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**Tree-Ring Analysis of Timbers from the 'Charlie Brown'  
Complex, 60-66 East Street, Colchester, Essex**

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## **Tree-Ring Analysis of Timbers from the 'Charlie Brown' Complex, 60-66 East Street, Colchester, Essex**

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### **Summary**

Many phases of construction at this building complex have been identified using stylistic evidence. The lack of rings in the majority of timbers precluded dendrochronological dating of several of the potential phases. Only one phase, thought to be of seventeenth-century origin, yielded a site chronology from three matching timbers, but only of 63 years in length. This did not date.

### **Keywords**

Dendrochronology  
Standing Building

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## **Introduction**

The building known as Charlie Brown's (NGR TM 0081 2531; Fig 1) is in fact a range including several phases and covering what is now designated 60-66 East Street, Colchester. Numbers 60 and 61 are listed as a house with shop of early seventeenth century date, the remainder are listed together as early seventeenth-century, late fifteenth-century and mid fourteenth-century properties running east to west. Number 63 has a two-bay mid fourteenth-century crown post roof, and number 65 incorporates a carriageway. The ground-floor plan (Fig 2) illustrates the complexity of this site.

Dendrochronological dating of this complex was requested by Paul Edwards, English Heritage Inspector of Historic Buildings. It was to inform a programme of detailed recording while an extensive programme of repairs was being carried out, to help interpret the development of the site, and give information which might assist in any reconsideration of the listing status of the site. This represented an unequalled opportunity to gain access to the timbers whilst they were exposed.

## **Methodology**

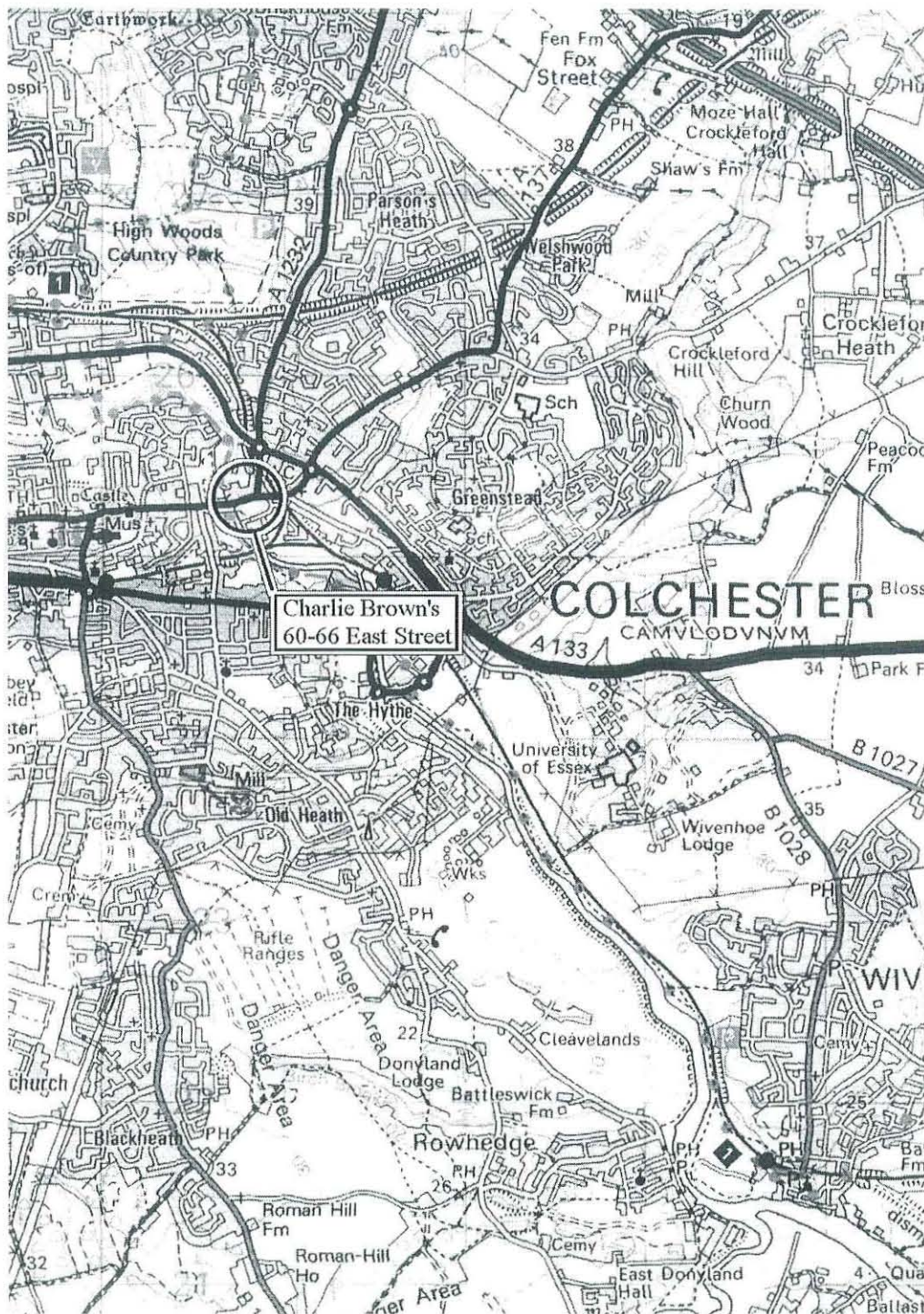
The site was visited in October AD 2003. Oak timbers with more than 50 rings, traces of sapwood, and accessibility were the main considerations in the initial assessment. Those timbers judged to be potentially useful were cored using a 15mm auger attached to an electric drill. The cores were glued to 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 utilising a binocular microscope with the sample mounted on a travelling stage with a linear transducer linked to a PC. This sometimes includes samples with less than 50, but more than 40 rings, which may crossmatch with other, longer series from the same site. 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 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 meant 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



**Figure 1:** Map showing the general location of Charlie Brown's, 60-66 East Street, Colchester,

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**

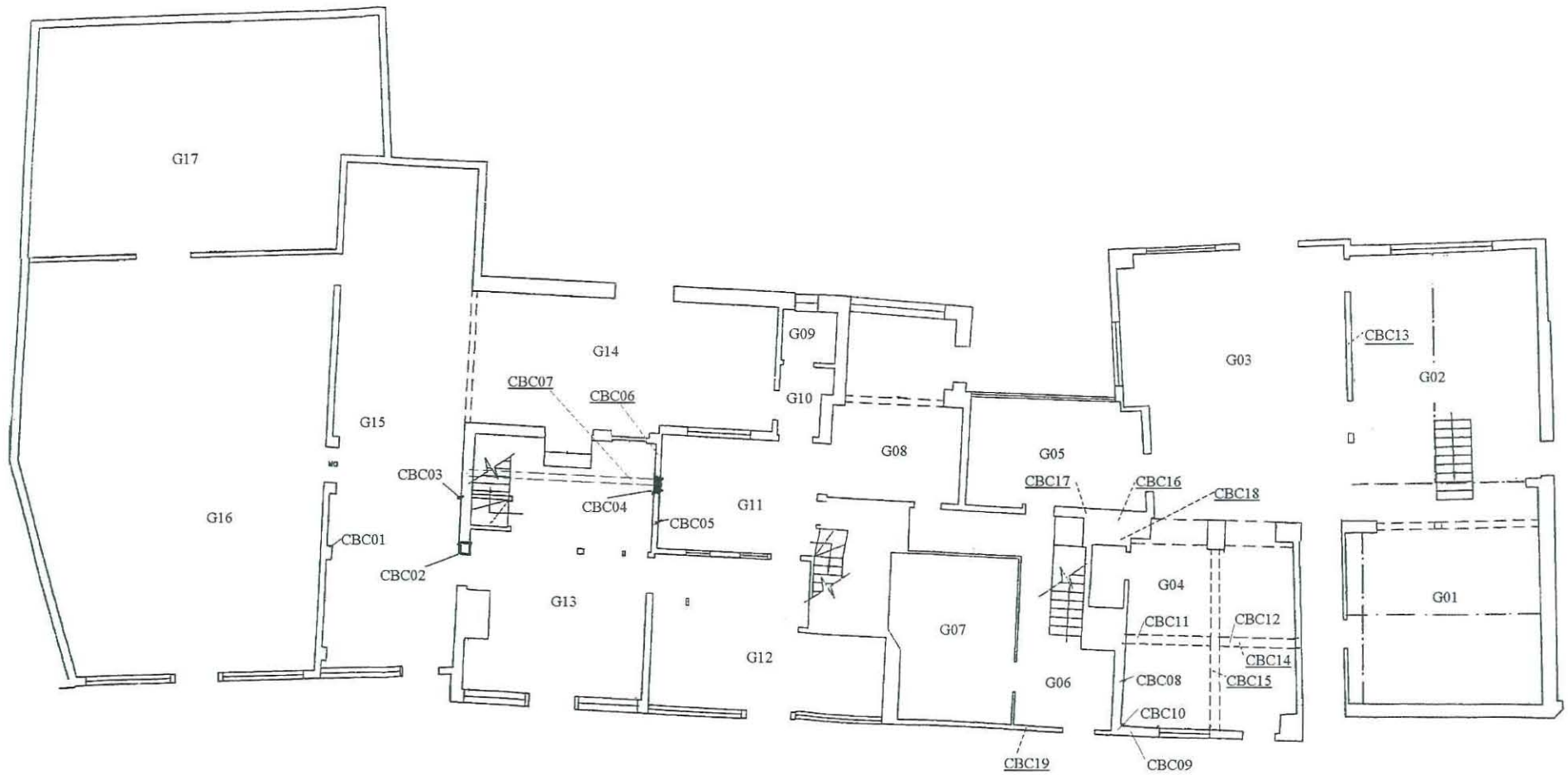
All the timbers sampled were of oak (*Quercus* spp.). Nineteen timbers were sampled (Table 1), though many could not be properly assessed for their dendrochronological suitability prior to sampling as they were covered in paint or whitewash or were largely hidden behind other timbers. Many timbers were rejected prior to sampling as unsuitable, including all those in the room and roof over the carriageway (at the west end of the complex; Fig 3), those in the crown post roofs, those in the roofs of the eastern end of the complex, and all except the post sampled in the rear wing at the east end (Fig 2).

Most timbers, including some of the largest timbers, eg CBC02 which was 0.34m (13.5") wide, were found to contain too few rings to be useful (Table 1). Those with sufficient numbers of rings to warrant further analysis were compared with each other, with the result that three timbers were matched together (Table 2; Fig 4) to form a site chronology, CBC8914m, of 63 years. This was compared with the extensive dated reference material available, and whilst it gave several apparently good statistical matches, these were not at a single consistent date. The series (Table 3) therefore remains undated.

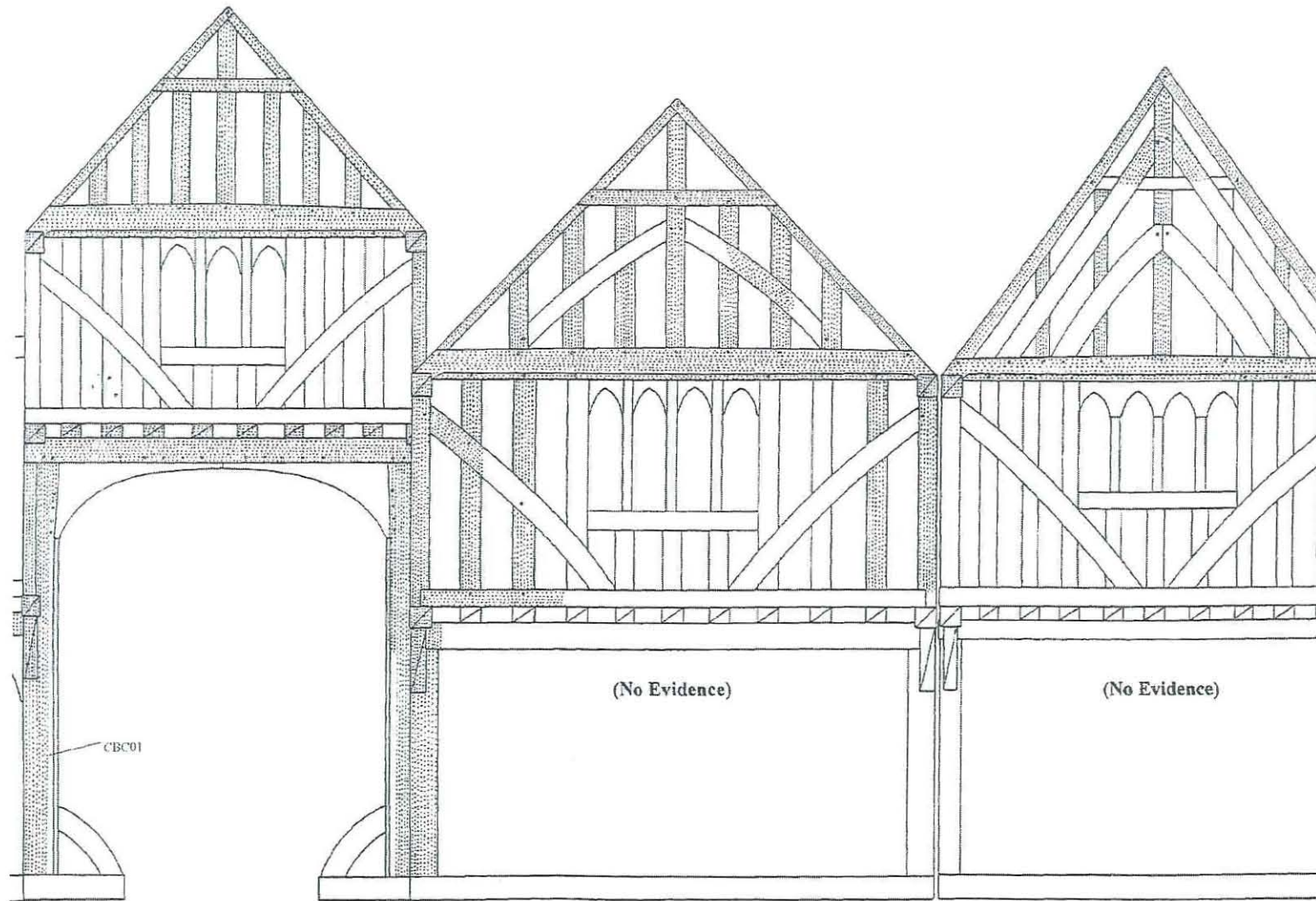
## **Interpretation and Discussion**

This area of coastal Essex has been found to have fast-grown oaks of large size but insufficient rings for dating throughout many centuries. Nevertheless, it was surprising to find so few suitable timbers in this large building complex, with its many different phases. Far more timbers were rejected than were sampled. The timbers were exposed to an extent which is unlikely to be repeated for several generations, and therefore the opportunity was taken to sample widely, even though in several cases decorative covering of the timber made assessment difficult.

Only one phase, stylistically dated to the seventeenth-century, yielded samples which matched each other and could be built into a site chronology. This relatively short 63-year chronology gave many possible statistical matches, but none of them were considered reliable as they were not exclusive to one year. The band of narrow rings on samples CBC 10 and 11 may result from some site-specific influence on growth. The rings were so narrow as to prevent individual rings from being distinguished.



**Figure 2:** Ground-floor plan of 60-66 East Street, showing the approximate positions of the timbers sampled for dendrochronology. Those sample labels underlined and indicated by broken lines are samples taken at first floor level; adapted from an original drawing by Ridout Associates



**Figure 3:** Section through the west end of the building complex, showing the carriageway (left) and adjacent rooms. Original timbers are shaded

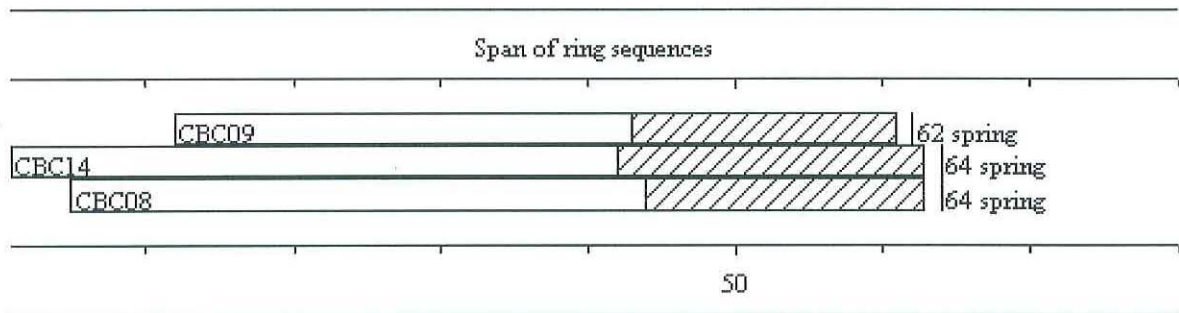
**Table 1:** Oak (*Quercus* spp.) timbers sampled from 60-66 East Street, Colchester, h/s represents the heartwood-sapwood boundary, figures in brackets represent additional unmeasured rings; C represents complete sapwood; ½C records the presence of spring vessels after the last complete ring; \* indicates the presence of a band of very narrow rings in which individual rings cannot be distinguished. Room numbers refer to the those used in the drawings made by Ridout Associates

Sample number	Origin of core	Total no of years	Average growth rate (mm yr <sup>-1</sup> )	Sapwood details
<b>Second probable 14<sup>th</sup>-century phase</b>				
CBC01	Carriageway, west wall, centre post	52	3.86	14
CBC02	Carriageway, east wall, centre post	37	not measured	2
CBC03	Carriageway, east wall, stud	24	not measured	8
<b>First probable 14<sup>th</sup>-century phase</b>				
CBC04	Post in west wall of first phase, room G13	46	3.02	-
CBC05	Dais beam, room G13	33	not measured	3
CBC06	First-floor wallplate	19	not measured	-
CBC07	East-west tie	37	not measured	7
<b>Second probable 17<sup>th</sup>-century phase</b>				
CBC08	West beam, room G04	59	2.86	19½C
CBC09	Front rail, room G04	50	2.39	18½C
CBC10	South-west post, room G04	c54*	not measured	-
CBC11	West section of main east-west beam	c43*	not measured	-
CBC12	East section of main east-west beam	29	not measured	-
CBC13	Middle post in rear range west wall	24	not measured	11
CBC14	East beam in room 103	63	1.86	21½C
CBC15	North-south beam in room above 103	82	2.20	19C
<b>First probable 17<sup>th</sup>-century phase</b>				
CBC16	North-east corner post, room 106	<40	not measured	h/s
CBC17	North wallplate, room 106	48	1.76	5
CBC18	Tie, room 106	30	not measured	-
CBC19	South wallplate, room 105	<40	not measured	-



**Table 2:** Crossmatching between series from what is thought to be the second phase of the seventeenth century

<i>t</i> -values		
Sample	CBC09	CBC14
CBC08	4.7	4.4
CBC09		5.9



**Figure 4:** Bar diagram showing the relative positions of overlap of the three matching undated samples and their interpreted relative felling dates

**Table 3:** Ring width data for the undated chronology CBC8914m

ring widths (0.01mm)	no of trees
279 270 243 185 391 302 283 385 348 272	1 1 1 1 2 2 2 2 2 2
399 420 374 344 301 339 332 297 284 301	2 3 3 3 3 3 3 3 3 3
262 335 391 263 340 355 278 297 274 276	3 3 3 3 3 3 3 3 3 3
315 327 171 194 136 345 285 193 169 186	3 3 3 3 3 3 3 3 3 3
184 193 165 135 117 144 132 164 197 150	3 3 3 3 3 3 3 3 3 3
176 162 142 149 176 133 99 115 95 80	3 3 3 3 3 3 3 3 3 3
119 105 167	3 2 2

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