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Summary

A tree-ring dating programme was commissioned of timbers in Higher Uppacott, a longhouse in Dartmoor National Park. Unfortunately tree-ring analysis provides no dating evidence for these timbers.

Keywords

Dendrochronology
Standing Building

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Introduction

This document is a technical archive report on the examination and tree-ring analysis of oak timbers from Higher Uppacott, a longhouse on Dartmoor, Devon (NGR SX 7012 7288). It is beyond the dendrochronological brief to describe the building in detail or to undertake the production of detailed drawings. Elements of this report may be combined with detailed descriptions, drawings, and other technical reports at some point in the future to form either a comprehensive publication or an archive deposition on the building.

Higher Uppacott is one of a pair of longhouses in the settlement of Uppacott. It stands at about 280 m height in Dartmoor National Park, within the enormous parish of Widecombe on the Moor. Widecombe village is 4 km north, Ashburton is about 6 km to the south-east (Figs 1 and 2). Tree-ring analysis was commissioned by Rebecca Child, the local English Heritage Historic Buildings Architect, to inform a programme aimed at re-organising the living accommodation, to inform the public presentation of this important building, and to strengthen and geographically extend the tree-ring data for Devon.

The following description is based on that of Keystone Historic Building Consultants (Thorp 2002, 11-30). The farmhouse is of L-plan, with a main block running north-south (Fig 3). The shippon is at the southern end, with a cross-passage, hall, and parlour to the north. A seventeenth-century parlour block is set at right angles to the parlour running east. The property is now of two stories throughout, and the shippon has a loft. The earliest timber structures appear to be three trusses. The southernmost truss (truss 1 of Thorp 2002) is in the shippon, and is a cruck frame with a collar (now lost), a yoke, a square set ridge, trenched purlins, and clasped rafters. The three bay roof over the hall and parlour is carried on two trusses (trusses 2 and 3 of Thorp 2002). These are A-frames set on posts in the walls (Fig 4). There are cambered collars, threaded purlins, and a diamond set threaded ridge, along with a number of possibly original rafters. The thatch and timberwork are smoke blackened. John Thorp suggests a fourteenth- or early fifteenth-century date for truss 1 (2002, 17-18) and a late fifteenth- or early sixteenth-century date for trusses 2 and 3 (2002, 19-21).

Methodology

The general methodology and working practises used at the Sheffield Dendrochronology Laboratory are described in English Heritage (1998). The methodology used for this building was as follows. The building was visited in company with Deborah Griffiths, Head of Archaeology and Historic Buildings with the Dartmoor National Park Authority, and Bill Allen, a Dartmoor National Park Ranger and the tenant of the property. An assessment of the dendrochronological potential of the building was undertaken. This assessment aimed to identify whether oak timbers with potentially suitable ring sequences for analysis existed in the structure. This assessment identified that the building contained suitable material. A dendrochronological sampling programme was devised that attempted to cover the suitable material by obtaining samples from as broad a range of timbers, in terms of structural element types, scantling sizes, carpentry features, and surface condition as was possible within the terms of the commission.

The most promising timbers were sampled using a 15mm diameter corer attached to an electric drill. The cores were taken as closely as possible along the radius of the timbers so that the maximum number of rings could be obtained for subsequent analysis. The core holes were left open to allow for ventilation. The ring sequences in the cores were revealed by sanding.

The complete sequences of growth rings in the cores were measured to an accuracy of 0.01mm using a micro-computer based travelling stage (Tyers 1999). The ring sequences were plotted onto semi-log graph paper to enable visual comparisons to be made between sequences. In addition a cross-correlation algorithm (Baillie and Pilcher 1973) was employed to search for positions where the ring sequences were highly correlated. These positions were checked visually using the graphs and, where these were satisfactory, new mean sequences were constructed from the synchronised series. The *t*-values reported below are derived from the original CROS algorithm (Baillie and Pilcher 1973). A *t*-value of 3.5 or over is usually indicative of a good match, although this is with the proviso that high *t*-values at the same relative or absolute position must be obtained from a range of independent sequences, and that these positions are supported by satisfactory visual matching.

All the measured sequences from this assemblage were compared with each other and any found to cross-match were combined to form a site master curve. These, and any remaining unmatched ring sequences, were tested against a range of reference chronologies, using the same matching criteria: high *t*-values, replicated values against a range of chronologies at the same position, and satisfactory visual matching. Where such positions are found these provide calendar dates for the ring-sequence.

The tree-ring dates produced by this process initially only date the rings present in the timber. The interpretation of these dates relies upon the nature of the final rings in the sequence. If the sample ends in the heartwood of the original tree, a *terminus post quem (tpq)* for the felling of the tree is indicated by the date of the last ring plus the addition of the minimum expected number of sapwood rings which are missing. This *tpq* may be many decades prior to the real felling date. Where some of the outer sapwood or the heartwood/sapwood boundary survives on the sample, a felling date range can be calculated using the maximum and minimum number of sapwood rings likely to have been present. Alternatively, if bark-edge survives, then a felling date can be directly utilised from the date of the last surviving ring. The dates obtained by the technique do not by themselves necessarily indicate the date of the structure from which they are derived. It is necessary to incorporate other specialist evidence concerning the re-use of timbers, seasoning, and the repairs of structures before the dendrochronological dates given here can be reliably interpreted as reflecting the construction date of phases within the structure.

Results

No suitable material was present in truss 1 or its associated roof in the shippon. Ten timbers were selected for sampling from the structural elements of trusses 2 and 3 and the associated roof. The samples were numbered **1-10** (Table 1). The sample locations throughout the structure were recorded using the Keystone truss numbering scheme of (Figs 3 and 4).

All the sampled timbers are oak (*Quercus* spp.). The tree-ring series from the sampled timbers were measured and the resultant series were then compared with each other. Three of the samples from the principal rafters were found to match together (Table 2), as were two from the common rafters (Table 3). Two site mean chronologies were calculated, named UPP_PRIN from the three principal rafter samples **1**, **2**, and **3** with a combined length of 82 years, and UPP_RAFT from the two common rafter samples **5** and **6** with a combined length of 65 years. These two site means and all the individual sequences were then compared with dated reference chronologies from throughout the British Isles and northern Europe. No replicated matching positions have been identified for these series. This material is thus undated by the analysis reported here. Appendix 1 lists the individual sample series.

Discussion

No tree-ring results were obtained from the sampling and analysis of the timbers at Higher Uppacott. No suitable material was present in the shippon. The samples from the hall are not matched to reference data. This may be because of the lack of contemporaneous reference sequences from this part of Devon. If this is the problem it is presumably not helped by the remoteness of the site and the relative shortness of the sequence lengths recovered from each sample. Since there are visual similarities in overall shape and branching patterns for three of the principal rafters it is possible to suggest these three timbers were slabs derived from a single tree. If this is correct then it may be that the material at Higher Uppacott is of a particularly difficult character for tree-ring analysis, demonstrated by the unusually low cross-correlations between the samples from these three timbers (Table 2).

Acknowledgements

The sampling and analysis programme was funded by English Heritage. Bill Allen and Debbie Griffiths discussed the building and its interpretation, and provided wonderful hospitality. Cathy Groves discussed the samples and the results in relation to other Devon material.

References

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Tyers, I, 1999 *Dendro for Windows program guide 2nd edn*, ARCUS Rep, **500**

Figure 1 Location of Higher Uppacott, Widecombe on the Moor, Devon, within England and Wales

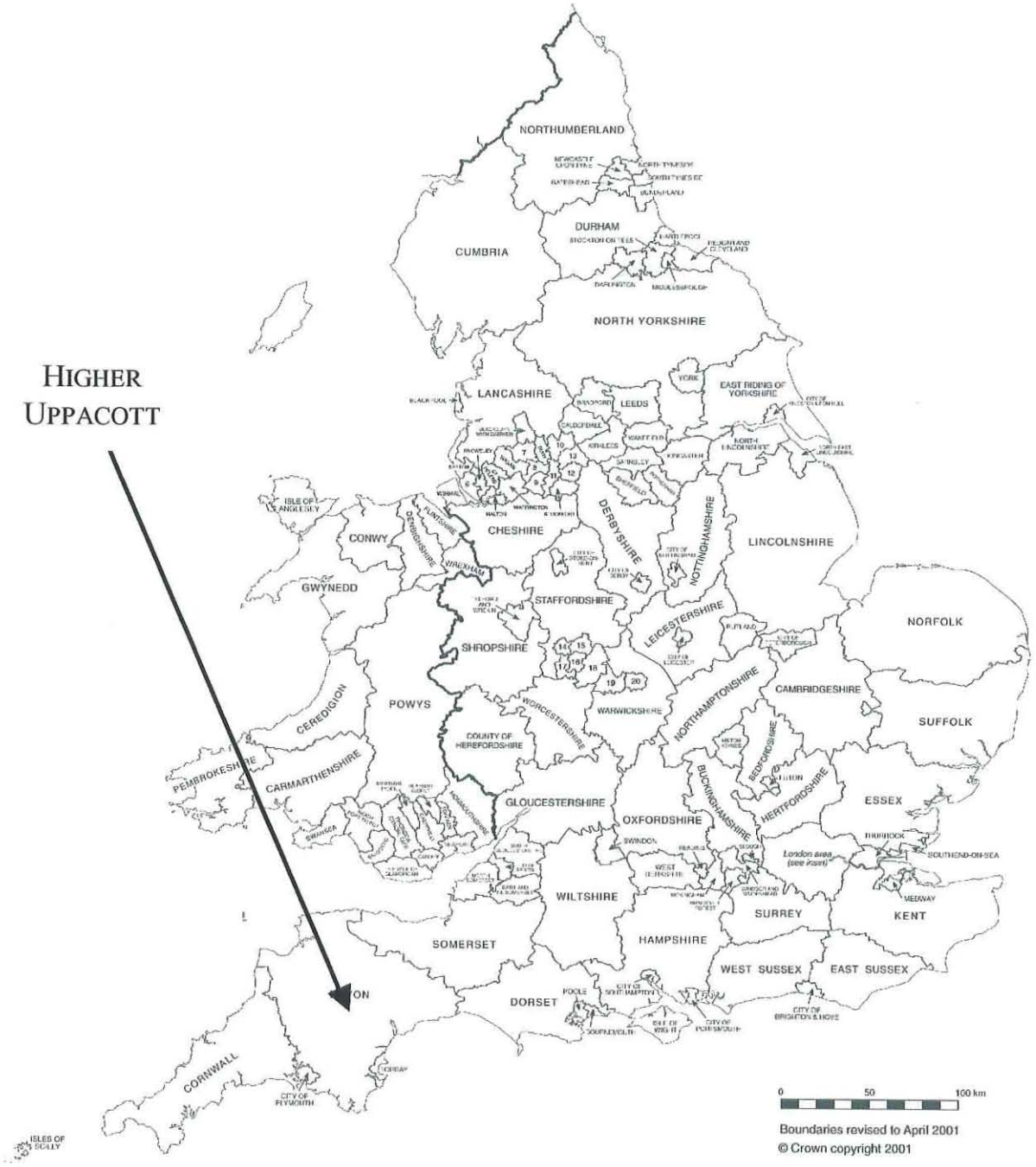

Figure 3 Plan of Higher Uppacott, Widecombe on the Moor, Devon. The labelled arrows indicate the approximate locations of the sampled timbers (based on Keystone drawing K655/1 supplied by English Heritage)

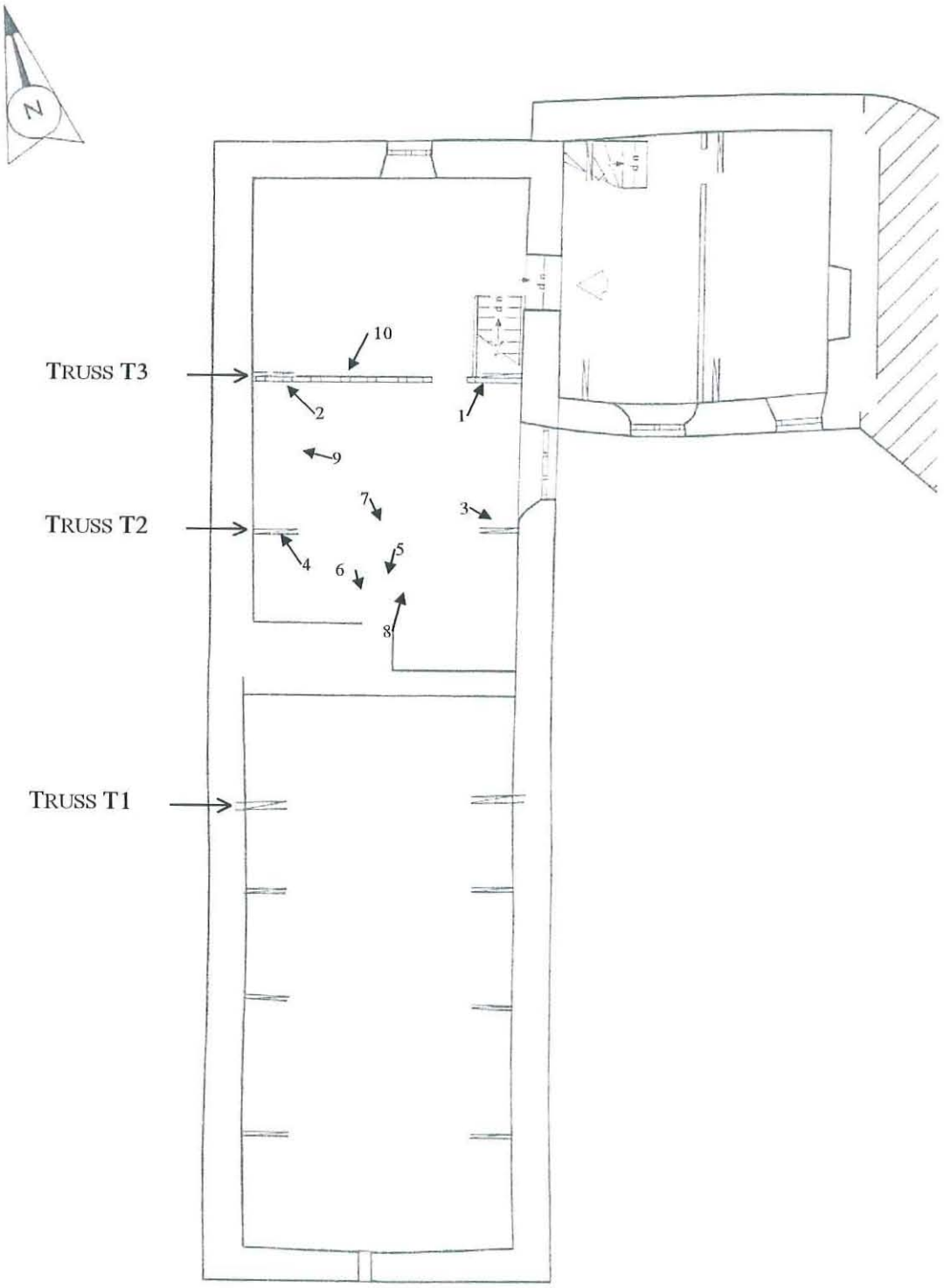

Figure 4 North face of Truss 3, Higher Uppacott, Widecombe on the Moor, Devon. The labelled arrows indicate the location of the sampled timbers visible on this elevation (based on Keystone drawing K655/3 supplied by English Heritage)

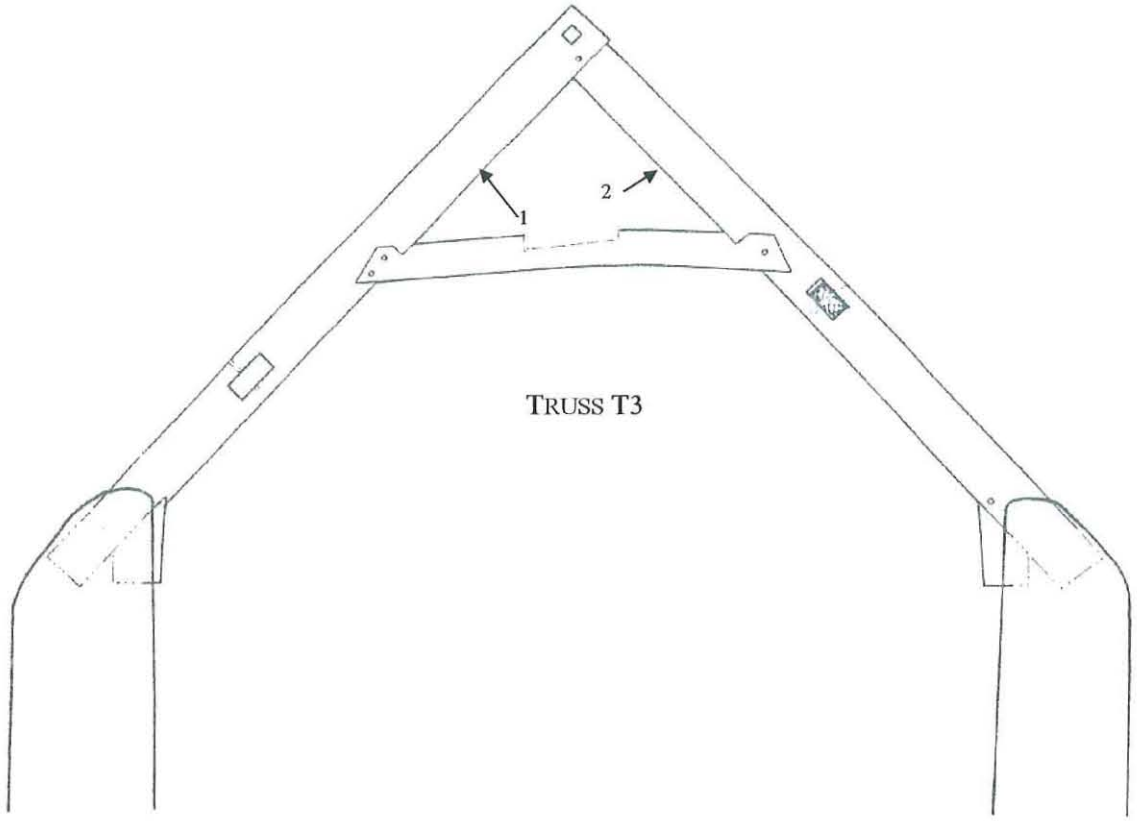

Table 1 List of samples from timbers from Higher Uppacott, Widecombe on the Moor, Devon

Core No	Origin of core	Cross-section size (mm)	Total rings	Sapwood rings	ARW (mm/year)
1	T3 east principal rafter	280 x 90	61	12	1.84
2	T3 west principal rafter	290 x 90	65	H/S	2.20
3	T2 east principal rafter	290 x 90	65	17+Bw	1.54
4	T2 west principal rafter	240 x 70	67	3	2.05
5	East rafter, 2 south of T2	130 x 50	65	5	1.46
6	West rafter, 3 south of T2	135 x 55	60	H/S	1.66
7	T2 collar	200 x 90	48	H/S	2.76
8	East rafter, 2 south of T3	110 x 55	56	19	1.58
9	West purlin, T2-T3	180 x ?	44	H/S	1.93
10	Stud under T3	150 x 85	66	3	1.14

KEY for Table 1 Total rings = all measured rings. Sapwood rings: H/S heartwood/sapwood boundary, Bw bark winter felled. ARW = average ring width of the measured rings

Table 2 *t*-value matrix for the timbers from Higher Uppacott, Widecombe on the Moor, Devon, forming the undated chronology UPP_PRIN, thought to be derived from a single tree

	2	3
1	3.99	4.54
2		4.90

Table 3 *t*-value matrix for the timbers from Higher Uppacott, Widecombe on the Moor, Devon, forming the undated chronology UPP_RAFT, derived from a single tree

	6
5	9.24

Appendix 1 Ring width data for samples from Higher Uppacott, Widecombe on the Moor, Devon, 100 = 1mm

Upct01

316	249	316	210	202	173	126	127	123	178
353	204	239	191	121	144	206	178	95	84
122	93	126	152	102	125	153	190	236	168
301	281	230	240	123	85	104	142	113	137
131	167	245	257	186	178	183	191	204	154
253	186	193	278	180	145	154	183	246	257
220									

Upct02

235	243	343	397	324	410	475	338	338	269
161	174	495	415	345	460	298	182	152	138
136	143	159	223	196	223	145	127	116	207
142	157	269	230	191	197	262	154	214	219
276	245	220	230	230	196	151	72	81	68
77	80	114	124	154	229	246	139	158	243
164	165	214	305	239					

Upct03

177	150	142	106	89	145	230	203	204	89
99	78	160	72	63	112	120	145	165	173
116	177	140	254	270	147	145	180	181	135
86	88	97	130	161	140	104	140	182	142
130	218	215	189	225	192	237	214	286	332
216	165	150	237	203	277	285	85	57	34
42	46	55	93	101					

Upct04

204	203	217	267	188	193	198	284	319	317
209	192	194	196	293	225	96	122	169	131
231	280	206	250	262	222	194	88	64	64
85	129	121	156	162	175	116	226	135	153
206	136	143	221	247	386	189	189	124	178
212	258	527	366	204	132	192	163	271	251
278	195	261	272	244	228	144			

Upct05

214	231	248	238	266	171	215	225	220	191
151	149	126	180	201	140	147	122	183	196
123	88	67	101	137	134	132	129	171	169
114	152	178	184	161	166	163	170	163	175
217	122	107	106	81	78	87	108	116	112
127	109	127	84	92	53	94	120	159	143
114	116	140	110	109					

Upct06

228	206	196	236	159	278	276	291	226	190
191	133	171	189	153	138	138	196	210	133
82	74	69	93	76	96	112	169	191	160
177	202	233	196	227	192	251	219	207	244
116	116	121	114	89	137	156	146	124	148
143	154	119	121	127	136	171	186	163	144