

Dendrochronological dating of the Clermont “Bouwerie” near Clermont, Columbia County, New York

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The Bouwerie is located on a low rise along the flats following the Roeliff-Jansen Kill off Buckwheat Road near Clermont in Columbia County, New York. It was built in at least three phases. Across the front of the main section—a large gambrel roofed structure—the date “1762” is prominently displayed on the brickwork. On the rear wall a brick has been inscribed with the date of 1761; hence, it was assumed that these dates may bracket the construction phase of this part of the house. The original house is a much smaller frame section to the west of the main section, and it was thought to have been built possibly before 1700 when the land was originally purchased. Subsequently this was extended to the east with the construction of a 12 foot frame addition. Finally, the bigger brick was erected immediately east of this extension. The Mesick-Cohen-Wilson-Baker architectural team (Christina A. Muir & John Mesick), asked the Cornell Tree Ring Laboratory to determine if the original house was built in the 17th century or at a later time, and whether the 1762 on the main house is correct.

The house now contains two separate basements, one under the front brick structure with a separate basement under the earliest frame house, but none under the adjoining frame extension. There is a large attic in the gambrel roof of the 1762 house, and originally the two framed sections (each of a story-and-a-half height) had unfinished garrets which c. 1800 were raised to a full two story height. The original structure consisted of a single room with a steep stair, located in the southeast corner, affording access to the basement as well as the garret. The small extension provided a second room with garret above, but without a basement space below. The main part of the house is much larger with a wide center hall and a single large room on each side; access to its separate cellar is by way of a stair located under the stair in the center hall.

At the house we bored 2 cores each from four beams in the older cellar, one beam in the main cellar, plus two attic rafters and a purlin in the attic of the gambrel roof on the front section.

The sampled timbers all contained either bark (including outer ring – the “waney edge”) or just the waney edge. These qualities are key to tree-ring dating because a calendar date of the outer ring tells the year and season of when that tree was felled, and house construction generally began soon after that.

Methods

At the lab, samples were prepared by first gluing the cores into holders, than sanding the transverse surface of the cores with 40- to 300-grit sandpaper. The ring-widths were measured on a moving table underneath a microscope with cross hairs, recording the widths with 0.01mm accuracy. Descriptions of each sample, including ring count and species, are listed in the appendix. Samples with less than 50 rings, or erratic growth due to presence of branches or scars, were only measured to see whether their ring patterns match with any of the other samples of the same species from the building.

CORINA software was used to compare and match the ring-width patterns in each sample that contain over 50 rings, both visually and statistically (= “crossdating”). Sequences from the same beam were averaged together. The averaged tree-ring series were then compared to the series of the samples with the same genus or species, and if they contained significantly similar tree-ring patterns, they were relatively dated to each other, detrended (removing the normal wide to narrow ring growth over time), and averaged together to form a working chronology. Besides the removal of the normal reduction in ring widths over time, detrending can remove other idiosyncratic growth patterns unique to a tree.

Results

All the sampled basement beams from both cellars are of oak (*Quercus* species). From the original basement, the first two sampled beams have sufficient ring count and the tree rings patterns crossdate significantly (Figure 1) to combine into a chronology of the original Bouwerie.

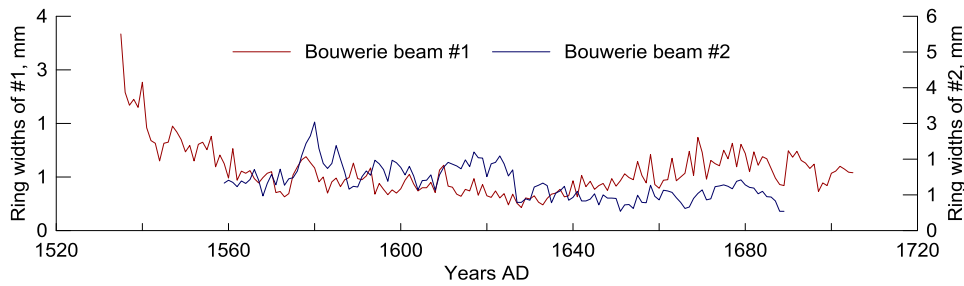


Figure 1. The raw measurements of two beams in the original basement placed against each other. The x-axis refers to their placement against a dated regional chronology as shown in Figure 2 below

Unfortunately sample 3, containing 73 rings, had several erratic growth patterns and while relative dating to the other two beams is definite, it is not included in the chronology (Table 1). Sample 4 contained only 25 rings with no preserved sapwood (or bark), too short to date securely. The Original Bowerie Oak Chronology, built of samples 1 and 2, is 171 years long, with bark. A comparison of the chronology with other buildings' and regional oak chronologies indicate that the outer ring dates to AD 1705 (Figure 2). The outer ring is complete, indicating that the tree was felled sometime between the end of the growing season in 1705 and early 1706, before the start of the growing season. The house was most likely built within a few months after the trees were felled.

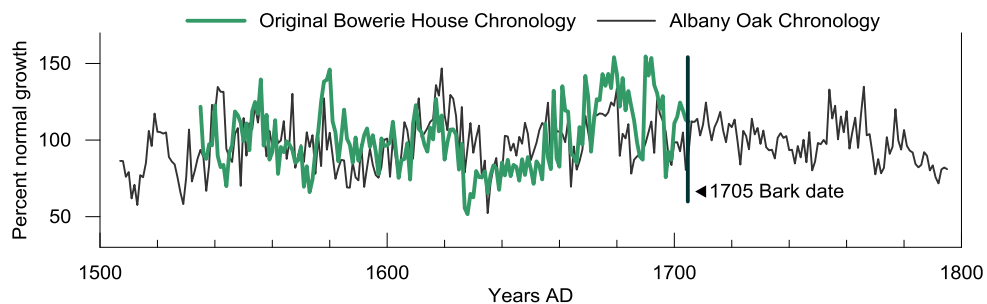


Figure 2. The chronology of the original house placed in time against the Albany Oak Chronology (E.R. Cook and C.B. Griggs), with the outer ring at 1705

For the main house's building date, only the basement sample is oak and datable from its tree rings patterns. It has normal ring growth and, with 88 rings plus bark, was compared to our extensive oak collection, plus those of E.R. Cook, from around Albany and Schenectady. A number of them securely place the sample's last complete ring at 1765; its partial outer ring indicates that it was cut down in spring-summer 1766 (Figure 3).

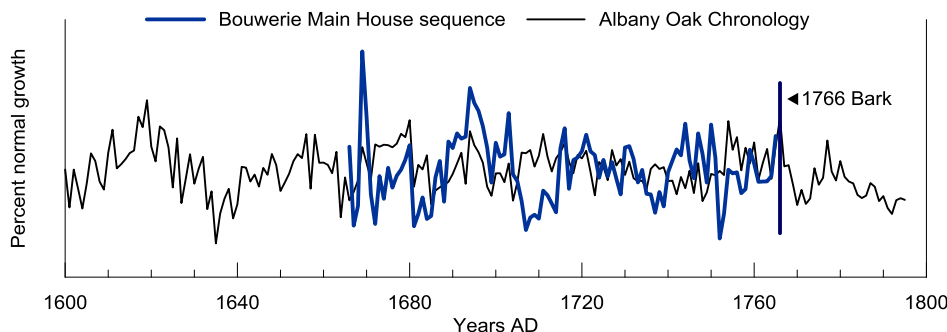


Figure 3. Shown here is the placement of sample 5, from the basement of the main house, on the same Albany Oak Chronology as in Figure 1. The visual similarities are less convincing here only due to measurements from a single tree.

Of the three attic samples, the rafters are both of a poplar species (*Populus sp.*), possibly an aspen species common to this area; the purlin is of chestnut (*Castanea dentata*). All contain less than 40 rings, and in any case, none of the species have any current tree-ring chronologies in New York with which to compare.

For the dates of the Bouwerie construction, our results indicate that the original building was constructed in 1705-06, in contrast to a pre-1700 date. The post-1700 date is quite understandable given the rather uneasy nature of the Hudson Valley due to raids and skirmishes between factions in the beaver wars at around that time. The same post-1700 date is true for all building dates of houses around the Albany area that are claimed to have been built prior to 1700 - none have been found, but in a few cases, wood from an earlier building has been re-used. 1705-6 date puts the Bouwerie's building date at the same time as the original house on the Mabee Farm west of Schenectady, and the Crailo House in Rensselaer, New York.

The timber used in the cellar beam in the main section of the Bouwerie was cut in spring-summer 1766, which raises a question on the possible 1765 construction date. However, the

house was certainly not built in 1762, the date on the front exterior wall. Perhaps the “1765” represents the date when the land was bought, or even when the construction began; the tree used for that beam was felled in 1766.

Acknowledgments: Thanks to Bill and Katie Griggs, Sturt and Callista Manning for help in collection. The facilities and equipment used in this research are part of the Cornell Tree Ring Laboratory, B48 Goldwin Smith Hall, Cornell University, Ithaca, NY.

Appendix

Below is a detailed list of the samples - their locations, sizes, ring counts, and dates. All basement beams are of oak (*Quercus* sp.). The species of the attic timbers are listed for each sample

The terms used below: The end dates of the samples listed below include the dates of an outer partial ring if one is present, indicated by a “+”. The partial rings are not included in the complete chronology since the rings are not measured. A “B” indicates the presence of bark; “W” indicates a waney edge with only bark removed; “p” indicates the presence of the pith, or center of the tree; “v” indicates that the outer ring is within 5 years of the waney edge or bark date; “vv” indicates an unknown number of rings absent to the bark; “++” indicates multiple rings present but unmeasured. A “+n”, where n is a number of rings indicates the number of unmeasured rings before or after the measured sequence. The “n” is generally 1 but occasionally more due to insect or structural damage of the rings.

Sample

Number	Description	Number of rings	Dates included
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Samples from the basement of the original building; unfortunately, with the dryness of the wood, most of the sapwood was partially or totally destroyed, due to softness or insect damage, except for CCB-1C.

CCB-

- 1 Cores taken from the NE beam at the bottom of the stairs in the original basement extending into the wine cellar; A and B were taken outside the wine cellar; C within. Minimum radius of 20cm, *Quercus* sp, with 8 sapwood rings, complete outer ring, and bark.

A = +1 +10 +136+vv

1527-1673

B = +p + 1 +169+2B

1534-1705++B

C = +p + 1 +167B	1538-1705B
CCB-1, ABC combined = +p + 1 +171B	1534-1705B

- 2 Core from center beam outside the wine cellar. Minimum radius 19cm, *Quercus* sp. Bark on beam where cored, but none survived in the sample; ~8 sapwood rings; several breaks in both cores due to insect damage completely removed some heartwood and all sapwood rings (A radius) or were too severe to crossover for a sure connection with the previous segment; the ring numbers were counted for the last segment, and they indicate a post-1703 year of construction.

A = p+1+120 +4	1558p - 1682++vv
B = p+1+130+~16v	1559p – after 1703v
CCB-2, A&B combined = p+1+131+~16v	1558p - after 1703v

- 3 Core from beam next to center beam (CCB-2 above) above, farthest from the staircase. Addition. Minimum radius 20.5 cm, *Quercus* sp, 10 sapwood rings and bark present, but outer sapwood rings were broken. 3B has very erratic growth patterns, but crossdatable; its ring-width series was not added to the chronology.

A = +1 + 73 + ~5v	1612 – after 1704v
B = +1 + 88 + ~3v	

- 4 Core from second beam inside wine cellar. Only one core taken due to short ring count and no sapwood. *Quercus* sp. Not included in chronology due to <50 rings.

A = +p +1 + 30+1vv	1645 - 1676+1vv
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Original Bouwerie House Oak Chronology – contains samples CCB- 1 and 2
N = 171B **1535 – 1705B**

Sample from the “1762” Bouwerie House:

Basement:

- 5 Core from 2nd basement, the only beam containing bark. Minimum radius 9.5cm, *Quercus* sp. Bark, 16 sapwood rings.

A = p +100+1B	1668-1766+B
B = +p+1+89+1v	1673-1763+v

Bouwerie 1762 House sequence **N=100B** **1668-1765**

Sample Number	Description	Number of rings	Dates included
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Sample from attic timbers:

6	Cores from roof rafter, 4th from window, with a waney edge. <i>Populus</i> sp. Minimum radius 10cm	A = p +31+1W B= +p +27v	Species not datable
7	Cores from roof rafter, 3rd from window, with a waney edge. <i>Populus</i> sp. Minimum radius 11.5cm.	A = +p +1 +36+1W B= +p +34v	Species not datable
8	Cores from roof purlin, near entrance to attic. Contains bark, <i>Castanea dentata</i> , minimum radius of 11.5cm, with 2 sapwood rings.	A = +1 +28B	Species not datable