

# **THE OLD POST OFFICE, LONG ACRE, BINGHAM, NOTTINGHAMSHIRE; TREE-RING ANALYSIS OF TIMBERS**

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## **SUMMARY**

Analysis by dendrochronology of 14 of the 16 samples obtained from timbers within this building (two samples have insufficient rings for reliable dating), has resulted in the production of two dated site chronologies, and dated a further three samples individually.

The site first site chronology comprises five samples from ceiling timbers to the first floor rooms, and one sample from the main ceiling beam of the café to the ground floor. This site chronology is 159 rings long, these rings dated as spanning the years 1531-1689. It is noteworthy that the hearth tax return of 1674 lists the house owner, John Needham, with two hearths. Interpretation of the sapwood on these samples would indicate that the first floor timbers were cut as part of a single episode of felling in 1689, while the beam to the café ceiling was felled at some time between 1646-71.

The second site chronology comprises three samples from the ground floor timbers to the rear buildings. This second site chronology is 87 rings long, these rings dated as spanning the years 1663-1749. Interpretation of the sapwood on these samples would indicate that these timbers were cut as part of a single episode of felling in 1749.

The earliest individually dated timber, a beam in a first-floor partition wall, has a remarkably early felling date of 1313. Two later dates are obtained from the timbers reused as the northwest and southwest purlins in the roof. These two timbers are likely to have been cut as a part of a single episode of felling sometime between 1603 and 1628.

The final two measured individual samples remain undated.

## **Introduction**

The Old Post Office, in Long Acre, Bingham, Nottinghamshire (SK 704 398, Figs 1a/b), would appear to be of two bays and is two storeys tall, each floor comprising two main rooms. One of the ground floor rooms has a particularly large fireplace with a decorated bresummer beam. Further single beams are found to the ceilings of the ground and first floor rooms, the ceiling of the eastern first floor room also retaining a series of common joists. The top floor contains a single loose timber which is believed to have been brought from another part of the house, though this is not certain. Within the roof most of the timbers are modern, probably twentieth century replacements, but there are also two clearly reused timbers now acting as purlins, but which may originally have been wallplates. There is no visible framing to any of the walls.

To the rear of the main body of the building there is a single storey with low attic range, currently used as a kitchen, preparation, and storage rooms for the adjoining café, along with a WC. These rooms also contain a few timbers to their ceilings or wall. The structural evidence would suggest that this range is a later addition to an already

existing building.

### **Sampling**

Core samples were obtained from a number of timbers which appeared suitable for tree-ring dating by reason of having sufficient rings for reliable analysis, and by appearing to be pertinent to the construction and development of the house. These timbers were distributed throughout the building to ground and first floors as well as to the roof, including the rear range buildings

Details of the samples are given in Table 1, including the timber sampled and its location, the total number of rings each sample has, and how many of these, if any, are sapwood rings. The individual date span of each dated sample is also given. In this table the rear of the building is taken to be facing north onto the courtyard and garden (now Old Post office Yard), the front to be facing south onto Long Acre.

**Table 1: Details of tree-ring samples from The Old Post Office, Long Acre.**

Sample number	Sample location	Total rings	Sapwood rings*	First measured ring date (AD)	Heart/sap boundary (AD)	Last measured ring date (AD)
BNG-001 D01	Main beam to ground floor ceiling	73	no h/s			
BNG-D02	Fireplace lintel	nm	---			
BNG-D03	East bedroom, main beam to ceiling	139	37C	1551	1652	1689
BNG-D04	East bedroom, west joist 3	65	24C	1625	1665	1689
BNG-D05	East bedroom, west joist 4	55	16	1629	1667	1683
BNG-D06	East bedroom, west joist 8	65	2	1607	1669	1671
BNG-D07	Middle bedroom/corridor, main ceiling beam	124	20C	1566	1669	1689
BNG-D08	West bedroom/corridor, lower horizontal beam	nm	---			
BNG-D09	West bedroom/corridor, upper horizontal beam	121	22C	1193	1291	1313
BNG-D10	Loose timber on corridor floor	115	5			
BNG-D11	Northeast purlin	151	6	1445	1589	1595
BNG-D12	Southwest purlin	80	9	1517	1587	1596
BNG-D13	Ground floor kitchen ceiling	82	17C	1668	1732	1749

BNG-D14	Ground floor kitchen bressummer	67	h/s	1663	1729	1729
BNG-D15	Ceiling beam to café room	101	h/s	1531	1631	1631
BNG-D16	Wall beam to toilet	81	19	1669	1730	1749

\*h/s = the sample has the heartwood/sapwood boundary, ie. only the sapwood rings are missing

C = complete sapwood is retained on the sample; the last measured ring date is the felling date of the tree represented

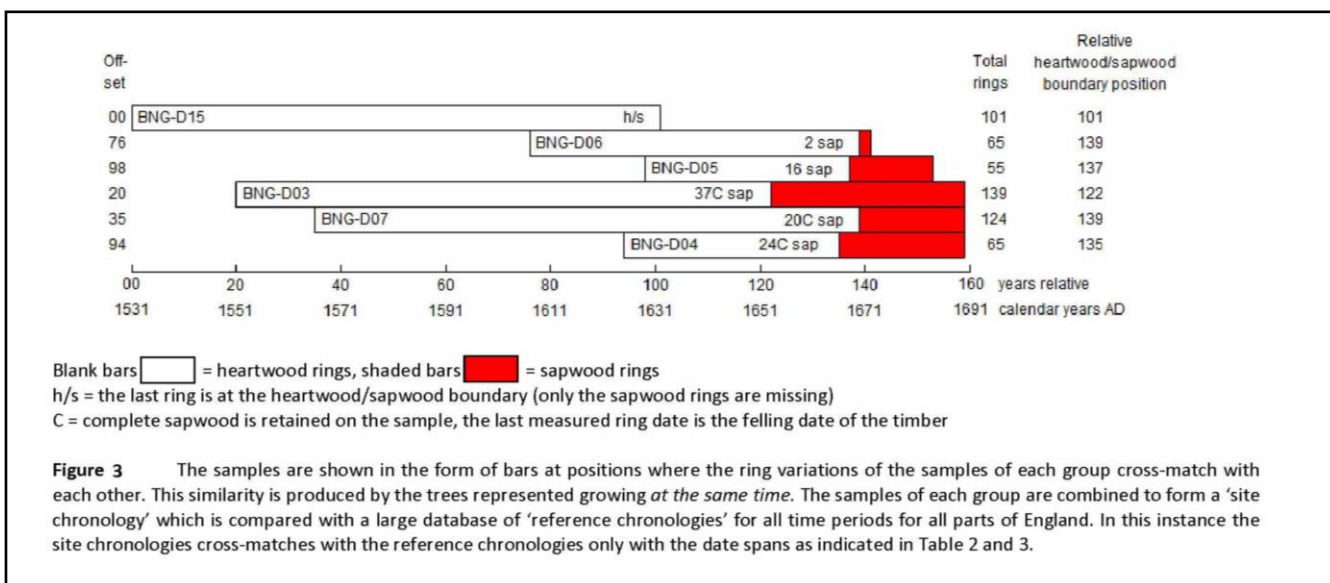
nm = sample not measured

## Analysis

Each of the 16 samples obtained from the various timbers of this building was prepared by sanding and polishing. It was seen at this time that two of these samples, BNG-D02 from a fireplace lintel, and BNG-D08 from a first floor beam, had less than the minimum of 50 rings deemed necessary for reliable dating, and they were rejected from this programme of analysis. The widths of the annual growth rings of the remaining 14 samples were, however, measured and the data then compared with each other. This comparative process indicated that two groups of cross-matching samples could be formed.

### Site chronology BNGDSQ01

The First group comprises six samples, BNG-D03, D04, D05, D06, and D07, from the ceiling beams of the first floor rooms, and one, BNG-D15 from the ceiling beam of the café to the ground floor. These samples cross-match with each other at the relative positions as shown in the bar diagram Figure 3 below.



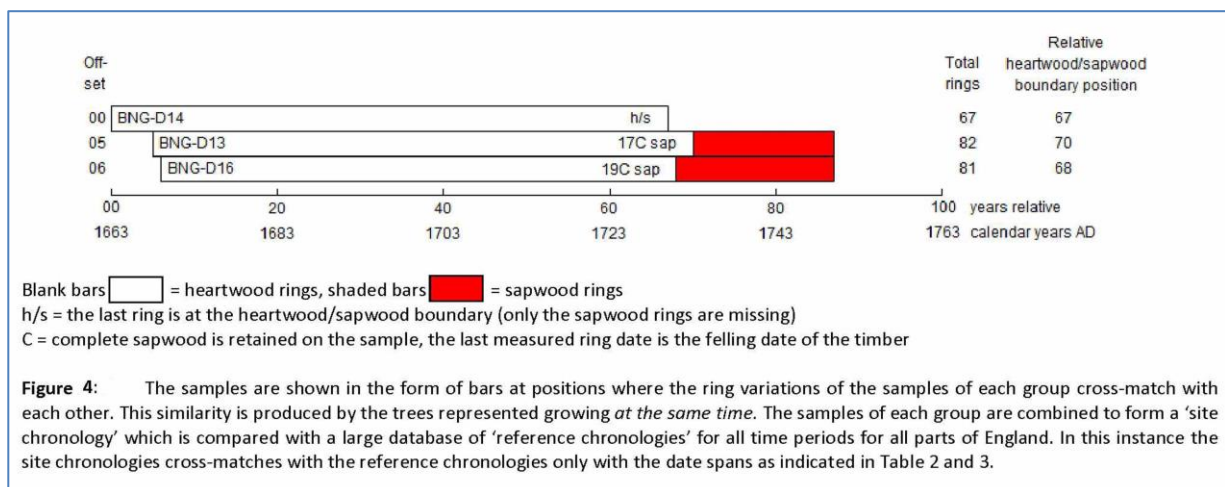
These six samples were combined at their indicated off-set positions to form BNGDSQ01, a site chronology with an overall length of 159 rings. This site chronology was then satisfactorily dated by repeated and consistent comparison with a large number of relevant reference chronologies for oak as spanning the years 1531 to 1689. The evidence for this dating is given in the *t*-values of Table 2 below.

Three of the samples, BNG-D03, D04, and D07, retain complete sapwood, that is they have the last ring produced by the trees they represent before they were felled. (This is indicated by upper case 'C' in Table 1 and the bar diagram). In each case this last, complete, sapwood ring, and thus the felling of the trees, is the same, being dated to 1689. Given the relative position and date of the heartwood/sapwood boundary on two of the other two samples, BNG-D05 and D06, in site chronology BNGDSQ01, (which is very similar to that on the samples from the trees known to have been felled in 1689), and the amount of sapwood on them, it is very probable that the trees they represent were felled in 1689 as well.

One sample, BNG-D15, in this site chronology does, however, have an earlier heartwood/sapwood boundary date, 1631, this being more than 20 years earlier than the next earliest (1652 on sample BNG-D03), and almost 40 years earlier than the latest (1669 on samples BNG-D07 and D08). This would suggest that the timber represented by sample BNG-D15 was felled earlier. Allowing for the usual 95% confidence limit for the amount of sapwood the tree might have had, 15 – 40 rings (as mentioned in the notes on tree-ring dating above), it is estimated that this timber was felled at some time between 1646 at the earliest and 1671 at the latest. This would accord well with the listing in the heart tax returns of 1674 that shows the house owner John Needham had two hearths.

### Site chronology BNGDSQ02

The second group comprises three samples, BNG-D13, D14, and D16, all of them from the single storey rear range. These samples cross-match with each other at the relative positions as shown in the bar diagram Figure 4. The three samples were also combined at their indicated off-set positions to form BNGDSQ02, a site chronology with an overall length of 87 rings. This site chronology was then also satisfactorily dated by repeated and consistent comparison with a large number of relevant reference chronologies as spanning the years 1663 to 1749. The evidence for this dating is given in the *t*-values of Table 3.



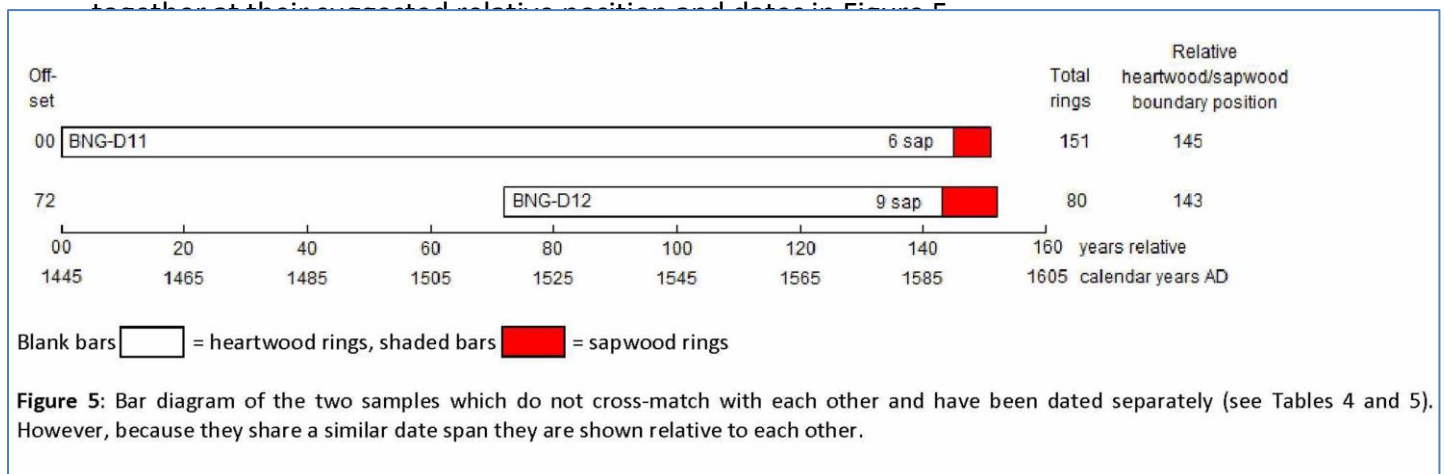
Two of the samples in this group, BNG-D13 and D16, also retain complete sapwood. In both cases this last, complete, sapwood ring, and thus the felling of the trees, is the same, being dated to 1749. Given the relative position and date of the heartwood/sapwood boundary on the other sample, BNG-D14, in site chronology BNGDSQ02, (which is very similar to that on the samples from the trees known to have been felled in 1749), and the amount of sapwood on it, it is very probable that the tree this sample represents were felled in 1749 as well.

### *Individually dated samples*

Site chronologies BNGDSQ01 and BNGDSQ02 were then compared with the five remaining measured but ungrouped samples, BNG-D01, D09, D10, D11, and D12. There was however, no further satisfactory cross-matching. Each of these five remaining samples was, therefore, compared individually with the full corpus of reference material for oak, this process indicating cross-matches and dates for three individual samples.

The earliest individually dated timber, the upper horizontal beam in the division wall between the west bedroom and the corridor, represented by sample BNG-D09, has a remarkably early last measured ring date of 1313, with the evidence for this being given in the *t*-values of Table 3. Given that complete sapwood is retained on this sample, this too is the felling date of the source tree. Given the small section of this timber that is visible, it is not possible to see any obvious evidence for reuse. It is unlikely, however, that this timber is primary and original.

Two later dates are obtained from samples BNG-D11 and D12, respectively from the timbers clearly reused as the northwest and southwest purlins in the roof. The 151 rings of sample BNG-D11 span 1445-1595, with the 80 rings of sample BNG-D12 spanning 1517-1596 (see Tables 4 and 5). Although these samples do not cross-match with each other to form a combined site chronology, because they share a very similar date-span, they are illustrated together at their suggested relative position and dates in Figure 5.



Neither sample BNG-D11 or B12 retains complete sapwood and it is thus not possible to give a precise, single year, date of felling for either of the trees represented. Both samples do, however, retain the heartwood/sapwood boundary and some sapwood. The average date of the heartwood/sapwood boundary on these two samples is 1588 which, taking the usual 95% confidence interval of 1540 for the number of sapwood rings the trees might have had, would suggest that the trees were cut as part of a single episode of felling sometime between 1603 (1588+15) and 1628 (1588+40).

The final two measured individual samples BNG-D01 and D10 remain undated. This analysis may be summarised as below:

Site chronology / samples	Number of samples	Number of rings	Date span	Felling date
BNGDSQ01	1 5	159	1531.1689	1646.71 1689
BNGDSQ02	3	87	1663.1749	1749
BNG-D09	1	121	1193.1313	1313
BNG-D11	1	151	1445.1595	1603.28
BNG-D12	1	80	1517.1596	1603.28
undated	2	---	---	---
unmeasured	2	---	---	---

## **Conclusion**

### ***Site chronology BNGDSQ01***

Site chronology BNGDSQ01 comprises six samples, five from the ceiling of the first floor and one from the ceiling of the ground floor cafe. The upper timbers were felled in 1689, the ground floor timber was felled between 1646.71. It is unclear if either ceiling represents a primary and original feature of this building, which would thus date it to the late seventeenth century, or whether they represent a later reworking or alteration phase of an already existing, earlier, building.

### ***Site chronology BNGDSQ02***

Site chronology BNGDSQ02 comprises three samples from the ceiling and walls of the rear range. It would appear that, as intimated from the structural evidence, these timbers represent a later, mid-eighteenth century, addition to an already existing building.

### ***Individually dated samples BNG-D09, D11, and D12***

Although there is no clear evidence for reuse, it is highly unlikely, given its early felling date of 1313, that the horizontal timber in the partition wall between the west bedroom and the corridor is an original, but is likely to be a section of beam reused from somewhere else.

It is possible that the purlins in the roof, which do show clear evidence of reuse and may originally have been wall plates, were part of an earlier building on this site. If so, tree-ring analysis would suggest that this building, or at least this part of the building, dates to the early to mid-seventeenth century, but were reused as part of the late-seventeenth century re-working.

### ***Undated samples BNG-D01 and D10***

Sample BNG-D01 from the ground floor ceiling beam, and sample BNG-D10, from the loose

beam in the first floor corridor, remain ungrouped and undated for the moment. Neither of these samples shows any peculiarities, such as compression or distortion, which might make cross-matching difficult and the reason for the lack of dating is unknown. However, it is very common in tree-ring analysis to find that a few samples remain undated. In due course, when further regional tree-ring data is obtained, these samples will be reanalysed in an attempt to produce a cross-match for them.

### **t-value tables of Reference Sites**

**Table 2:** Results of the cross-matching of site chronology BNGDSQ01 and the reference chronologies when the first ring date is 1531 and the last ring date is 1689

<b>Reference chronology</b>	<b>t-value</b>	
Walnut Cottage, Hoveringham, Notts	11.0	( Arnold and Howard 2009a unpubl )
Little Castle, Bolsover Castle, Derbys	9.8	( Arnold <i>et al</i> 2003 )
Riding House, Bolsover Castle, Derbys	9.4	( Arnold <i>et al</i> 2005 )
The Wheatsheaf, Cropwell Bishop, Notts	9.2	( Arnold <i>et al</i> 2008 )
Middleton Hall, Middleton, Warwicks	9.0	( Arnold <i>et al</i> 2006 )
Brewhouse Yard Museum, Nottm	8.9	( Howard <i>et al</i> 1994 )
East Midlands Master Chronology	8.8	( Laxton and Litton 1988 )
Potterdike House, Newark, Notts	8.3	( Arnold <i>et al</i> 2002 )

**Table 3:** Results of the cross-matching of site chronology BNGDSQ02 and the reference chronologies when the first ring date is 1663 and the last ring date is 1749

<b>Reference chronology</b>	<b>t-value</b>	
Castle House, Melbourne, Derbys	6.4	( Arnold and Howard 2009b unpubl )
Middleton Hall, Middleton, Warwicks	5.9	( Arnold <i>et al</i> 2006 )
St John The Baptist, Grimstone, Leics	5.6	( Arnold <i>et al</i> 2005 )
Church Farm, Hayton, Notts	5.5	( Arnold <i>et al</i> 2008 )
St Firmin's Church, Thurlby, Lincs	5.4	( Arnold and Howard 2010 )
East Midlands Master Chronology	5.2	( Laxton and Litton 1988 )
Ragnall House (barn), Ragnall, Notts	5.1	( Howard <i>et al</i> 1997 )
Blidworth, Notts	5.0	( Laxton <i>et al</i> 1982 )

Site chronologies BNGDSQ01 and SQ02 are composites of the data of their constituent cross-matching samples as seen in the bar diagrams Figures 3 and 4. This composite data produces 'average' tree-ring patterns, where the overall climatic signal of the growth is enhanced, and the possible erratic variations of any one individual sample are reduced. These 'average' site chronologies are then compared with several hundred reference patterns covering every part of Britain for all time periods, the site chronologies dates only at the time spans indicated.

**Table 4:** Results of the cross-matching of sample BNG-D09 and the reference chronologies when the first ring date is 1193 and the last ring date is 1313

<b>Reference chronology</b>	<b>t-value</b>
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The Hollies, Bathley, Notts	7.5	( Alcock <i>et al</i> 1991 )
40-44 Castlegate, Newark, Notts	6.8	( Arnold <i>et al</i> 2002 )
'Severns', Castle Road, Nottm	5.9	( Howard <i>et al</i> 1996 )
40-44 Cartergate, Newark, Notts	5.8	( Arnold <i>et al</i> 2002 )
Old White Hart, Newark, Notts	5.8	( Arnold <i>et al</i> 2002 )
Southview Cottage, Norwell, Notts	5.8	( Hurford <i>et al</i> 2010 )
Manor House, Cropwell Bishop, Notts	5.8	( Howard <i>et al</i> 1985 )
22-24 Kirkgate, Newark, Notts	5.6	( Arnold <i>et al</i> 2002 )

**Table 5:** Results of the cross-matching of sample BNG-D11 and the reference chronologies when the first ring date is 1445 and the last ring date is 1595

Reference chronology	t-value	
Church Farm House, Ockbrook, Derbys	5.7	( Arnold and Howard 2009 )
Nun Appleton, Tadcaster, W Yorks	5.6	( Arnold <i>et al</i> 2008 )
Clumpcliff, Wakefield, W Yorks	5.3	( Howard <i>et al</i> 2000 )
Weston Hall, Weston upon Trent, Derbys	5.3	( Arnold and Howard 2010 unpubl )
Holy Trinity Church, Kirk Ireton, Derbys	5.3	( Howard <i>et al</i> 1995 )
Riding House, Bolsover Castle, Derbys	5.0	( Arnold <i>et al</i> 2005 )
Gatehouse, Kenilworth Castle, Warwicks	5.0	( Arnold and Howard 2007 )
Old Hall Cottage, Twyford, Derbys	4.9	( Arnold <i>et al</i> 2008 )

**Table 6:** Results of the cross-matching of sample BNG-D12 and the reference chronologies when the first ring date is 1517 and the last ring date is 1596

Reference chronology	t-value	
Lowdham Old Hall, Lowdham, Notts	8.1	( Howard <i>et al</i> 1992 )
St John The Baptist, Muston, Leics	6.6	( Arnold <i>et al</i> 2005 )
Sinai Farm, Burton on Trent, Staffs	5.4	( Arnold <i>et al</i> 2008 )
Clumpcliff, Wakefield, W Yorks	5.3	( Howard <i>et al</i> 2000 )
Brewhouse Yard Museum, Nottm	5.3	( Howard <i>et al</i> 1994 )
Keyworth Barn, Keyworth, Notts	5.2	( Laxton <i>et al</i> 1984 )
East Midlands Master Chronology	5.2	( Laxton and Litton 1988 )
Hipper Hall, Walton, Derbys	5.2	( Howard <i>et al</i> 1995 )

Whereas site chronologies BNGDSQ01 and SQ02 are 'averaged' composites of the data of the samples which cross-match with each, samples BNG-D09, D11, and D12 have been dated individually (Tables 4, 5, and 6).