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Tree-Ring Analysis of Timbers from Fiddleford Manor, Calf Close Lane, Sturminster Newton, Dorset

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Summary

This building is especially known for its elaborate roofs in the Hall and Solar, thought to be contemporaneous and of late fourteenth-century origin. Three timbers from the Solar roof dated, though two are thought to have been derived from the same tree. The felling dates for the two trees involved are AD 1301-33 and AD 1324-56, suggesting a slightly earlier construction date than the time of ownership of William Latimer, after AD 1355, to whom both roofs have traditionally been attributed. No timbers dated from the Hall roof.

A main beam from the Buttery ceiling was felled after AD 1524, and three inserted ceiling beams in the Hall most likely form a single group of timbers felled in the winter AD 1553-4, at the end of a known period of remodelling of the property.

Keywords

Dendrochronology
Standing Building

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Introduction

Fiddleford Manor (NGR ST 801 136; Fig 1), also often referred to as Fiddleford Mill, is situated about one and a half kilometres east of Sturminster Newton. The former manor house is presently configured as two houses. At the south end is the fourteenth-century two-storey Solar and an adjoining Hall, belonging to English Heritage and open to the public. This section is a Scheduled Ancient Monument. North of this, the sixteenth-century range attached to the solar functions as a private house. Both sections of the building are listed grade I.

It is likely that the Hall and Solar were built for William Latimer, when the manor of Fiddleford passed to him around AD 1355. Although there are slight differences in the form of the trusses in the Hall and Solar roofs, shown in Figures 4-7, they are thought to be exactly contemporaneous.

During the sixteenth century, the house belonged to the White family and extensive remodelling was undertaken by Thomas and Ann White (AD 1539-55). During this period, the Hall was rebuilt in finely worked stone, a new fireplace was constructed in the south wall, and a porch and oriel window were added. The old roof was dismantled and re-erected in order to insert the beams that support a flat moulded plaster ceiling, which has since been removed. The service rooms were also removed from the ground floor and an internal staircase added at this time. In the late-sixteenth or early-seventeenth century a gallery was added at the west end of the Hall.

Dendrochronological investigation of the Solar and remaining original parts of the Hall roof was requested in order to date the construction of the Hall and Solar roofs and the remodelling of the Hall with the insertion of the ceiling beams (Figs 2-7). This would both inform the future management of the property and assist in its interpretation to the visiting public.

Methodology

The site was visited in September AD 2002 when Jenny Chesher and Nicholas Molyneux (English Heritage) discussed the areas of interest and possible sampling. This resulted in the original brief being extended to include timbers in the service rooms. The sampling was carried out in October AD 2002. 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 utilizing a binocular microscope with the sample mounted on a travelling stage with a linear transducer linked to a PC. 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

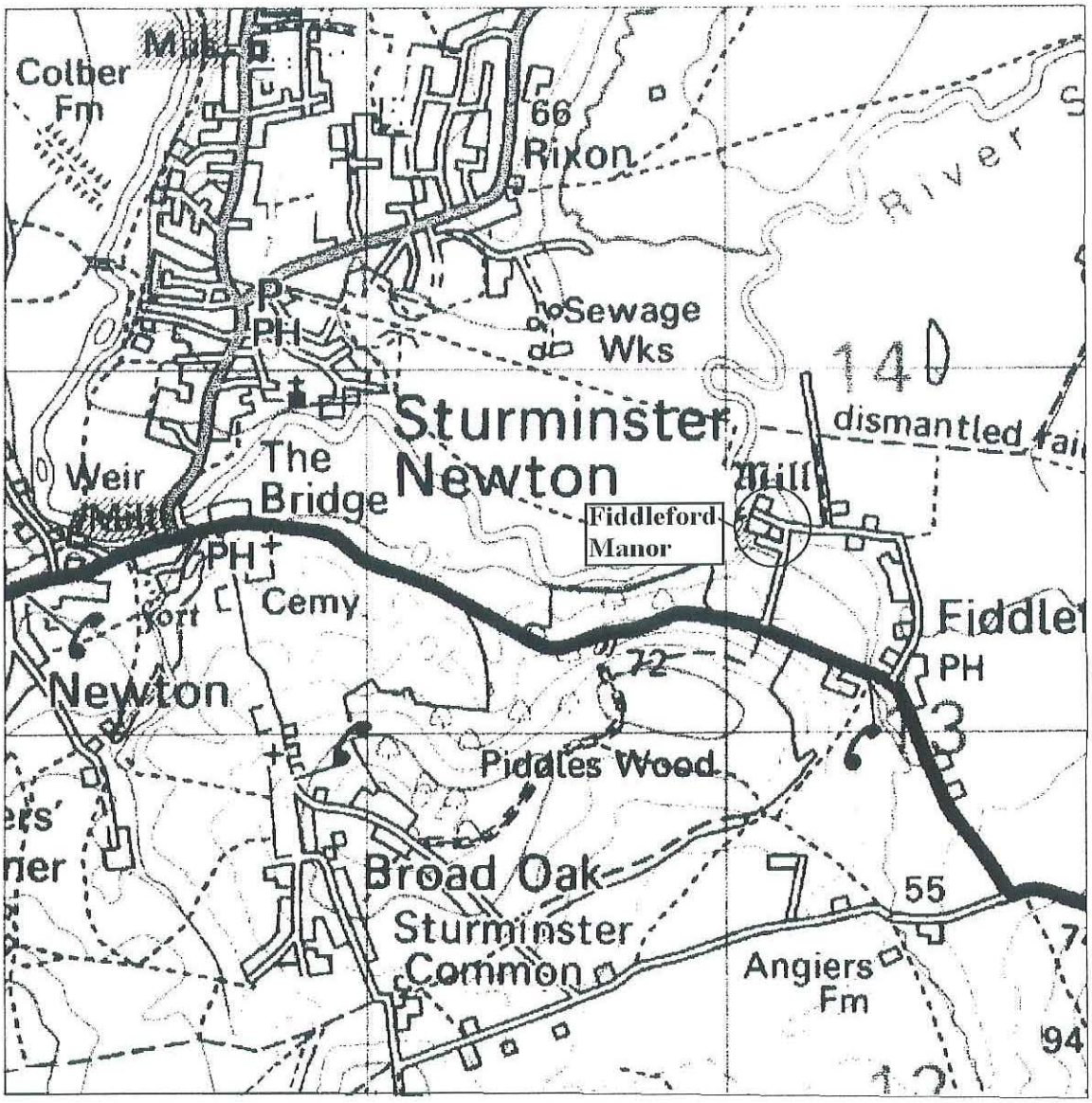

Figure 1: Map showing the general location of Fiddleford Manor

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 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).

Results

A large number of the timbers assessed were unsuitable for further study as they contained too few rings. This factor also meant that most of the areas that were subsequently sampled had far fewer samples representing them than would normally be thought desirable.

All the timbers investigated were of oak (*Quercus* spp.). The locations of the samples are shown in Figures 2 - 7, and described along with other basic details in Table 1. None of the drawings available were suitable for locating samples FDF 14 and 15, from the Buttery, although the north-south ceiling beam is in the equivalent position to the beam in the Pantry, and the sole plate adjacent to the stairs was sampled in a similar position to the base of the central stud in the Pantry, shown in Figure 3. The Buttery is located at the southern end of the Solar wing, with the Pantry to the north. In addition to the sampled areas, two other sets of timbers were assessed but rejected. The doorway and partition timbers between solar and hall at first-floor level had too few rings, and the stair treads looked to have sufficient rings but could not be sampled without causing unacceptable aesthetic damage.

Table 2 shows the crossmatching between samples, highlighting that there are two groups of timbers. Samples FDF 09 and 10 crossmatch with a *t*-value of 10.4, and show very strong similarities in their plots. As they are two elements of a rafter pair they are assumed to be from the same tree, and were combined in further analysis. Thus series FDF0910 and FDF13 were combined to form a 149-year series FIDDLEFORD1, which was dated by comparison with a range of multi-site regional, and individual site chronologies, the best results being shown in Table 3.

Samples FDF 01, 02, 03, and 14 were combined into a second site chronology, FIDDLEFORD2, which was dated in the same way, the best results being shown in Table 4.

The data for each site chronology are given in Table 5. A bar diagram showing the relative positions of overlap of the dated timbers is given in Figure 8.

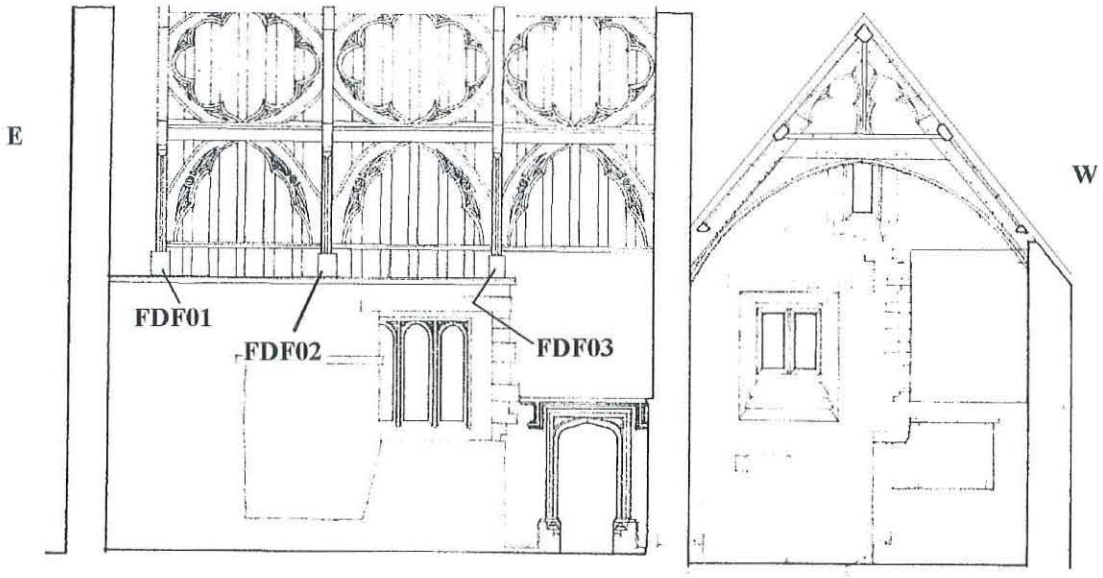

Figure 2: Cross-section looking south, showing the inserted ceiling beams in the hall from which samples were taken for dendrochronology, adapted from an English Heritage drawing

Figure 3: Cross-section looking south, showing timbers in the pantry sampled for dendrochronology, adapted from an English Heritage drawing

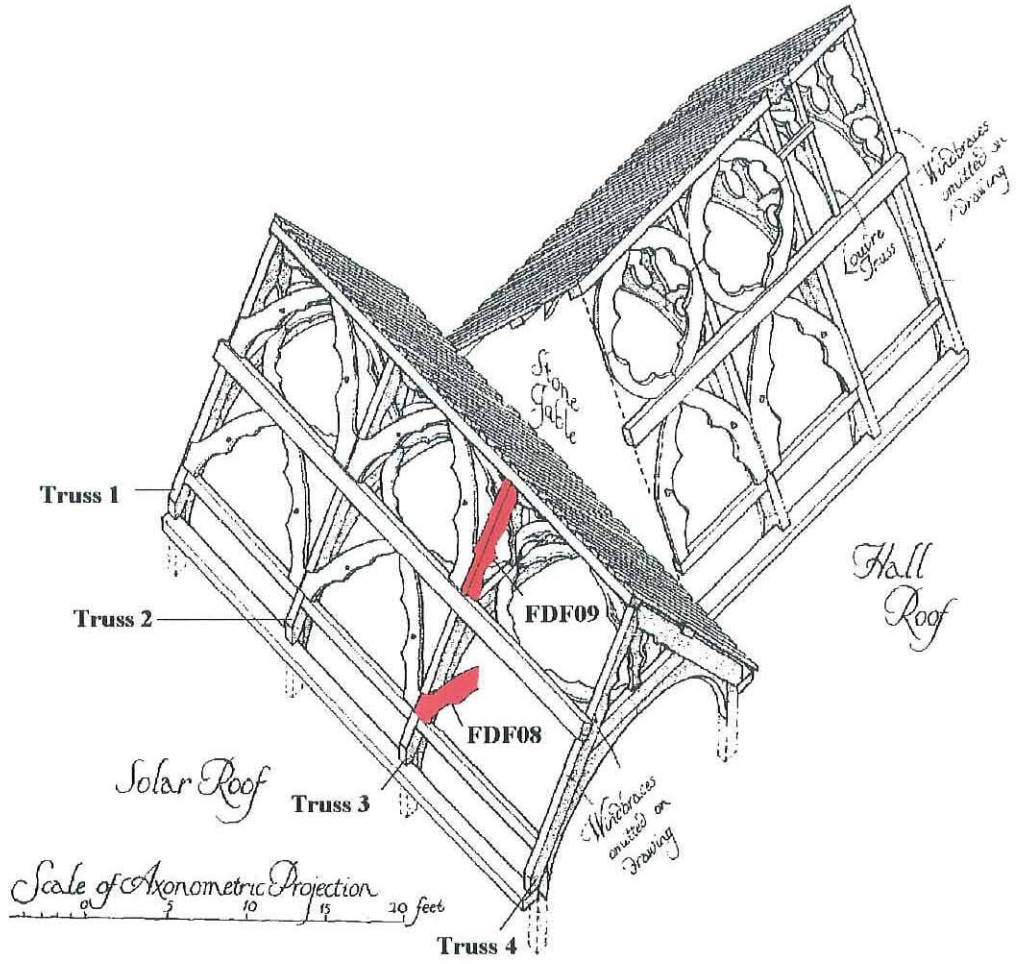

Figure 4: Projection of the Hall and Solar Roof showing the numbering of trusses in the Solar, and some timbers sampled for dendrochronology, adapted from an English Heritage drawing

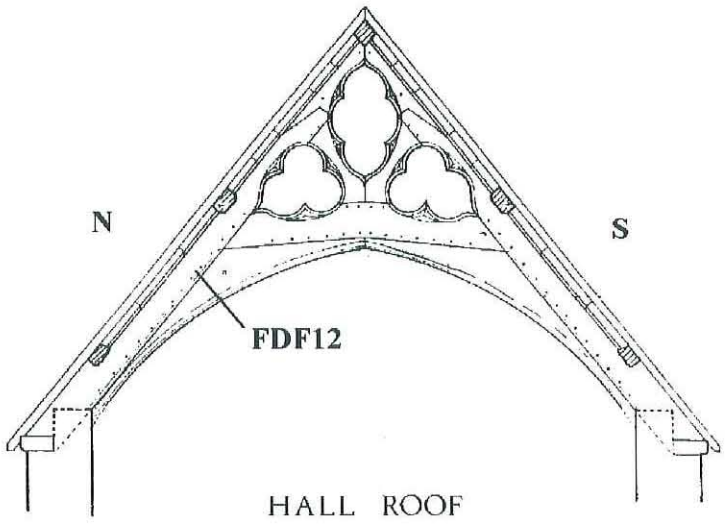

Figure 5: Drawing of the west truss of the Hall, showing the location of sampling for dendrochronology, adapted from an English Heritage drawing

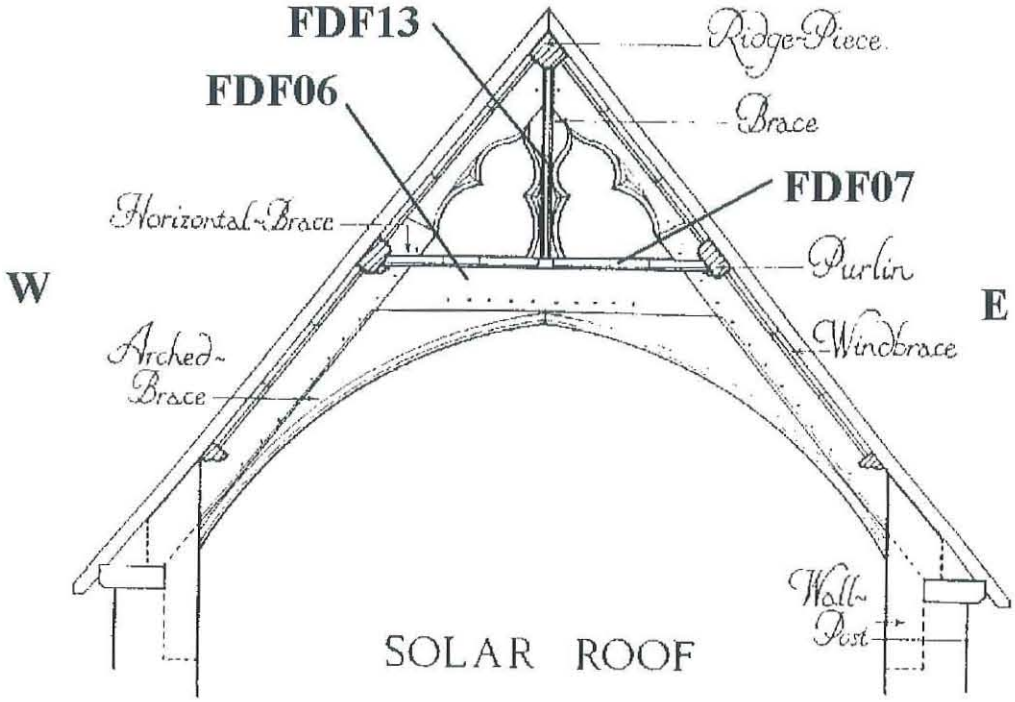

Figure 6: Drawing of Truss 2 of the Solar roof, showing the approximate locations of sampling of the timbers, adapted from an English Heritage drawing

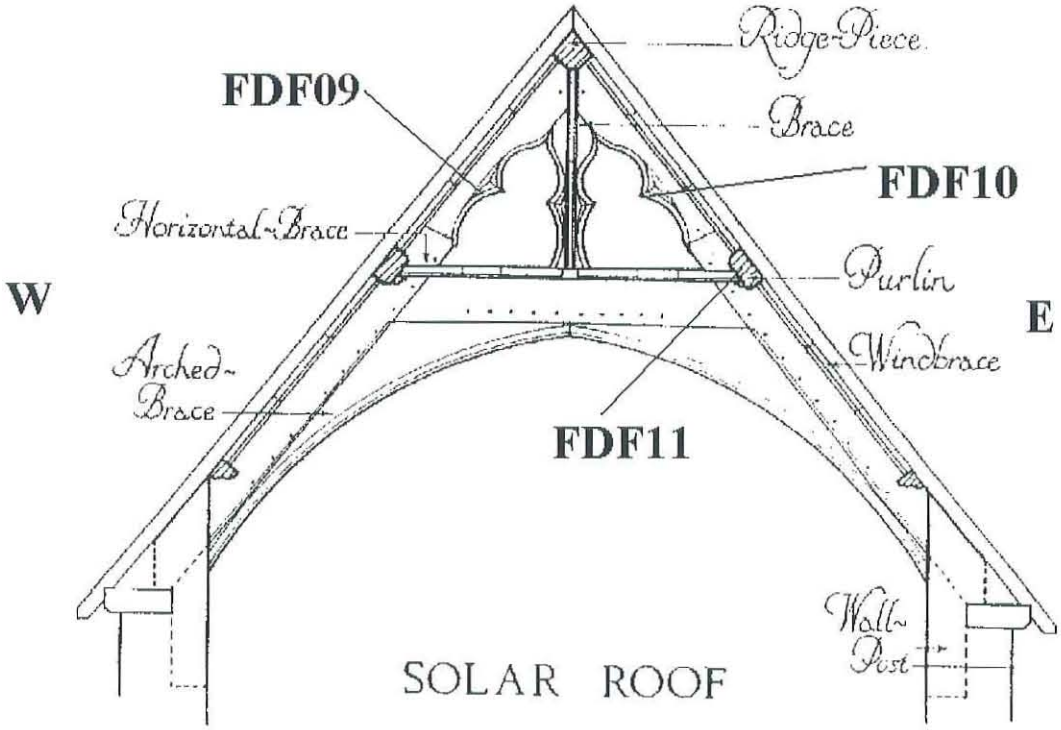

Figure 7: Drawing of Truss 3 of the Solar roof, showing the approximate locations of sampling of the timbers, adapted from an English Heritage drawing

Table 1: Oak (*Quercus* spp.) timbers sampled from Fiddleford Manor. h/s represents the heartwood-sapwood boundary, C represents complete sapwood with bark showing felling in the winter period

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
Inserted Ceiling Beams – Hall						
FDF01	East beam	93	1.23	17C	1461-1553	Winter 1553-4
FDF02	Central beam	91 (+14)	1.63	-	1443-1533	after 1556
FDF03	West beam	101	1.71	11	1433-1533	1533-63
Pantry						
FDF04	North-south ceiling beam	52	2.86	+22 broken off	undated	unknown
FDF05	Central stud, south wall	<50	unmeasured	-	undated	unknown
Solar Roof						
FDF06	Truss 2, collar	<50	unmeasured	-	undated	unknown
FDF07	Bay 1, south-east horizontal brace	<50	unmeasured	-	undated	unknown
FDF08	Bay 3 west, north lower windbrace	<50	unmeasured	-	undated	unknown
FDF09	Truss 3, west upper rafter	56	1.28	-	1183-1238	after 1247
FDF10	Truss 3, east upper rafter	146	1.30	h/s	1170-1315	1324-56
FDF11	Bay 3, south-east purlin	<50	unmeasured	-	undated	unknown
FDF13	Truss 2, crown post	126	0.80	h/s	1167-1292	1301-33
Hall Roof						
FDF12	West truss, north principal rafter	109	1.36	h/s	undated	unknown
Buttery						
FDF14	North-south ceiling beam	65	1.08	-	1451-1515	after 1524
FDF15	Sole plate	66	2.78	2	undated	unknown

Table 2: Crossdating between the dated timbers from Fiddleford Manor. A (–) represents a *t*-value of less than 3.0

	t-value					
Sample no	**FDF02**	**FDF03**	**FDF14**	**FDF09**	**FDF10**	**FDF13**
FDF01	5.7	6.0	-	-	-	-
FDF02		5.3	4.2	-	-	-
FDF03			4.7	-	-	-
FDF14				-	-	-
FDF09					10.4	4.2
FDF10						5.2

Table 3: Dating of the oak site chronology FIDDLEFORD1

	Fiddleford1 AD 1167 - 1315	
Dated reference or site master chronology	*t*-value	Overlap (yrs)
Hants97 (Miles pers comm)	10.0	149
Devon (Groves pers comm)	8.5	149
Southern England (Bridge 1988)	8.4	149
London1175 (Tyers pers comm)	7.6	149
Winterbourne, Gloucestershire (Miles 2001)	9.5	132
Bradford-on-Avon, Wiltshire (Groves and Hillam 1994)	9.3	142
Long Sutton, Somerset (Miles and Worthington 1997)	8.9	142
Glastonbury, Somerset (Bridge 2001a)	8.7	121
Muchelney, Somerset (Bridge forthcoming)	8.1	149
Meare, Somerset (Bridge 2002a)	8.0	141
Coxwell, Berkshire (Siebenlist-Kerner *et al* 1978)	7.9	101
North Cadbury, Somerset (Miles and Worthington 1998)	7.2	73
Doulting, Somerset (Miles and Worthington 2000)	7.1	121

Table 4: Dating of the oak site chronology FIDDLEFORD2

	Fiddleford2 AD 1433 - 1553	
Dated reference or site master chronology	*t*-value	Overlap (yrs)
Hants97 (Miles pers comm)	8.1	121
London1175 (Tyers pers comm)	7.5	121
Oxon93 (Miles pers comm)	7.4	121
Southern England (Bridge 1988)	5.3	121
Windsor Castle, Berkshire (Hillam and Groves 1996)	8.1	121
Sherborne, Dorset (Bridge 1993)	7.9	42
Mottisfont, Hampshire (Miles 1996)	6.8	106
Westgate Street, Gloucester (Tyers and Wilson 2000)	6.7	86
Oxford Prison (Miles and Haddon-Reece 1995)	6.6	119
Exton, Hampshire (Miles and Haddon-Reece 1995)	6.1	114
Little Wymondley, Hertfordshire (Bridge 2001b)	5.9	91
Vowchurch, Herefordshire (Nayling 1999)	5.9	121
Badge Court, Worcestershire (Bridge 2002b)	5.6	67

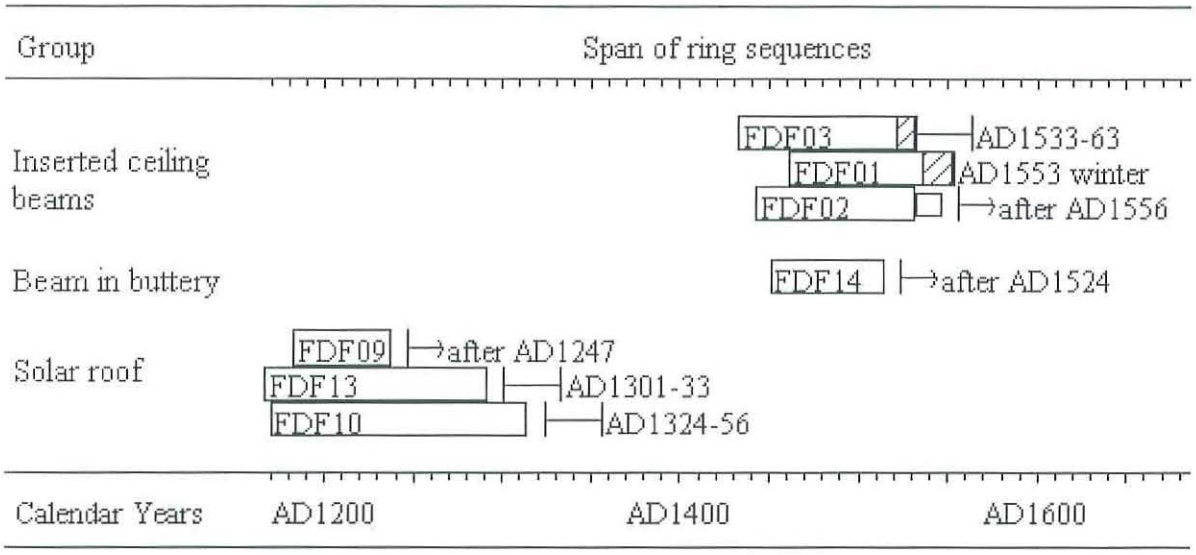

Figure 8: Bar diagram showing the relative positions of overlap of the dated samples from Fiddleford Manor, with their interpreted felling date ranges. Narrow bar sections represent additional unmeasured rings

Interpretation and Discussion

Whilst much of the timber used in the construction of the Hall and Solar roofs was fast-grown and knotty, suggesting a hedgerow-like origin, some timbers contain sufficient rings to enable them to be dated. The quality of the timber is surprising, given the magnificence of the roofs, and may suggest a shortage of timber locally at the time of construction. There has never been a question that the two roofs were anything other than exactly contemporaneous, though insufficient suitable timbers were available from the Hall to check this notion dendrochronologically. The only sampled timber from the Hall failed to date.

The two dated timbers from the Solar roof both have likely felling periods that make it probable that they were felled before the date that the property passed to William Latimer. It should be noted however that the date of the heartwood-sapwood boundaries in these two timbers are some 23 years apart. If they are assumed to be contemporaneous, their combined felling date period is AD 1324 – 33, but further evidence is required to show whether or not it is valid to consider these timbers as a single group. For such a large roof it is possible that some timbers were stockpiled before use. Nevertheless, it is of interest that this derived felling period is decades before the presumed construction date of after AD 1355. It would be useful to get further dates on roof timbers, though it is unlikely that any further timbers are datable using current methodology.

The inserted ceiling beams in the Hall appear to form a single group of timbers, one of which has an actual felling date of winter AD 1553-4. This is in accord with the known remodelling period of AD 1539-55. FDF02 has a likely felling date a few years after this date, but this may be one of the 5% of timbers that has fewer than the 9-41 year range of sapwood ring numbers. Nicholas Molyneux (English Heritage) noted during our initial assessment of the building that these beams were more likely to date the rebuilding of the Hall walls than the

insertion of the ceiling *per se*. If the historical records for remodelling can be relied on, the dendrochronological results suggest that these beams probably do also date the time of insertion of the ceiling, since the date is right at the end of the period, just prior to the death of Thomas White.

The single dated timber from the service rooms, the main north-south ceiling beam in the Buttery, may have a slightly earlier felling date range (after AD 1524) and may represent earlier work in this phase of remodelling, or it may be contemporaneous with the inserted beams in the Hall, but since no sapwood was found on the sample it is difficult to say more than this. The Buttery beam did not match the Hall ceiling beams particularly well (Table 2), suggesting it was perhaps from a different source.

The derived site chronologies are not especially well replicated, but both date readily. The earlier site chronology matches well with more local chronologies, whereas the late chronology matches with chronologies from a wider geographical spread.

The timbers of the stair treads and a window lintel in the Buttery were not sampled on this occasion for the reasons given above, but these could possibly provide further dating evidence in the future.

Acknowledgements

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Table 5: Ring width data for the site chronologies Fiddleford1 AD 1167-1315 and Fiddleford2 AD 1433-1553

ring widths (0.01mm)	number of trees

Fiddleford1 1167-1315

149	170	133	166	214	181	217	324	245	247	1	1	1	2	2	2	2	2	2	2
115	176	167	133	240	249	172	93	106	106	2	2	2	2	2	2	2	2	2	2
232	90	124	139	126	119	161	175	202	189	2	2	2	2	2	2	2	2	2	2
191	213	167	230	203	159	129	114	126	107	2	2	2	2	2	2	2	2	2	2
75	128	103	147	89	83	79	79	100	84	2	2	2	2	2	2	2	2	2	2
80	62	118	105	88	62	57	58	81	112	2	2	2	2	2	2	2	2	2	2
87	141	131	78	47	51	72	67	76	51	2	2	2	2	2	2	2	2	2	2
73	80	69	56	59	73	96	101	105	115	2	2	2	2	2	2	2	2	2	2
71	65	84	79	82	67	80	70	104	94	2	2	2	2	2	2	2	2	2	2
66	68	60	60	76	83	60	60	76	83	2	2	2	2	2	2	2	2	2	2
63	91	55	59	94	69	93	78	46	51	2	2	2	2	2	2	2	2	2	2
64	67	59	81	71	67	67	68	77	93	2	2	2	2	2	2	2	2	2	2
57	35	51	63	57	98	120	91	78	65	2	2	2	2	2	2	1	1	1	1
58	60	35	54	101	152	68	53	62	60	1	1	1	1	1	1	1	1	1	1
63	85	76	68	67	59	66	74	125		1	1	1	1	1	1	1	1	1	

Fiddleford2 AD1433 to AD1553

265	302	294	199	150	186	121	65	233	152	1	1	1	1	1	1	1	1	1	1
123	177	142	171	184	216	133	175	148	94	2	2	2	2	2	2	2	2	3	3
89	123	128	183	172	213	148	202	109	160	3	3	3	3	3	3	3	3	4	4
193	129	201	199	154	174	165	160	140	120	4	4	4	4	4	4	4	4	4	4
137	139	152	73	80	85	97	109	148	114	4	4	4	4	4	4	4	4	4	4
105	95	118	130	142	115	140	112	72	76	4	4	4	4	4	4	4	4	4	4
107	119	117	212	129	104	141	151	133	199	4	4	4	4	4	4	4	4	4	4
154	157	142	121	113	119	122	143	157	182	4	4	4	4	4	4	4	4	4	4
205	178	156	100	112	158	243	135	219	229	4	4	4	3	3	3	3	3	3	3
150	112	116	97	123	152	112	97	181	108	3	3	3	3	3	3	3	3	3	3
152	160	170	125	136	117	282	226	361	159	3	1	1	1	1	1	1	1	1	1
146	200	240	171	188	186	227	110	77	65	1	1	1	1	1	1	1	1	1	1
115										1									