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TIMBER CIRCLE II, HOLME-NEXT-THE-SEA, NORFOLK DENDROCHRONOLOGICAL ANALYSIS OF OAK TIMBERS

SCIENTIFIC DATING REPORT

Ian Tyers

INTERVENTION AND ANALYSIS

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SUMMARY

A tree-ring sampling and dating programme was commissioned on oak timbers from a Bronze Age timber circle on the Norfolk foreshore at Holme-next-the-Sea. This circle, Holme II, is located about 0.1km east from the Holme I circle 'Seahenge' which was dated to 2049 BC when excavated in 1998–9 (Groves 2002). The Holme II circle comprises an outer palisade of large, vertical-split, oak posts set side-by-side; a possibly incomplete inner-arc of oak posts set at intervals, and a central setting of two horizontal timbers surrounded by an oval of stakes with interwoven branches. The central-setting timbers were displaced by tidal erosion in 2004, and one was lost to the sea. In June 2013 tree-ring sampling was undertaken on timbers exposed in two test pits. One timber with intact bark-edge was recovered from each test pit, the results of which identified that the oak timbers from the outer circle and the central setting are precisely contemporaneous with those of the Holme I circle, both being felled in 2049 BC.

CONTRIBUTORS

Ian Tyers

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The sampling and analysis of timbers from Holme II was funded by English Heritage (EH) through Norfolk County Council. Practical help and valuable discussions were provided by David Robertson and James Albone, Norfolk County Council Historic Environment Service, Mercedes Langham-Lopez (Bradford University student on placement with HES), Maisie Taylor, and Peter Marshall and Cathy Tyers, both of the Scientific Dating Team (EH). Dave Brown (Queen's University, Belfast) kindly provided updated prehistoric bog oak data sets, and Cathy Tyers kindly reviewed the bark-edges and discussed them in comparison with those from Holme I.

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DATE OF INVESTIGATION

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CONTENTS

INTRODUCTION

This document is a technical archive report on the tree-ring analysis of oak (*Quercus* spp) timbers from a timber circle on the foreshore at Holme-next-the-Sea, Norfolk. It is beyond the dendrochronological brief to describe the circle 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 monument.

The Holme I and Holme II timber circles stand in the intertidal zone on the north coast of Norfolk about 0.1 km apart. The sites are within the Holme Dunes National Nature Reserve (Fig 1). The Holme II circle comprises an outer palisade of large, vertical-split oak posts set side-by-side, a possibly incomplete inner-arc of oak-posts set at intervals, and a central setting of two horizontal timbers surrounded by an oval of stakes with interwoven branches (Fig 2). The central setting of timbers was displaced by tidal erosion in 2004, with one element being lost to the sea. A programme of radiocarbon was conducted in 2000. A sample of bark from a central log dated to 2350-2030 cal BC (Gu-5860; 3770±50BP; Reimer *et al* 2013), and a sample of wickworth of six-years' growth dated to 2470-2030 cal BC (Gu-5808; 3810±70BP). This dating identified that some parts of the structure were broadly contemporaneous, or slightly earlier than Holme I (Brennand and Taylor 2003).

The site was first recorded in 1999 and since then has been subject to regular monitoring (Ames and Robertson 2009). It is located within an important bird reserve and all archaeological activity on the beach is undertaken within a framework of consent from the Landowner, Reserve Managers, and Natural England. Large-scale excavation is considered not to be a realistic option. The circle endures a cycle of periodic sand cover and exposure through beach movement and as such suffers significant beach erosion processes. Thus it was entirely covered between 2005 and 2010, whilst in 2004 one of the central timbers was lost to tidal erosion. At current rates of erosion the circle is expected to suffer significant degradation of the timbers by 2014 and could be lost to the sea by 2017 (Robertson 2012).

METHODOLOGY

Access to the circle on Holme Beach requires sensitive negotiation around the timetables of the breeding birds, daylight low tides, and good conditions in the North Sea. The lowest tides provide only a 2–4 hour time-frame in which to access and undertake recording at the monument. Accordingly a project design to undertake scientific dating of the outer palisade was prepared and agreed with English Heritage (Marshall and Tyers 2011; Robertson 2012). Funding was agreed in 2013, and consent obtained from the Landowner, Reserve Manager, and Natural England. After a number of lost opportunities to undertake sampling during low tides due to adverse weather conditions, time and tides finally allowed the monument to be visited in June 2013 accompanied by David

Robertson, Maisie Taylor, James Albone, and Mercedes Langham-Lopez. In the space of a few hours two test pits were excavated and recorded. One was located against the outer side of the outer palisade and the other, between the outer palisade and the inner-arc of timbers. Six timbers were excavated, recorded, sub-sampled for dendrochronology, and then returned to their setting. Five of these were from the outer circle and one from the inner arc recorded under HER event ENF132004. The analysis report also combines data from one of the two central timbers, which had been rescued from the beach in 2004 and stored in a tank at Flag Fen, Peterborough. The timber was found to have been somewhat degraded however, when sub-sampled during the dismantling of the store in 2009. The samples are planned to be returned to the monument, at the request of the landowner, although at the time of writing the monument is again covered by sand.

Tree-ring dating employs the patterns of tree-growth to determine the calendar dates for the period during which the sampled trees were alive. The amount of wood laid down in any one year by most trees is determined by the climate and other environmental factors. Trees over relatively wide geographical areas can exhibit similar patterns of growth, and this enables dendrochronologists to assign dates to some samples by matching the growth pattern with other ring-sequences that have already been linked together to form reference chronologies.

Samples from Holme II were obtained from selected timbers by hand-sawing a cross-section at an optimum location to maximise the ring sequence length. The samples were prepared to identify their potential, and tree-ring analysis of suitable samples only, was then undertaken.

Each sample was placed in a deep-freeze for 48 hours in order to consolidate the timber. A surface equivalent to the original horizontal plane of the parent tree was then prepared with a variety of bladed tools. This preparation revealed the width of each successive annual tree ring. Each prepared sample could then be accurately assessed for the number of rings it contained, and at this stage it was also possible to determine whether the sequence of ring widths within it could be reliably resolved. Dendrochronological samples need to be free of aberrant anatomical features such as those caused by physical damage to the tree, which may prevent or significantly reduce the chances of successful dating.

Standard dendrochronological analysis methods (see eg English Heritage 1998) were applied to each suitable sample. The complete sequence of the annual growth rings in the suitable samples was measured to an accuracy of 0.01mm using a micro-computer based travelling stage. The sequences of ring widths were then plotted onto semi-log graph paper to enable visual comparisons to be made between sequences. In addition, cross-correlation algorithms (eg Baillie and Pilcher 1973) were employed to search for positions where the ring sequences were highly correlated. Highly correlated positions were checked using the graphs and, if any of these were satisfactory, new composite sequences were constructed from the synchronised sequences. Any *t*-values reported below were 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 need to have been obtained from a range of independent sequences, and that these positions were supported by satisfactory visual matching.

Not every tree can be correlated by the statistical tools or the visual examination of the graphs. There are thought to be a number of reasons for this: genetic variations; site-specific issues (for example a tree growing in a stream bed will be less responsive to rainfall); or some traumatic experience in the tree's lifetime, such as injury by pollarding, defoliation events by caterpillars, or similar. These could each produce a sequence dominated by a non-climatic signal. Experimental work with modern trees shows that 5–20% of all oak trees, even when enough rings are obtained, cannot be reliably cross-matched. With the additional problems of archaeological material, it is typically found that less than 80% of apparently suitable archaeological oak samples are dateable.

Converting the date obtained for a tree-ring sequence into a useful date requires a record of the nature of the outermost rings of the sample. If bark or bark-edge survives, a felling date precise to the year or season can be obtained. If no sapwood survives, the date obtained from the sample gives a *terminus post quem* for its use. If some sapwood survives, an estimate for the number of missing rings can be applied to the end-date of the heartwood. This estimate is quite broad and varies by region. This report uses a minimum of 16 rings and a maximum of 54 rings as a sapwood estimate, this was derived from the material from Holme I (Groves 2002).

Where bark-edge or bark survives, the season of felling can be determined by examining the completeness or otherwise of the terminal ring lying directly under the bark. Complete material can be divided into three major categories:

- 'early spring', where only the initial cells of the new growth have begun - this is equivalent to a period in March/April, when the oaks begin leaf-bud formation;
- 'later spring/summer' where the early wood is evidently complete but the late wood is evidently incomplete, which is equivalent to May-through-September of a normal year, and
- 'winter' where the latewood is evidently complete and this is roughly equivalent to September-to-March (of the following year) since the tree is dormant throughout this period and there is no additional growth put on the trunk.

These categories can overlap as, for example, not all oaks simultaneously initiate leaf-bud formation. It should also be noted that slow growing or compressed material cannot always be safely categorised.

The analysis may highlight potential same-tree identifications if two or more tree-ring sequences are obtained that are exceptionally highly correlated. Such pairs, or sometimes more, are then used as a same-tree group and each can be given the interpreted date of the most complete of the samples. They are most useful where several timbers date but only one has any sapwood or where same-tree identifications yield linkages between different areas of a monument.

It should be noted that the BC/AD scale used by dendrochronologists has no year zero so 1 BC immediately precedes AD 1.

RESULTS

The selected material comprised seven oak samples each obtained by hand-sawing a cross section from a timber at the optimum location identified in order to maximise its dendrochronological potential (Table 1; Fig 3). Six of these samples were suitable for measurement, and five of the tree-ring series from these were found to cross-match each other (Table 2). These five individual series also showed high *t*-values against the Holme I site master-chronology, independantly validating the relative offsets indicated by the internal cross-matching (Table 3). A composite sequence of 328-years mathematically constructed from the matched series at their synchronised positions was compared with reference data of prehistoric and historic date from throughout England and northern Europe. A number of statistically significant matches were obtained between the sequence and reference series, primarily with the composite sequence from the Holme I circle, along with other contemporaneous chronologies from across England. These indicate that the composite sequence dates from 2376–2049 BC inclusively (Table 4). The sampled material was derived from the outer palisade, the inner arc, and the central setting. The dated material however, was derived from the outer palisade and the central setting only.

The measurement data for all the measured samples are listed in Appendix 1.

DISCUSSION

The dated samples are derived from the outer palisade and the central setting. These are discussed separately, as is the information obtained from the 'displaced' timber from the inner arc. Comparison is then made with Holme I.

Outer palisade

This outer circle comprises vertical-oak posts, mostly polygonal in cross-section. They appear to be mostly split sections of large trees rather than complete small trees (Figs 2 and 3).

The five samples obtained from timbers of the outer palisade yielded four dateable tree-ring sequences. The exception was timber 402 which contained an unmeasurable band of narrow rings between two short measurable, but undated series.

The tree-ring analysis dates the rings present in the four dateable samples. The correct interpretation of those relies upon the characteristics of the final rings in them. Bark-edge survived on one of these timbers (401), the heartwood/sapwood boundary survived on one other (400), and the possible boundary on another (403). No sapwood was present on the remaining dateable timber, 405. Samples 403 and 405 were derived from the same tree so they can both be given the same interpretation. Making allowances for minimum and maximum likely amounts of missing oak sapwood provides individual felling dates, or felling date ranges, or *terminus post quem* dates for each of the dateable oak timbers. Figure 4 and Table 1 includes the felling date or interpreted felling date ranges for each of the dateable samples.

The interpretation of the outer palisade dated samples is straightforward. Sample 402 is complete to bark edge. This retains an incomplete ring for 2049 BC. This timber was therefore felled in the spring or summer of 2049 BC. The calculated felling date ranges for the other oak samples indicates this group of timbers were either precisely or broadly contemporaneous (Fig 4).

Inner arc

One of the vertical timbers from this partial or partially lost inner circle of smaller timbers was sampled as 404 (Fig 2). This contained too few rings for tree-ring analysis and does not provide any useful interpretative data. Furthermore, due to it being heavily eroded and with no sapwood, it was also rejected for radiocarbon dating.

Central setting

The two horizontal beams forming the central setting were disturbed by tidal action in 2004 when one of the timbers, 281, was lost. The other, timber 280, was recovered by staff from Norfolk Archaeological Unit, Norfolk Landscape Archaeology, and Flag Fen in March 2004 following agreement from English Heritage and the Norfolk Wildlife Trust, and was stored in a tank at Flag Fen. A sample from this timber was recovered in 2009 when the store at Flag Fen was being cleared.

The sample obtained from this timber yielded a straightforward dateable tree-ring sequence. Sample 280 is complete to bark edge and retains an incomplete ring for 2049 BC. This timber was therefore felled in the spring or summer of 2049 BC. The felling date obtained for this sample indicates this timber was precisely contemporaneous with the outer palisade (Fig 4).

Comparison with Holme I

Comparison of the small sub-sample of timbers in Holme II and the previous analysis of 55 timbers from Holme I is instructive. Fifty of the Holme I samples were intact to bark-edge. This includes 49 timbers from the outer palisade, as well as the timber forming the central setting of this circle which was an upturned tree. Forty-nine of these were felled in 2049 BC. In each of these the final ring appeared likely to be incomplete indicating that the Holme I timbers were derived from trees that were felled during the spring or early summer of 2049 BC. The one exception had an apparently complete ring for 2050 BC but showed no signs of growth for 2049 BC. This timber could have been felled as early as the start of the dormant season in 2050 BC but as late as spring 2049 BC and it may have been an individual tree that started its growth later than its contemporaries. The presence of material with precisely the same bark-edge date at Holme II is remarkable, and clearly demonstrates the two circles were constructed at the same time.

The Holme I material included eight pairs, one triplet, five sets of four, and one set of five timbers derived from individual trees. Considering the limitation of the information obtained from a small sub-sample of the Holme II palisade it seems likely the same pattern is also present, since one pair has been identified from the analysis of five palisade timbers.

The Holme I circle utilised a relatively small number of quite uniform trees. The site master sequence is of 181-years, and it was interpreted as being constructed from 15–20 oak trees mostly of between 100 and 150 years lifespan and 0.2 to 0.4m diameter. Holme II samples 280, 401, 403, and 405 are similar to this material, and there is no reason to suppose they were derived from a different part of the contemporaneous landscape. In contrast Holme II sample 400 is different from all the other material from both palisade circles, this sample contains 294 rings. It retained no sapwood but it is reasonable to suppose it was contemporaneous with the others, in addition the pith was also not present in this sample. Making minimal allowances suggests that this timber was derived from an at least 350 year old oak tree, of potentially 0.6m diameter. Timber 400 stood on the south-west side of the palisade, roughly in alignment with the central timbers. It may have been a larger, or longer timber, potentially marking an entrance or other feature of the circle. The only other long-lived tree known from either circle is the upturned tree forming the central feature of Holme I which was not fully sampled but is thought to have had 250–350 rings, extrapolated from the sampled partial radius.

Timber 402 from Holme II is the only timber in either circles outer palisade to contain an unmeasurable band of narrow growth and thus to have proven undateable.

The sample from the inner-arc timber 404 contains less rings than any other sampled oak in the palisades or central settings of both circles, and has a slightly faster average growth rate than some of the smallest and fastest growing timbers used in Holme I. However, as it is small and eroded, it may be the residual part of otherwise similar material.

The dateable oak material from Holme II matches each other and that of the material from Holme I and it is likely that all the oak timbers were derived from the general vicinity of Holme.

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FIGURES

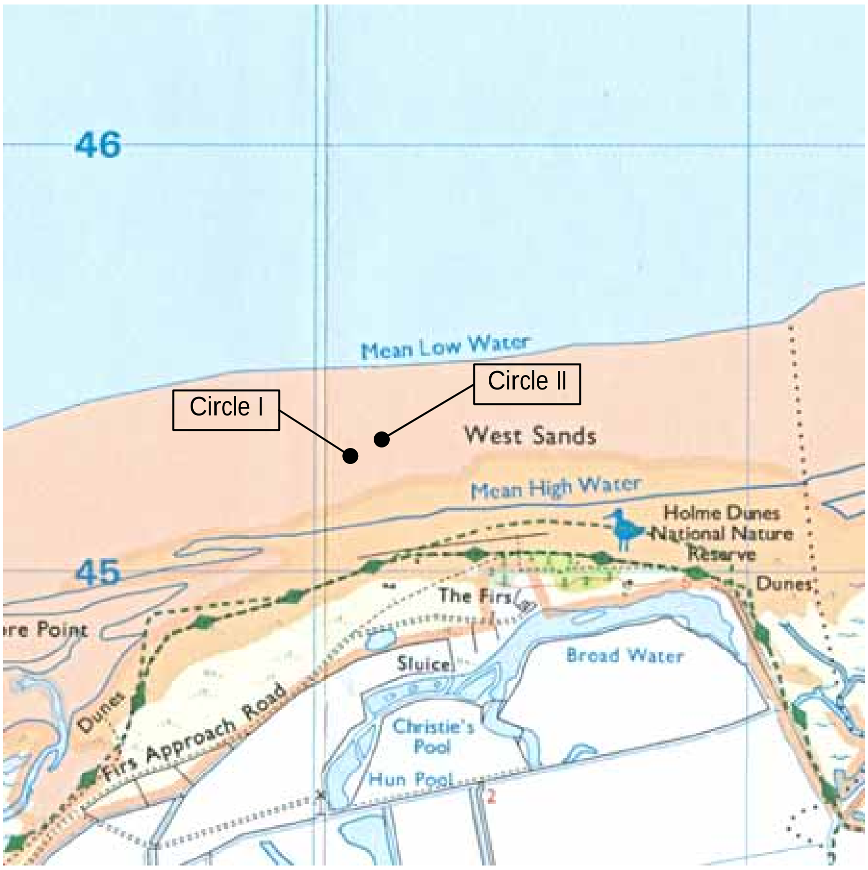

Figure 1: Location of Holme-next-the-Sea timber circles 1 & II. © Crown Copyright and database right 2014. All rights reserved. Ordnance Survey Licence number 100024900

Figure 2: Part of the outer palisade of Holme-next-the-Sea timber circle II

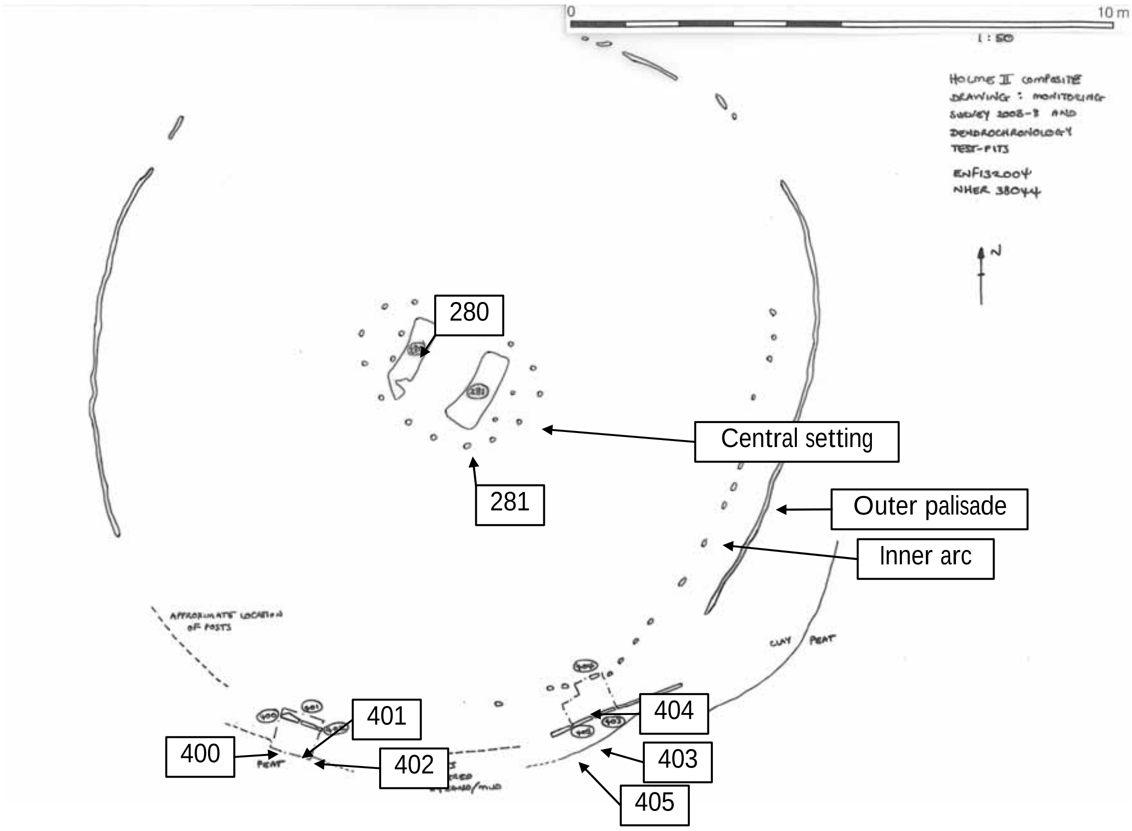

Figure 3: Holme-next-the-Sea timber circle II plan, showing areas mentioned in the text and the sampled timbers, based on a drawing supplied by David Robertson, Norfolk County Council

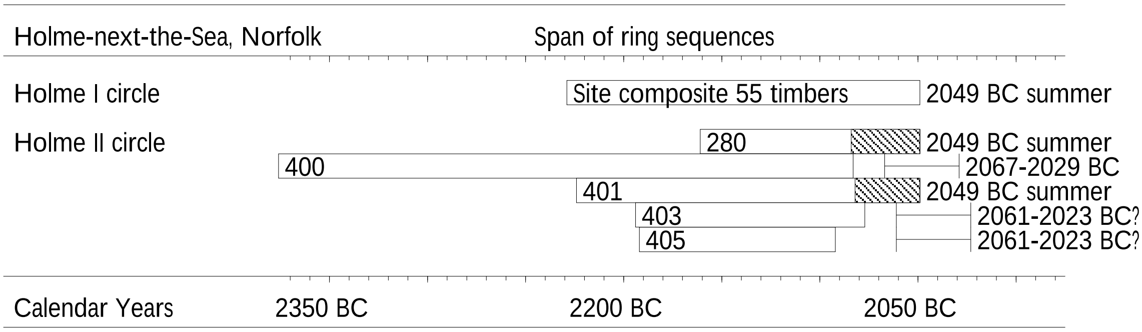

Figure 4: Bar diagram showing the absolute dating positions of the five dated tree-ring sequences for samples from Holme-next-the-Sea timber circle II, the composite sequence from Holme-next-the-Sea timber circle I is shown for comparison. The interpreted felling dates are also shown for each sample

KEY: White bars are oak heartwood, black and white hatched bars are oak sapwood.

TABLES

Table 1: Details of the 7 oak samples from timbers from Holme-next-the-Sea timber circle II

Sample	Location	Rings	Sap	Date of measured sequence	Interpreted result
280	central feature	113	35+Bs	2161 BC–2049 BC	2049 BC summer
400	outer palisade	294	H/S	2376 BC–2083 BC	2067–2029 BC
401	outer palisade	176	33+Bs	2224 BC–2049 BC	2049 BC summer
402	outer palisade	50+?+53	-	not dated	-
403	outer palisade	118	?H/S	2194 BC–2077 BC	2061–2023 BC?
404	inner arc	34	-	not analysed	-
405	outer palisade	101	-	2192 BC–2092 BC	2061–2023 BC?

KEY For locations see Figure 2. H/S is heartwood/sapwood edge, ?H/S is possible heartwood/sapwood edge, Bs bark after incomplete annual ring. Interpretations based on 16–54 sapwood rings. Sample 402 contains an unmeasured band of unresolved rings marked '?'

Table 2: The t-values (Baillie and Pilcher 1973) between the five dated oak timbers from Holme-next-the-Sea timber circle II. - t-value less than 3.0. These series were combined to form the composite sequence HNS2-T5 used in Table 4

	400	401	403	405
280	-	4.28	3.73	-
400		4.51	4.56	3.68
401			5.07	3.89
403				13.10

Table 3: Showing example t-values (Baillie and Pilcher 1973) between the five dated timbers from Holme-next-the-Sea timber circle II, and the composite sequence from the Holme I timber circle (Groves 2002)

Sample sequence	HNS1-T55 2229–2049 BC
HNS2-280	8.75
HNS2-400	5.09
HNS2-401	8.97
HNS2-403	6.40
HNS2-405	6.52

Table 4: Showing example t-values (Baillie and Pilcher 1973) between the composite sequence HNS2-T5 constructed from the five dated series from Holme-next-the-Sea timber circle II and prehistoric oak reference data

	HNS2-T5 2376–2049 BC
Holme I timber circle (Groves 2002) 2229–2049 BC	8.90
Holme Fen, nr Peterborough bog oaks (Brown pers comm) 3141–1868 BC	6.84
Sawtry Fen, nr Peterborough bog oaks (Brown pers comm) 2585–1745 BC	6.09
Croston Moss, nr Preston bog oaks (Brown pers comm) 3198–1682 BC	5.20
Langford Quarry, nr Newark, Trent gravel oaks (Hillam 1998) 2979–2125 BC	5.11

APPENDIX 1

Measurements in units of 0.01mm

hns2_280

262	223	314	235	356	385	488	317	322	209
338	269	244	289	298	398	253	256	219	226
177	343	254	254	145	98	93	169	174	245
200	224	144	98	89	132	119	109	82	137
147	200	211	186	185	146	88	101	190	192
192	130	142	175	121	102	124	125	134	138
145	111	116	140	65	90	149	181	90	119
136	83	113	108	157	144	126	130	97	133
117	159	89	93	88	163	98	74	124	82
83	81	60	46	58	91	104	95	63	56
78	117	115	79	62	45	42	39	42	45
43	39	42							

hns2_400

90	96	95	69	91	101	109	155	147	119
168	132	106	95	113	156	109	102	123	112
137	143	104	128	128	128	126	98	107	122
119	129	132	141	80	86	110	85	96	73
112	122	85	124	140	121	89	72	80	89
74	75	90	74	111	117	125	68	88	100
120	100	116	103	99	95	84	80	70	64
116	116	109	113	144	124	89	73	99	112
117	157	149	85	103	133	110	92	102	122
136	118	114	105	126	87	54	71	88	118
140	132	155	142	95	140	170	90	82	131
119	164	93	131	129	133	96	83	75	84
107	78	89	104	121	82	100	80	76	67
78	129	171	91	70	50	71	76	147	129
143	106	131	113	86	73	57	72	86	74
67	75	71	88	86	89	114	135	126	187
177	127	142	112	181	173	154	160	156	129
114	97	90	104	158	134	134	159	151	125
141	105	83	42	34	44	48	62	77	73
89	82	80	70	87	87	80	62	63	72
71	53	70	81	66	58	65	72	52	62
78	78	91	57	67	55	77	93	65	58
97	80	68	97	52	62	80	57	59	76
68	82	77	49	71	63	78	64	71	45
87	64	85	109	102	64	98	84	96	64
78	70	92	75	73	88	136	93	95	84
75	56	75	63	57	74	67	58	56	45
40	87	67	76	96	83	68	82	100	78
64	121	83	81	69	82	83	79	59	83
93	78	69	80						

hns2_401

351	346	349	284	310	322	247	366	229	206
175	225	185	126	128	110	134	104	118	105
98	93	156	128	80	47	63	59	65	51
73	92	59	83	66	54	83	83	83	151
104	96	81	41	39	49	59	73	74	95
149	107	106	175	214	206	155	139	202	154
265	258	238	211	241	273	243	233	300	350
194	130	56	68	66	61	75	69	78	88
103	83	79	114	155	121	82	62	87	69
100	149	160	134	169	144	123	84	102	102
161	156	120	122	154	144	137	135	130	96
85	122	97	125	77	84	72	62	55	75
77	69	64	74	56	77	70	56	49	68
64	57	74	69	53	45	41	63	45	44
38	39	39	42	43	35	39	43	39	29
30	29	42	84	49	32	33	41	53	59
42	43	42	48	42	41	52	41	36	38
45	33	50	28	25	28				

hns2_402i

90	72	90	61	101	141	73	96	85	73
88	83	88	154	80	74	47	56	59	49
70	68	69	88	115	94	81	89	112	96
81	66	86	94	127	135	148	175	191	217
145	102	77	92	94	43	37	45	38	38

hns2_402o

52	30	25	37	30	23	43	70	52	53
49	49	40	31	33	39	64	66	46	51
66	63	60	50	54	42	41	65	60	70
44	40	38	34	55	40	49	45	44	47
44	46	56	40	81	69	49	64	73	39
40	40	66							

hns2_403

130	224	66	31	55	40	120	50	126	193
278	170	236	210	349	99	58	72	91	164
224	112	173	256	272	263	114	85	212	104
172	159	202	279	209	185	113	133	141	120
72	134	69	159	129	113	140	139	110	149
138	152	157	148	168	158	93	134	131	63
187	280	226	135	162	184	123	103	99	89
138	144	120	94	83	61	73	109	75	91
85	87	75	145	62	148	96	65	59	136
84	110	113	119	62	69	73	65	68	134
101	68	88	92	76	106	67	148	87	70
55	63	73	68	67	40	77	68		

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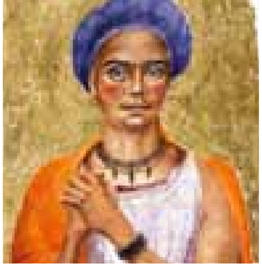
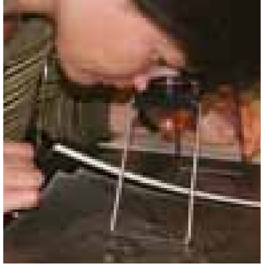
109	52	34	36	87	70	228	248	340	232
273	259	360	208	42	86	114	227	271	134
164	262	128	162	68	63	124	58	91	90
107	110	126	115	64	109	145	86	75	141
62	150	109	82	170	200	79	111	134	147
178	133	197	103	69	73	93	42	88	120
169	137	175	113	110	56	80	117	125	173
148	91	96	73	77	115	87	122	85	91
70	179	68	185	101	80	48	104	87	100
125	122	75	80	91	87	80	219	187	83
100									


ENGLISH HERITAGE RESEARCH AND THE HISTORIC ENVIRONMENT

English Heritage undertakes and commissions research into the historic environment, and the issues that affect its condition and survival, in order to provide the understanding necessary for informed policy and decision making, for the protection and sustainable management of the resource, and to promote the widest access, appreciation and enjoyment of our heritage. Much of this work is conceived and implemented in the context of the National Heritage Protection Plan. For more information on the NHPP please go to http://www.english-heritage.org.uk/professional/protection/national-heritage-protection-plan/.

The Heritage Protection Department provides English Heritage with this capacity in the fields of building history, archaeology, archaeological science, imaging and visualisation, landscape history, and remote sensing. It brings together four teams with complementary investigative, analytical and technical skills to provide integrated applied research expertise across the range of the historic environment. These are:

- Intervention and Analysis (including Archaeology Projects, Archives, Environmental Studies, Archaeological Conservation and Technology, and Scientific Dating)
- Assessment (including Archaeological and Architectural Investigation, the Blue Plaques Team and the Survey of London)
- Imaging and Visualisation (including Technical Survey, Graphics and Photography)
- Remote Sensing (including Mapping, Photogrammetry and Geophysics)

The Heritage Protection Department undertakes a wide range of investigative and analytical projects, and provides quality assurance and management support for externally-commissioned research. We aim for innovative work of the highest quality which will set agendas and standards for the historic environment sector. In support of this, and to build capacity and promote best practice in the sector, we also publish guidance and provide advice and training. We support community engagement and build this in to our projects and programmes wherever possible.

We make the results of our work available through the Research Report Series, and through journal publications and monographs. Our newsletter *Research News*, which appears twice a year, aims to keep our partners within and outside English Heritage up-to-date with our projects and activities.

A full list of Research Reports, with abstracts and information on how to obtain copies, may be found on www.english-heritage.org.uk/researchreports

For further information visit www.english-heritage.org.uk

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