**PIZZA PLACE, 19 MARKET PLACE, BINGHAM**
**TREE-RING ANALYSIS OF TIMBERS**


## Summary

Analysis by dendrochronology of five of the eight samples obtained from timbers within this building (three samples having insufficient rings for reliable dating), has resulted in the production of one dated site chronology, comprising two samples, and dated a further two samples individually.

The site chronology, composed of a sample from the main ceiling beam of the west first floor room, and a sample from the lower purlin to the cat-slide roof, is 65 rings long, these rings dated as spanning the years 1685 - 1749. Interpretation of the sapwood on these samples would indicate that the timbers were cut as part of a single episode of felling at some point between 1757 at the earliest and 1782 at the latest.

The earliest individually dated timber, the north-east purlin to the main roof, has an estimated felling date of sometime between 1603 and 1628, while the latest individually dated timber, the upper purlin to the cat-slide roof, has an estimated felling date of sometime between 1635 and 1640.

A single measured sample, from the eastern ground floor ceiling beam, remains undated.


## Introduction

The Pizza Place on Market Square, Nottinghamshire (SK 704 398, Figs 1a/b), is a complicated building comprising a main two and a half storey block facing onto the square, with a lower addition, beneath a cat-slide roof, to the rear. There are timbers at both ground and first floor ceiling levels to the main block, and the roof of the cat-slide addition. There is no wall framing visible.
Detailed plans are available in the accompanying house history pages.

## Sampling

C 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. Although there were in theory a few other timbers available for sampling, these were derived from fast-grown trees and as such were unlikely to provide sample with the minimum number of rings, 50, here deemed necessary for reliable analysis.

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 rear yard or service area, the front to be facing south onto Market Place.

**Table 1:** Details of tree-ring samples from Pizza Place, Market Square, Bingham, Nottinghamshire

| Sample number | Sample location | Total rings | Sapwood rings* | First measured ring date (AD) | Heart/sap boundary (AD) | Last measured ring date (AD) |
|---|---|---|---|---|---|---|
| BNG-F01 | Eastern ground floor ceiling beam | 122 | 21C | ------ | ------ | ------ |
| BNG-F02 | Eastern fireplace bressumer | nm | --- | ------ | ------ | ------ |
| BNG-F03 | Western ground floor ceiling beam | nm | --- | ------ | ------ | ------ |
| BNG-F04 | Ceiling beam to east first floor room | nm | --- | ------ | ------ | ------ |
| BNG-F05 | Ceiling beam to west first floor room | 57 | h/s | 1685 | 1741 | 1741 |
| BNG-F06 | Upper purlin to cat-slide roof | 66 | h/s | 1555 | 1620 | 1620 |
| BNG-F07 | Lower purlin to cat-slide roof | 56 | 7 | 1694 | 1742 | 1749 |
| BNG-F08 | North east purlin to main roof | 75 | h/s | 1514 | 1588 | 1588 |

*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 eight samples obtained from the various timbers of this building was prepared by sanding and polishing. It was seen at this time that three of these samples, BNG-F02, F03, and F04, respectively from the eastern ground floor fireplace bressumer, from the western ground floor ceiling beam, and from the ceiling beam to the east first floor room, had less than the minimum of 50 rings deemed necessary for reliable dating, and they were rejected from this programme of analysis. The annual growth ring widths of the remaining five samples were, however, measured and the data then compared with each other.

By this process a single group of two cross-matching samples could be formed, the two samples, BNG-F05 and BNG-F07 respectively from the main ceiling beam of the west first floor room and from the lower purlin to the cat-slide roof, cross-matching with each other at the positions indicated in the bar diagram Figure 3. The two cross-matching samples were combined at their indicated off-set positions to form BNGFSQ01, a site chronology with an overall length of 65 rings. This site chronology was then satisfactorily dated by repeated and consistent cross-matching with a large number of relevant reference chronologies for oak as spanning the years 1685 to 1749. The evidence for this dating is given in the *t*-values of Table 2.

**Table 2:** Results of the cross-matching of site chronology BNGFSQ01 and the reference chronologies when the first ring date is 1685 and the last ring date is 1749

| Reference chronology | *t*-value | |
|---|---|---|
| Catholme, Staffs | 7.2 | ( Howard *et al* 1992 unpubl ) |
| Quenby Hall, Quenby, Leics | 5.9 | ( Arnold *et al* 2008 ) |
| St John The Baptist, Grimstone, Leics | 5.9 | ( Arnold *et al* 2005a ) |
| St Firmin Church, Thurlby, Leics | 5.4 | ( Arnold and Howard 2010 ) |
| Stoneleigh Abbey, Stoneleigh, Warwicks | 5.4 | ( Howard *et al* 2000 ) |
| East Midlands Master Chronology | 5.2 | ( Laxton and Litton 1988 ) |
| Oakham Castle, Oakham, Rutland | 5.0 | ( Arnold and Howard forthcoming ) |
| Bretby Hall, Bretby, Derbys | 5.0 | ( Howard *et al* 1999 ) |

Site chronology BNGFSQ01 is a composite of the data of the two cross-matching samples as seen in the bar diagram Figure 3. This composite data produces an 'average' tree-ring pattern, where the overall climatic signal of the growth is enhanced, and the possible erratic variations of either individual sample are reduced. This 'average' site chronology is then compared with several hundred reference patterns covering every part of Britain for all time periods, the site chronology dating only at the time span indicated.

Neither of these two samples retains complete sapwood (the last ring produced by the tree before it was felled), and it is thus not possible to say with certainty exactly when the trees represented were cut. Both samples do, however, retain the heartwood/sapwood boundary

(denoted by 'h/s' in Table 1 and the bar diagram). This means that only the sapwood rings are missing. On both samples the relative position and date of this boundary is virtually identical at 1741 and 1742, which, given that the amount of sapwood on oak trees generally lies within known limits (15–40 rings), it is possible to say that the two trees were almost certainly cut as part of a single episode of felling at some point between 1757 at the earliest and 1782 at the latest.

Site chronology BNGFSQ01 was then compared with the three remaining measured but ungrouped samples. There was however, no further satisfactory cross-matching. Each of these three remaining samples was, therefore, compared individually with the full corpus of reference material for oak, this process indicating cross-matches and dates for two of these individuals.

The earliest individually dated sample, BNG-F08, from the north east purlin to main roof, has a last, heartwood/sapwood boundary, ring date of 1588. Using the same sapwood estimate as above, 15-40 rings, would give this timber an estimated felling date in the period 1603 to 1628.

The second individually dated sample, BNG-F06 from the upper purlin to the cat-slide roof, has a last, heartwood/sapwood boundary, ring date (h/s) of 1620. Using the same sapwood estimate as above, 15-40 rings, would give this timber an estimated felling date in the period 1635-60.

## Conclusion

It would appear therefore that, as possibly indicated by the archaeological building survey undertaken, timbers with different felling dates are to be found reused here. One timber has a felling date in the early seventeenth century while another has a felling date in the mid-seventeenth century. Two other timbers were felled in the mid-to later-eighteenth century. The diagram compares the datable timbers.

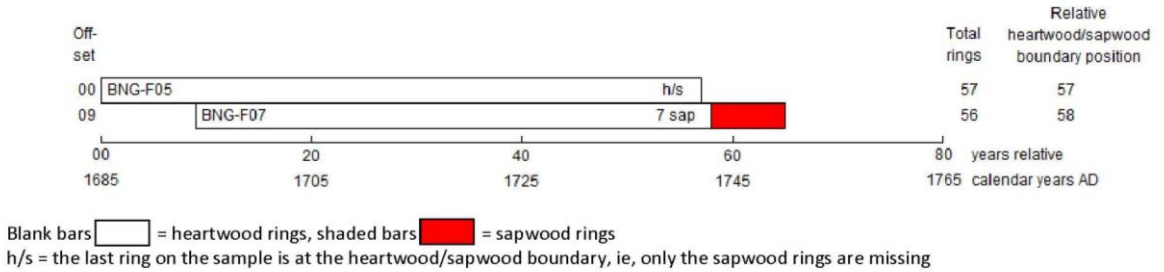


**Figure 3**: Bar diagram of the samples in site chronology BNGFSQ01 at positions indicated by their cross-matching. The samples are shown in the form of bars at positions where the ring variations cross-match with each other. This similarity is produced by the trees represented growing in the same general area *at the same time as each other.* The samples are combined to form a 'site chronology' which is compared with a large database of 'reference' chronologies for all time periods for all parts of England. In this instance site chronology BNGFSQ01 cross-matches with the reference chronologies with a date span of 1685–1749 (see Table 2).

### *Undated samples BNG-F01*

Sample BNG-F01, from the eastern ground floor ceiling beam, remains undated, despite having 122 rings. This sample does not show 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.

It is possible that the source tree was grown during a time period (the later-eighteenth, or possibly the early-nineteenth century) for which, at the moment, there is little reference data available in this region. It is only with the accumulation of data, such as that obtained as part of the Bingham Buildings project, that this gap may be filled and the presently undated samples may in due course be dated.