1485	122	6.9

Table 3b: Dating evidence for the site sequence ttw22o, AD 1388–1510

Source region:	Chronology name:	Publication reference:	File name:	Span of chronology (AD)	Overlap (years)	*t*-value
Herefordshire	The Shop & Cottage, Weobley	Tyers 2007	WEOB_BS	1308–1445	57	8.0
Herefordshire	Cradley Village Hall	Miles and Worthington 2004a	CRADLEY	1347–1530	123	6.9
Herefordshire	Court Cottate, Preston Wynne	Tyers and Groves 1999	PWYNNE	1349–1539	123	6.8
Breconshire	The Three Tuns, Hay on Wye	Bridge *et al* 2016	HAY3TUNS	1386–1652	123	6.7
Herefordshire	Hightown/Booth Hall, Hereford	Boswijk and Tyers 1997	HIGHTOWN	1302–1489	102	6.6
Herefordshire	Westfields East, Pembridge	Tyers 2004b	PWFE	1288–1483	96	6.2
Shropshire	New Hall, Eaton-under-Heywood	Miles and Worthington 2004b	NEWHALL1	1390–1564	121	6.1
Herefordshire	Kings Pyon barn	Groves and Hillam 1993	KINGPYON	1346–1480	93	6.0
W Midlands	Manor House, West Bromwich	Arnold and Howard 2009	WBRASQ01	1318–1590	123	6.0
Cornwall	Mousehole, Cornwall	Arnold and Howard 2008a	MSHASQ01	1374–1613	123	5.7

Table 3c: Dating evidence for the site sequence ttw2328m, AD 1449–1559, regional chronology file name in bold

Source region:	Chronology name:	Publication reference:	File name:	Span of chronology (AD)	Overlap (years)	*t*-value
Herefordshire	Farmer's Club, Hereford	Tyers 1996	HEREFC	1313–1617	111	9.1
Herefordshire	Dore Abbey	Tyers and Boswijk 1998	DORE2	1363–1612	111	8.4
Herefordshire	Cradley Village Hall	Miles and Worthington 2004a	CRADLEY	1347–1530	82	8.1
Montgomeryshire	Ystumcolwyn Barn, Meifod	Miles *et al* 2005	YSTUM1	1416–1558	110	8.0
Wales	Welsh Master Chronology	Miles 1997b unpubl	**WALES97**	404–1981	111	7.7
Worcestershire	Plowstall Farmhouse, Bayton	Miles *et al* 2008	BAYTONPF	1410–1570	111	7.7
Herefordshire	White House, Vowchurch	Nayling 2000	WVT9	1364–1602	111	7.6
Wales/borders	Hillside oaks	Siebenlist-Kerner 1978	**GIERTZ**	1341–1636	111	7.6
Shropshire	Stokesay Castle	Miles and Worthington 1997	STOKE4	1449–1640	111	7.5
Worcestershire	Hartlebury Castle Chapel Roof	Tyers 2008	HARTCHPL	1399–1678	111	7.5

Table 3d: Dating evidence for the site sequence ttw33, AD 1340–1467

Source region:	Chronology name:	Publication reference:	File name:	Span of chronology (AD)	Overlap (years)	*t*-value
Herefordshire	Church House, Pembridge	Tyers 2004b	PCH_T6	1323–1474	128	6.1
Herefordshire	Upper Limebrook, Wigmore	Tyers 2004c	LIMEBRK	1220–1447	108	6.0
Hampshire	The Old Post Office, Tichborne	Miles and Worthington 2001	TCHBRNPO	1408–1608	60	5.6
Herefordshire	Church Ale House, Colwall	Hillam 1991	COLWALL	1354–1482	114	5.6
West Sussex	Jarvis, Steyning	Miles *et al* 2007	JARVIS1	1384–1514	84	5.5
Herefordshire	Booth Hall, Hereford	Boswijk and Tyers 1997	HIGHTOWN	1302–1487	128	5.5
Shropshire	Barnaby House, Ludlow	Miles and Worthington 1997	LUDLOW8B	1317–1438	99	5.4
Worcestershire	St Cuthbert's, Wick	Bridge 1983	WICK	1255–1496	128	5.2
Dorset	Winterborne Clenston Barn	Bridge 2007	WINTCLEN	1339–1515	128	5.1
Herefordshire	Church Street, Hereford	Tyers 1996	HERE14C	1335–1595	128	5.1

Table 3e: Dating evidence for the site sequence ttw41, AD 1416–1556, regional chronology file names in bold

Source region:	Chronology name:	Publication reference:	File name:	Span of chronology (AD)	Overlap (years)	*t*-value
Montgomeryshire	Llwyn Llandrinio	Miles *et al* 2003	LLWYN	1413–1551	136	7.6
Herefordshire	Penrhos Court, Kington	Tyers 1998	PENRHOS2	14201571	137	7.1
Caernarfonshire	Plas Mawr House, Conwy	Miles 1997c unpubl	PLASMAWR	1360–1578	141	7.1
Herefordshire	Old Post Office, Pembridge	Tyers 2002	PPO_T2	1350–1538	123	7.0
Shropshire	Lydbury North, village mean	Miles *et al* 2007	LYDBURY	1363-1658	141	6.9
Gloucestershire	Swan House, Blakeney	Miles *et al* 2009	SWANHS	1386–1628	141	6.7
Caernarfonshire	Parc Llanfrothen	Miles *et al* 2006	BDGLRT22	1386–1669	141	6.7
Wales	Welsh Master Chronology	Miles 1997b unpubl	**WALES97**	404–1981	141	6.6
Merionethshire	Cefn Caer Pennal	Miles and Worthington 1999	CEFNCAR1	1404–1525	110	6.5
Shropshire	Clungunford Master Chronology	Miles 2002 unpubl	CLNGNFRD	1273–1653	141	6.5

Table 3f: Dating evidence for the site sequence ttw44, AD 1430–1499, regional chronology file names in bold

Source region:	Chronology name:	Publication reference:	File name:	Span of chronology (AD)	Overlap (years)	*t*-value
West Midlands	St Mary's Abbey, Halesowen	Arnold and Howard 2008b	HLNASQ01	1310–1535	70	6.0
Montgomeryshire	Ffinnant, Llansantffraid-ym-Machain	Miles *et al* 2010	FFINNANT	1437–1609	70	5.7
South Yorkshire	Brampton Bierlow Hall, nr Rotherham	Hillam 1984	BBIERLOW	1423–1536	70	5.7
Montgomeryshire	Llwyn Llandrinio	Miles *et al* 2003	LLWYN	1413–1551	70	5.6
Sussex	Falmer Court Barn	Howard *et al* 1998	FALASQ01	1386–1497	68	5.6
Shropshire	Abcott Manor, Clungunford	Miles and Worthington 2002	CGFA	1422–1545	70	5.6
West Yorkshire	Westgate End House, Wakefield	Arnold and Howard 2015	WKFBSQ01	1377–1567	70	5.6
Shropshire	Clungunford Master Chronology	Miles 2002 unpubl	CLNGNFRD	1273–1653	70	5.5
Yorkshire	Elland Old Hall	Hillam 1984	ELLAND	1372–1574	70	5.5
Shropshire	Shropshire Master Chronology	Miles 1995 unpubl	**SALOP95**	881–1745	70	5.4

FIGURES

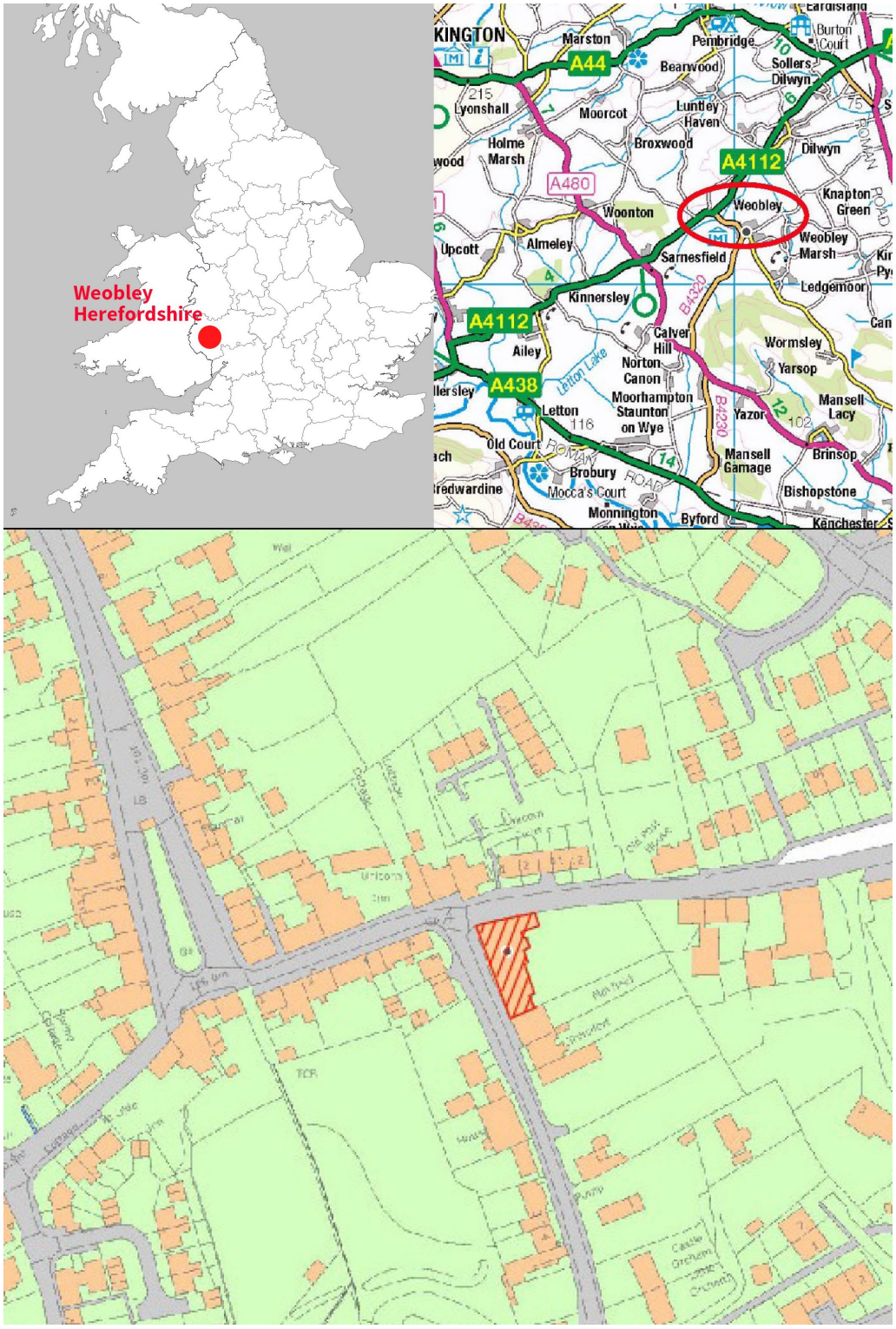

Figure 1: Maps to show the location of The Throne, Weobley in Herefordshire, marked in red. Scale: top right 1:150,000, bottom 1:1,600 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100024900.

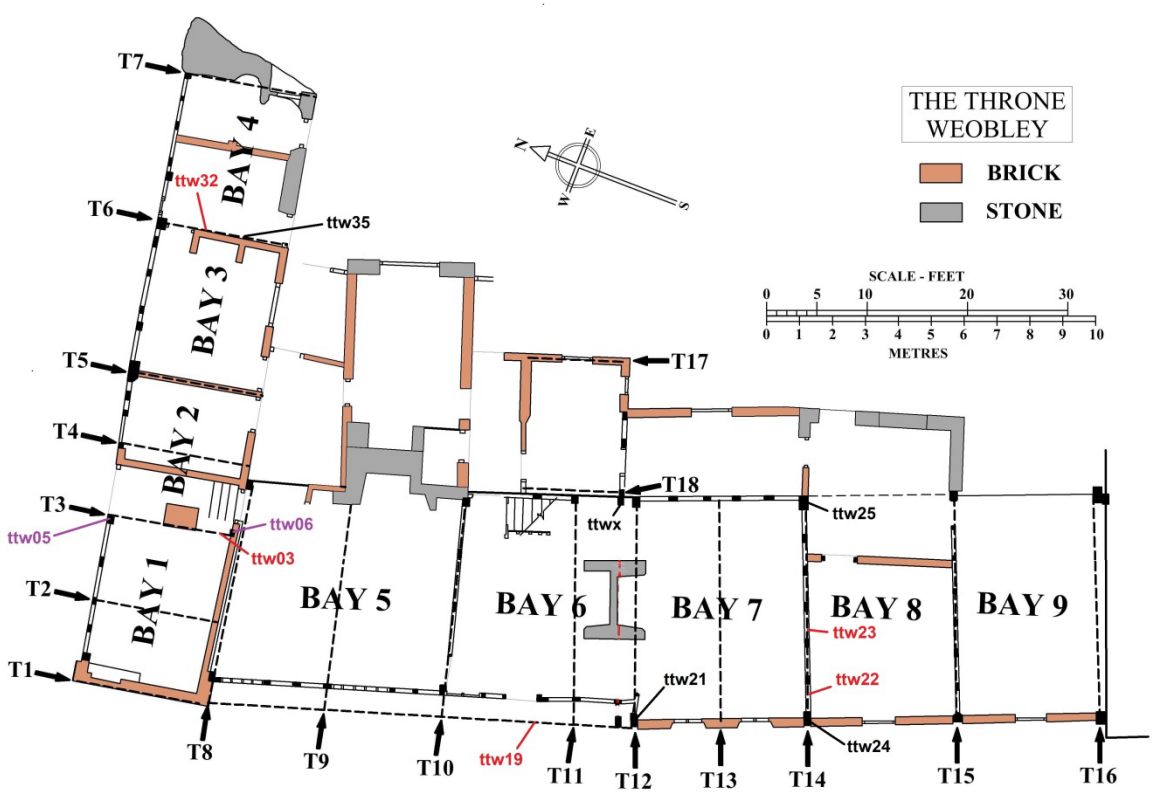

Figure 2: Plan of The Throne, Weobley, showing the bays and truss numbers referred to in the text (based on an original drawing by Duncan Jones). The approximate locations of timbers not shown in photographs are also indicated (cellar timbers are labelled in purple, ground- and first-floor timbers in black, and roof timbers in red)

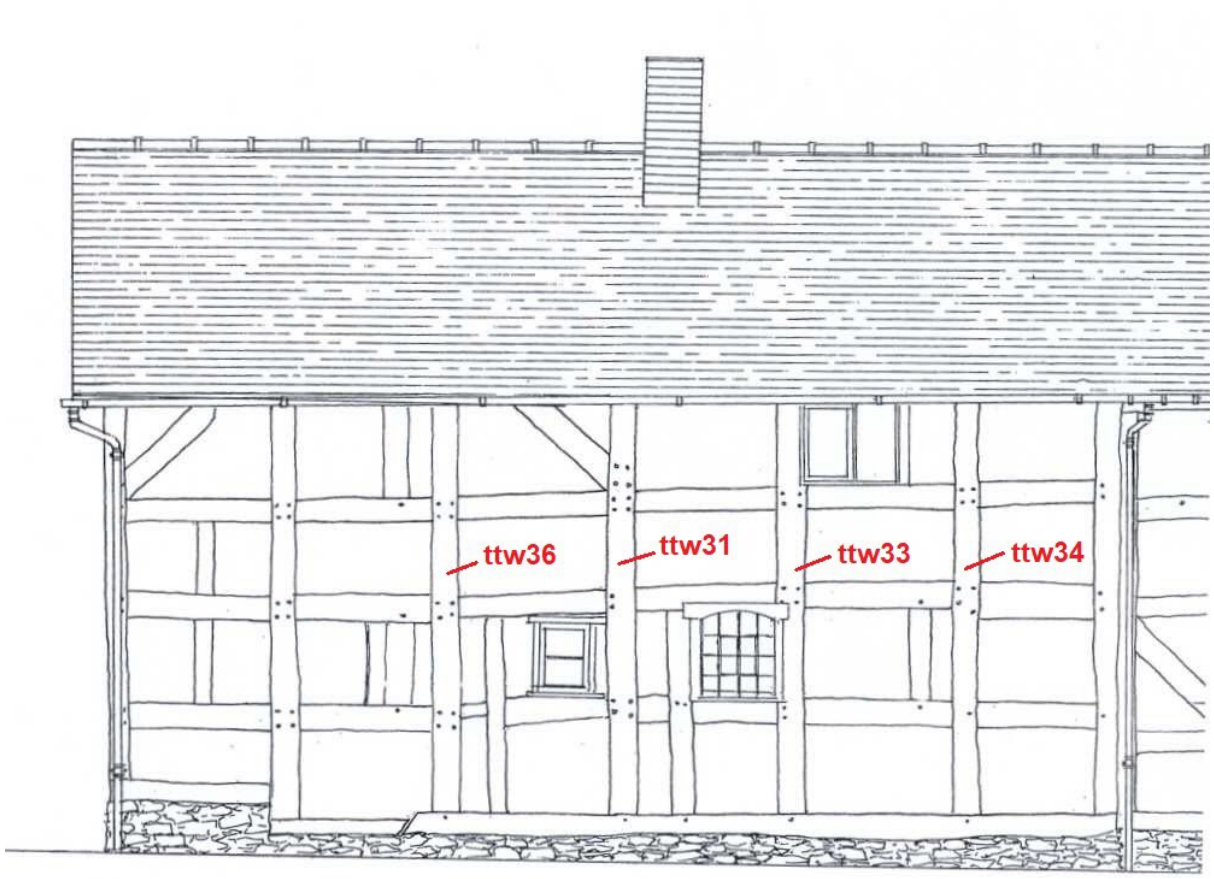

Figure 3: North elevation of bays 3 and 4 showing timbers sampled for dendrochronology (adapted from an original drawing by Andrew Thomas)

Figure 4: View of the porch, looking south-west, showing the tiebeam and mid-rail sampled for dendrochronology (photograph Martin Bridge)

Figure 5: View of the south side of bay 1 on the right, with truss 8 on the left, showing timbers sampled for dendrochronology (photograph Duncan James)

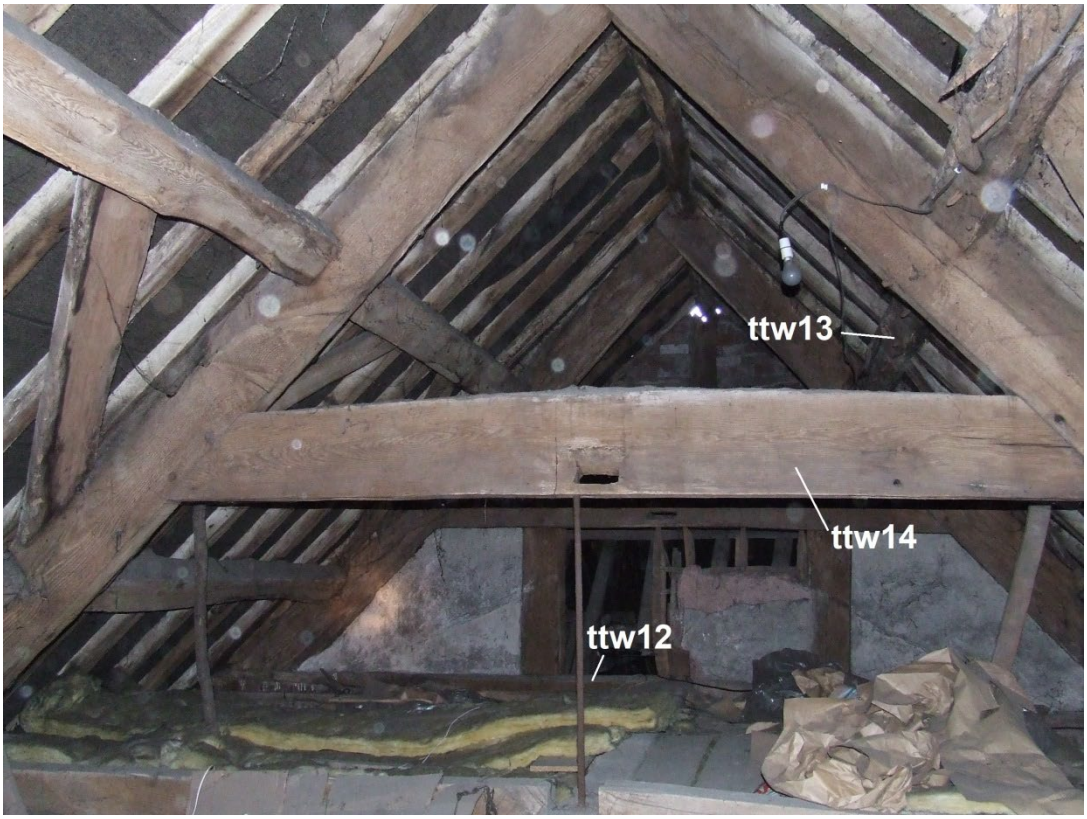

Figure 6: View of truss 9 (foreground) and truss 8 (rear) showing timbers sampled for dendrochronology (photograph Martin Bridge)

Figure 7: View of truss 10 looking south, showing timbers sampled for dendrochronology (photograph Duncam James)

Figure 8: View of truss 11, looking north, showing timbers sampled for dendrochronology (photograph Duncan James)

Figure 9: Ground floor of bay 5, showing the fireplace lintel sampled for dendrochronology (photograph Martin Bridge)

Figure 10: View of the west post of truss 15 sampled for dendrochronology (photograph Martin Bridge)

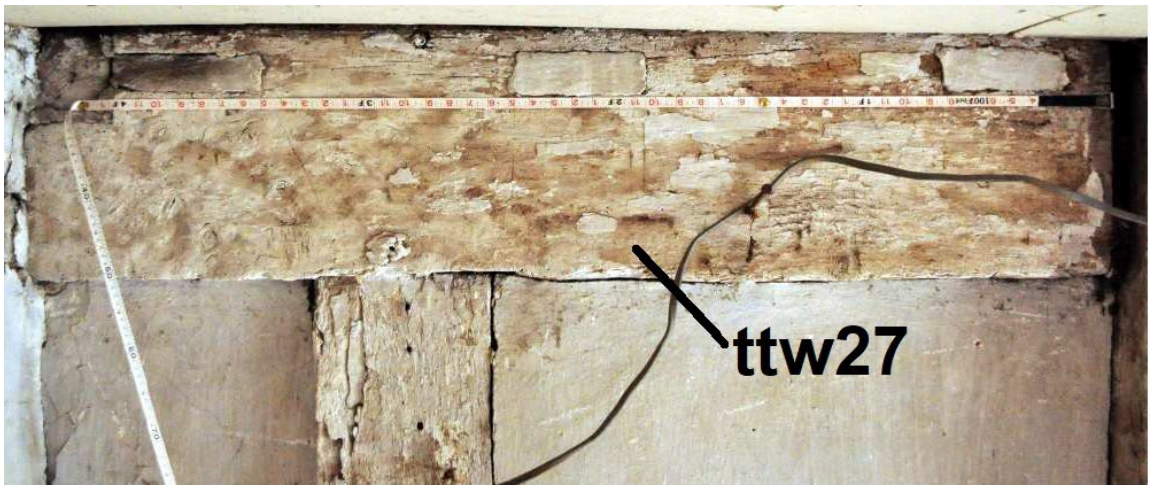

Figure 11: The girding beam in truss 14 sampled for dendrochronology (photograph Duncan James)

Figure 12: Ceiling of the ground-floor room in bay 7, looking east, showing the beam sampled for dendrochronology (photograph Martin Bridge)

Figure 13: View of the porch ground-floor ceiling, looking north-east, showing the beams sampled for dendrochronology (photograph Martin Bridge)

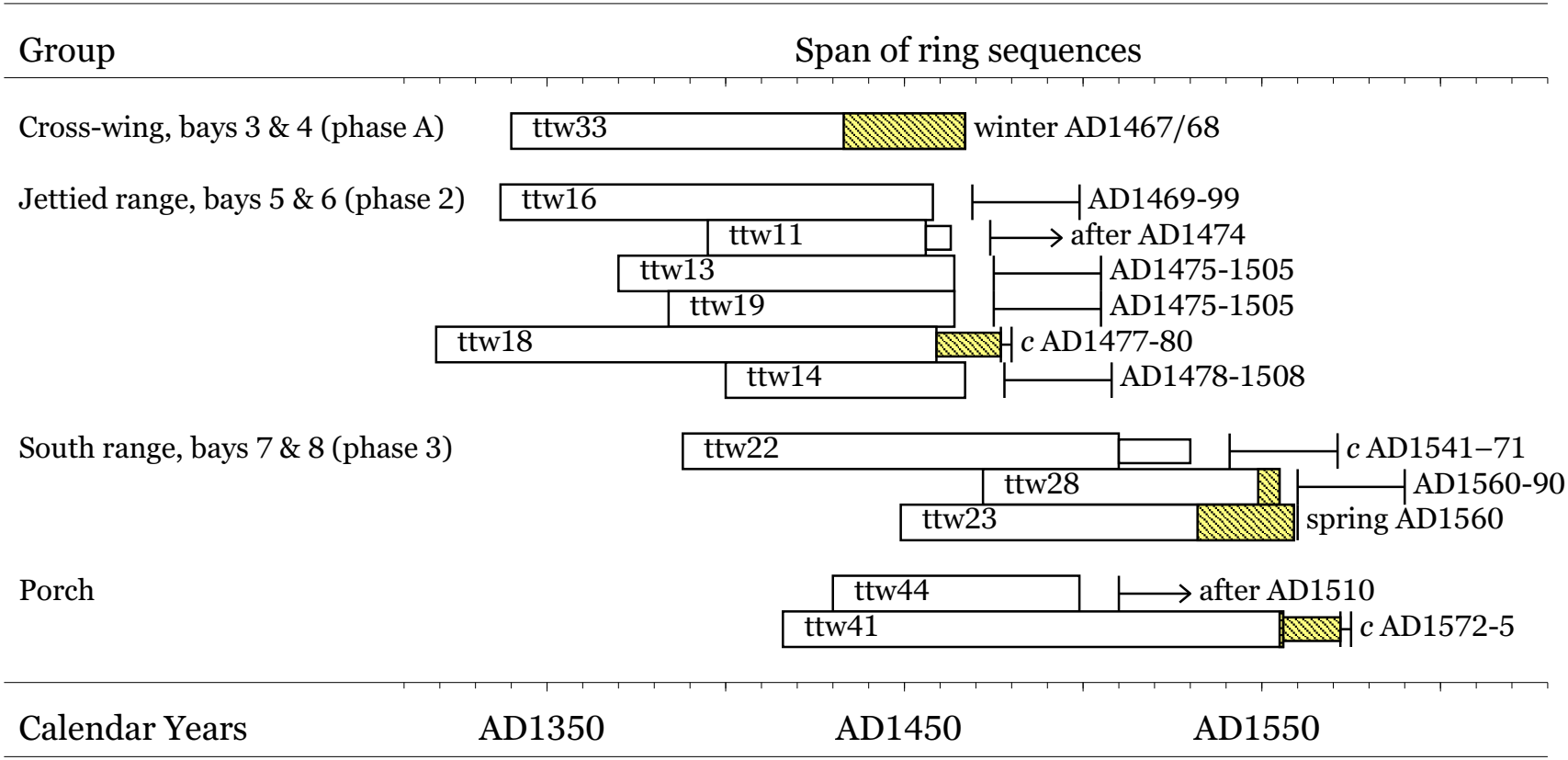

Figure 14: Bar diagram showing the relative positions of overlap and likely felling date ranges for the dated timber from the Throne, Weobley. The white bars represent heartwood rings, the yellow hatched bars represent sapwood rings, and narrow bars represent additional unmeasured rings

DATA OF MEASURED SAMPLES

Ring width values (0.01mm) for the sequences measured

ttw02

412	400	544	417	94	98	123	118	111	128
169	256	272	287	328	398	430	366	282	259
166	232	216	358	301	230	273	437	252	144
147	139	199	206	214	249	283	179	113	76
156	137	173							

ttw03

280	243	201	148	135	74	87	120	149	141
140	141	152	174	207	187	193	185	179	195
224	172	137	137	154	143	150	150	131	114
123	105	106	99	80	69	77	57	57	65
72	43	86	75	59	40	48	43	81	90
162	143	127	113	114	71	75	75	103	98
80	107	108	104	96	141	101	98	102	99
61	44	54	62	74	74	80	62	63	70
67	51	62	45	45	42	45	46	53	48
50	48	49	40	41					

ttw04

330	440	276	404	327	277	286	213	227	341
384	319	279	305	341	269	338	206	199	243
210	112	241	250	218	196	129	132	257	245
164	129	161	179	233	105	131	184	191	140
136	147	84	110	178	129	145	149	157	195
225	298	183	199	151	152	119	99	173	122
121	216	208	159	165	207	157	116	156	162

ttw11

274	325	345	450	418	495	395	380	386	391
347	343	362	371	362	304	236	263	266	249
237	208	218	144	156	188	158	184	245	259
257	212	170	191	259	260	285	253	203	216
263	264	222	181	124	206	190	207	235	205
196	206	190	199	193	199	209	246	230	205
213	250								

ttw13

144	88	146	100	121	103	76	55	52	46
50	51	38	40	52	55	69	85	87	70
77	101	112	119	130	130	151	112	174	180
230	205	187	186	146	140	117	134	152	160
140	101	97	93	86	116	96	124	136	89
102	124	123	205	145	170	170	113	124	128
140	168	115	114	113	120	108	103	92	72
85	101	91	100	131	120	132	141	107	150
101	164	115	122	155	128	131	144	115	99
117	105	95	118	111					

ttw14

473	417	393	388	347	307	287	312	325	347
290	237	255	247	254	245	250	279	186	124
193	210	255	303	319	310	297	248	295	295
260	253	209	185	228	209	205	163	150	102
200	178	172	196	234	243	271	292	269	275
233	277	325	270	316	270	264	245	259	242
271	288	249	280	233	159	291	162		

ttw15

454	450	535	529	457	363	241	212	179	137
145	171	223	184	224	253	254	260	289	299
289	257	259	195	207	212	165	237	345	348
248	309	227	224	359	239	209	292	278	297
336	101	175	160	199	172	188	181	201	208
167	218	188	158						

ttw16

209	260	244	190	163	124	133	225	171	163
200	187	157	146	177	143	171	169	123	111
115	112	69	72	74	108	140	129	77	69
55	70	104	87	104	92	77	89	63	50
60	78	97	107	84	60	50	64	77	101
91	101	75	89	103	92	78	77	95	126
113	129	164	155	190	128	169	177	185	231
205	225	289	217	167	192	209	278	237	203
242	207	138	236	196	164	261	177	189	144
90	107	121	132	156	124	105	134	138	122
111	93	88	110	111	107	67	108	114	94
88	105	124	135	117	119	122	139	140	177
160	142								

ttw17

375	368	357	322	363	245	232	449	364	422
414	363	478	327	222	420	541	352	393	343
327	219	233	225	230	169	197	248	196	166
252	239	218	180	216	238	255	222	208	267
200	212	189	205	219	222				

ttw18

182	118	142	130	143	118	105	78	112	130
103	63	52	54	61	123	171	177	117	156
139	131	127	91	77	111	154	142	139	129
111	108	130	129	145	158	128	116	116	94
84	64	80	104	122	129	70	75	52	56
72	84	115	100	76	96	68	43	67	80
106	103	80	47	44	60	56	71	83	70
64	62	60	58	46	51	63	123	113	123
162	240	146	157	201	220	227	238	219	254
302	231	156	176	155	233	241	181	204	207
130	260	170	160	388	242	253	191	113	190
196	194	206	189	130	146	179	131	128	137

88 107 126 109 122 120 112 85 90 116
140 149 125 140 127 151 143 176 154 136
213

ttw19
63 130 108 102 111 126 160 218 234 283
255 270 301 277 303 284 357 253 223 287
199 211 193 167 188 190 173 126 152 127
130 148 163 156 183 118 190 181 168 196
159 183 226 191 163 189 150 136 139 128
128 106 118 106 120 129 146 150 91 115
122 132 128 142 130 131 118 108 125 109
120 114 141 129 121 111 128 137 139 130
88

ttw20
407 347 322 394 354 351 537 545 529 372
547 380 503 527 540 585 426 452 481 492
501 491 421 541 401 463 446 463 452 389
418 464 80 371 429 332 381 344 372 330
313 408 476 422 370 348 399 386 364 193
132 162 216 219 147 179 290 281 262 301
264 291 220 184 199 333 485 236 233 134
248 422 293 301 264 199 220

ttw21
452 530 174 87 138 221 229 235 211 346
397 358 320 277 298 320 269 361 412 472
372 618 532 288 209 220 423 361 238 282
334 242 283 296 200 160 148 135 167 186
141 114 127 112 111 100 101 136

ttw22
295 239 196 392 402 272 264 285 481 330
359 395 454 338 246 313 271 263 259 226
239 304 184 160 222 192 177 213 191 209
146 105 118 200 176 194 208 170 130 87
118 118 121 122 174 170 153 153 162 167
212 168 175 193 147 206 221 196 172 175
178 154 162 178 177 187 168 208 185 135
197 142 158 142 156 93 80 78 69 82
86 89 85 81 65 70 81 73 80 74
62 65 54 69 58 59 70 59 84 58
50 65 43 60 51 55 54 59 65 60
74 107 69 70 52 67 76 56 59 29
37 43 34

ttw23
323 258 357 283 248 313 213 296 239 259
102 316 306 195 325 194 272 308 288 295
340 370 320 262 242 268 475 352 385 280
337 221 422 370 394 365 270 272 310 265

184 243 186 168 220 167 134 289 184 160
266 201 134 211 167 283 451 280 352 355
412 282 313 286 332 277 191 132 124 125
229 138 142 186 169 133 98 142 138 113
100 99 115 79 72 85 109 77 91 78
105 76 109 99 80 94 87 86 93 97
116 136 97 66 77 86 88 89 108 100
109

ttw24
381 90 90 72 48 74 52 58 70 78
73 84 86 42 68 108 94 92 92 149
133 176 128 166 214 194 262 310 375 110
61 41 45 44 65 88 84 96 166 131
115 123 137 151 171 145 175 181 185 219
182 236 188 216 217 252 202 279 276 384
670 665 391 352 375 416 458 463 311 398
660 127 373 429 415 449 411 405 231 266
253 205 62 55 39 39 49 66 78 81
115 103 154 93 125 121

ttw25
318 365 351 399 354 417 341 395 232 265
261 303 77 107 134 67 75 61 78 77
65 68 66 80 84 103 103 93 114 118
158 133 197 277 230 267 261 220 67 33
41 46 40 50 55 63 69 59 84 116
98 82 108 106 165 115 95 175 156 164
177 168 220 198 254 202 222 188 300 358
533 730 650 553 429 307 360 369 343 290
198 409 276 214 221 228 289 306 462 428
93 48 57 93 42 47 38 57 69 98
155 200 200 182 210 152 165 88 35 34

ttw26
381 380 386 433 423 340 167 83 138 180
157 189 241 337 317 244 190 267 330 256
283 314 303 286 213 265 273 234 185 222
317 292 260 288 261 327 266 324 278 235
225 190 200 175 212 152 141 116 132 111
119 153 120 119 138 169 142 165 114 61
58 49 40 49 37 48 74 63 58 86
76 88 95 83 69 61 75 86 74 72
78 69 64 72 71 78 79 79 69 70
62 67 71 69 69 68 74 39 46 47
54 59 64 85 100 106 84 83 89 81
97 70 69 77 72 83 66 68 79 56
64 53 45 30 20 33 41 41 40 44
57 59 69 85 69 66 64 66 64 70
70 47 55 60 38 53 59 54 58 48
39 44 42 56 39 46 48 43 43 49
44 59 48 53 53 66 67 67 70 62
62 108 89 55

ttw27

95	104	156	162	151	147	156	181	164	223
164	137	230	418	337	415	462	146	89	131
135	182	155	114	145	177	223	226	192	109
75	91	95	169	180	173	221	180	208	238
301	217	279	190	310	268	99	58	60	77
82	89	85	69	52	29	56	126	145	138
100	82	109	138	157	179	131	118	186	172
189	221	168	171	245	266	239	120	181	211
239	300	234	208	234	235	203	219	223	122
45	37	47	65	51	95	120	134	175	116
127	122	167	206	197	207	234	154	192	216
229	65	32	45	38	34	47	35	56	100
111	150	227	147	170	211				

ttw28

341	275	344	490	366	267	159	265	252	300
278	283	279	249	333	286	249	173	301	224
157	159	217	214	312	225	153	277	178	143
155	186	231	278	261	224	330	287	258	268
268	257	200	204	191	249	252	351	194	216
191	226	154	102	161	183	134	110	99	171
115	126	130	70	141	133	130	151	110	141
105	107	96	55	72	87	89	115	111	130
107	119	124	135						

ttw32

92	106	68	37	36	40	136	325	155	114
109	133	205	543	564	478	430	382	420	453
509	531	464	367	404	451	380	487	111	34
35	49	95	116	123	170	222	412	146	38
37	53	65	108	155	134	171	222	138	112
135	120	223	315	320	351	347	288	312	90
74	65	59	69	97	83	87	115	101	116
154	118								

ttw33

140	119	106	64	97	123	106	86	94	140
117	128	93	69	103	68	55	99	66	90
86	55	82	63	63	40	56	55	47	55
60	42	40	61	75	72	54	45	43	68
56	50	43	75	58	65	70	55	85	67
85	73	52	54	69	64	87	73	63	70
88	85	76	74	77	59	55	63	86	115
137	93	77	84	78	87	65	73	85	73
77	92	99	100	97	100	68	49	90	102
63	61	74	82	94	119	137	183	76	67
78	86	82	91	86	63	64	90	75	92
75	79	81	66	64	63	74	71	58	58
44	38	32	43	29	43	36	62		

ttw34

172 138 140 161 191 159 173 120 124 119
94 76 122 125 136 142 112 150 121 142
105 123 131 102 90 74 86 112 101 129
102 118 108 87 94 93 95 86 79 94
67 87 70 84 83 74 68 76 73 57
69 69 72 74 64 75 107 75 87 96
81 63 67 110 131 95 76 70 68 50
66 68 85 76 64 78 107 150 200 181
201 177 105 163 147 135 145 127 134 128
161 132 138 150 94 96 77 68 71 82
67 49 56 50 54 68 71 57 60 57
58 46 58 60 48 48 40 42 36 34
39 32 32 37 44 42 36 40

ttw36
620 509 535 597 570 593 525 457 463 519
421 517 475 380 289 290 303 403 399 245
387 385 302 366 342 379 314 318 284 291
327 310 318 223 217 204 238 229 245 201
219 118 165 138 171 198 215 169 163 183
192 173 103 164 203 189 161 160 132 109
97 98 133 157 114 106 114 86 111 121
78 54 98 113 169 142 181 124 147 114
93 112

ttw41
152 149 133 97 116 117 97 138 129 121
112 108 118 111 113 113 116 97 127 107
95 87 74 88 120 120 95 118 121 113
127 107 95 84 77 64 72 105 101 91
92 83 85 73 87 102 100 83 56 78
75 66 68 74 74 78 81 91 109 122
114 99 91 110 104 113 108 121 116 111
121 126 89 77 123 95 80 98 88 97
92 99 71 79 84 83 94 94 92 82
92 76 92 113 90 107 103 99 78 79
96 90 73 105 91 101 119 88 104 107
139 138 140 159 105 151 106 114 127 127
143 112 103 98 123 145 119 145 140 119
117 120 139 144 119 132 120 144 117 122
67

ttw42
153 229 306 335 312 273 319 332 316 348
318 270 303 367 387 333 368 283 403 382
293 353 358 215 464 376 242 382 290 349
238 238 314 303 195 215 164 228 179 315
174 214 190 187 183 194 140 170 183 161
170 207 192 176 155 53 197 176 178 139
137 144 168 132

ttw43
116 116 111 112 129 122 152 117 98 144

125 117 119 119 115 101 97 115 113 110
125 75 89 112 115 115 112 106 85 94
77 96 96 92 102 91 113 114 104 107
105 99 112 109 89 74 105 92 94 103
92 104 101 101 127 121 131 152 108 126
132 115 103 105 123 119 113 122 128 103
119 117 123 152 172 109 126 127 124 114
101 112 119 136 104 95 123 104 114 115
132 122 103 131 118 141 117

ttw44
239 308 192 170 131 157 137 143 129 120
151 121 109 137 163 132 143 139 161 179
124 123 157 156 174 221 212 184 168 124
148 158 136 142 120 115 125 110 119 109
117 106 123 128 135 175 134 110 108 155
140 139 140 160 166 153 162 198 133 146
116 124 104 142 173 163 177 165 142 137

ttwx
455 451 557 542 569 539 559 511 566 410
314 255 294 339 315 303 234 217 183 153
150 158 128 156 148 223 217 139 152 113
88 109 108 121 123 126 111 119 108 98
118 108 88 84 97 104 123 145 151 162
139 155 192 169 174 148 184 213 184 115
147 150 130

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