

Dendrochronological dates of the Winkelman House, Gloucester, MA

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Rob Winkelman took seven samples with a hollow borer from beams in his house at 308 Main Street, Gloucester, Massachusetts, and sent them to us at the Cornell Tree-Ring Laboratory along with information about the history of the house and the location of the beams from which the cores were drilled (Figure 1). He states, "The historical record indicates that the land for this house as it stands now was purchased by Henry Pew in 1835. Two men, Babson & Norwood, owned the entire section of land around our house. An 1835 map of Gloucester called the Mason Map clearly shows that no houses were on this land. Henry Pew paid taxes on this land only for the years 1835 & 1836. Tax records reflect that it wasn't until 1837 that he first paid taxes for both the land and house." Winkelman also suggested that the house could have been moved from another location, which implies that its original construction date could have been considerably earlier than 1837. The house is of Federal style, a style built generally in the late 1700s to early 1800s.

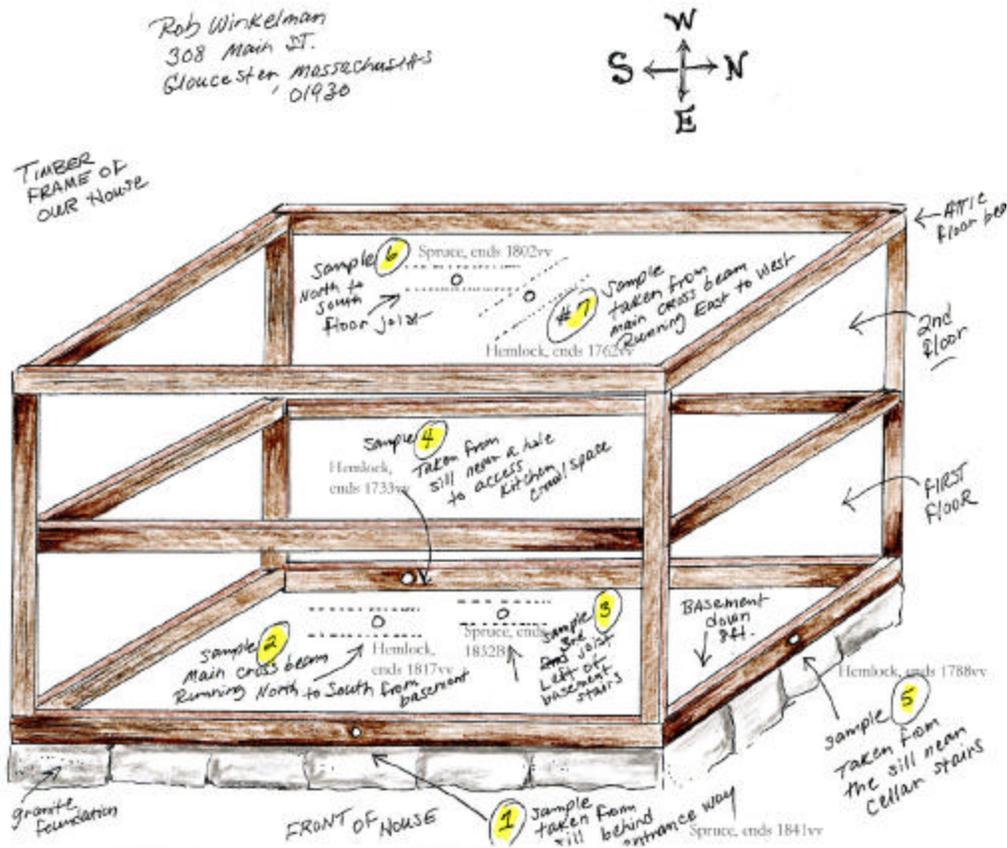


Figure 1. Sketch by Winkelman of the frame of the house and the location from which each sample was taken. In addition, the species and end dates of each sample are indicated here.

We prepped the samples and measured their ring-widths, measuring each width twice with reconciliation for differences of more than 3%. Four samples are hemlock (*Tsuga canadensis*); and 3 samples are spruce (*Picea* spp., red, white or black; species of spruce cannot be discerned from wood alone). One sample with bark is a spruce sample. The tree-ring patterns in the individual samples of each species securely crossdated (matched with each other) and site chronologies were constructed for each species (Table 1 and Figure 2).

Samples	Location in house	Chronology		Number of Rings	Outer Ring
		Begins	Ends		
Spruce					
1	Basement, N-S sill behind east entrance	1742	1841	1+100	1841v
3	Basement, 3rd joist left of basement stairs	1760	1832	1+73	1832B
6	Attic, N-S floor joist	1677	1801	1+125+1	1802vv
Hemlock					
2	Basement, main cross beam, running N-S	1728	1817	1+90	1817vv
4	Basement, western N-S sill, opposite to #1	1671	1732	1+62+1	1733vv
5	Basement, northern E-W sill	1714	1787	1+74+1	1788vv
7	Attic floor, main cross beam running E-W	1698	1761	p+1+64+1	1762vv

Table 1. List of beams from which each sample was bored. The end dates indicate the outer ring of the sample, based on the crossdatings shown in Figure 2. The “p”, “1+”, and “+1” in the Number of Rings column indicates presence of pith (p), and partial rings before (1+) or after (+1) the sequence of complete measured rings. The year of a partial ring after the sequence is added to the chronology for the Outer Ring date, along with one of three indicators: B = Bark present, v = subjectively close to outer ring, vv = unknown number of rings missing.

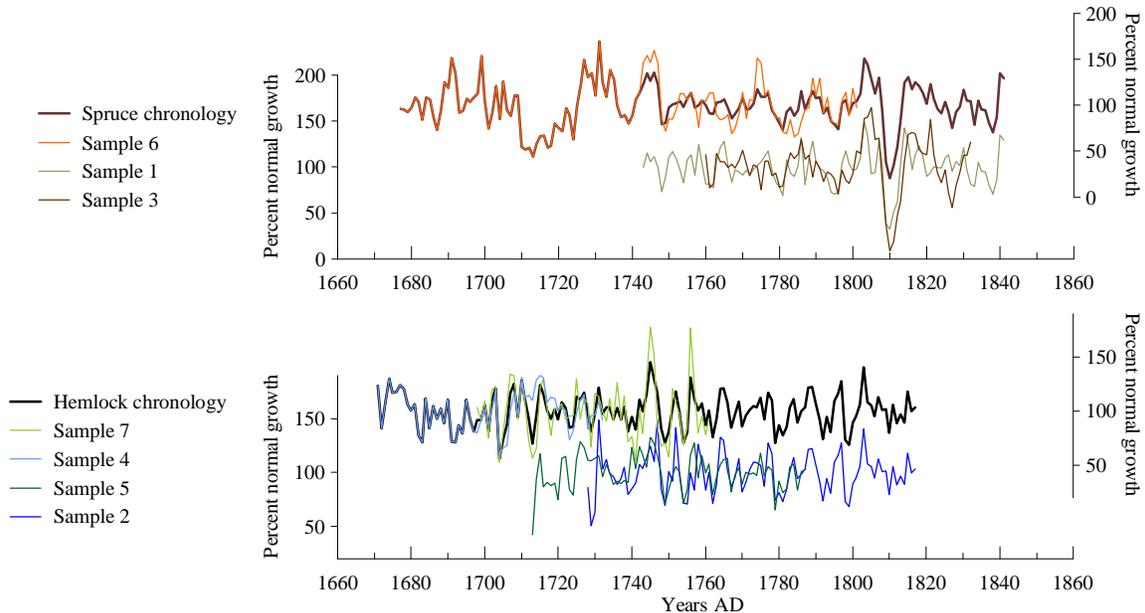


Figure 2. The tree-ring patterns of the spruce (top) and hemlock (bottom) samples and their chronologies. The raw measurements have been detrended to remove the normal reduction in ring-widths across the lifespan of a tree. Their AD dates were determined by matching the patterns of the chronologies with regional spruce and hemlock chronologies (see Figure 3).

The patterns in each chronology were compared with a regional chronology of the same genus, both visually and statistically. The regional chronologies were built from forest and other historic building site chronologies developed by our lab and the Lamont-Doherty Tree-Ring Lab (ER Cook, available at the International Tree-Ring Data Bank). The results are shown in the Figure 3; the AD dates in Figure 2 are based on these results.

The end date of spruce sample #3, the only sample with bark and a complete ring directly under the bark, indicates that the tree from which the joist was sawn was felled after the growing season in 1832 or in the early months of 1833. Winkelman suggests that this could have been added just to support one of the chimneys before transportation, but its presence also suggests that one possible building phase of the original house was 1832-1833. However, the end dates of all the other samples except one (#1, the front sill beam) suggest that there was an earlier construction date.

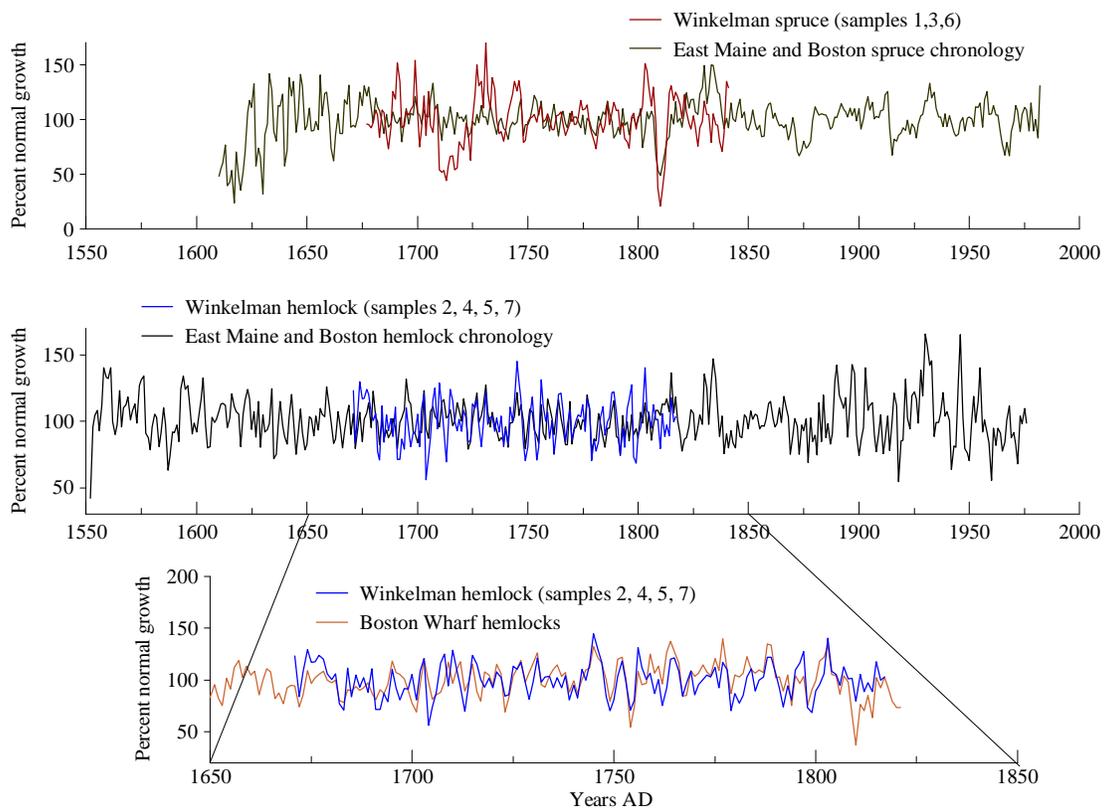


Figure 3. The spruce and hemlock chronologies of the Winkelman House placed in time where their patterns best match their respective species' regional chronologies. The bottom graph shows the high similarity between the Winkelman and Boston wharf hemlock chronologies.

The outer ring dates of the four hemlock samples and one spruce sample indicate that the house was more likely built earlier in the 1800s, but on exactly what date it was built is not possible to determine owing to the lack of bark dates. For example, sample #2 was collected by boring into one side of the beam, so the rings present only at the corners of the beam are not included. From my experience, an additional count of 10-15 rings is likely, so this beam was probably part of the 1832-33 construction date, or even later. The range of the other samples' outer ring dates (1761-1802) in three samples (numbers 5, 6, and 7) are very similar to those of most historic chronologies based on squared beams; a large range of rings are removed in the squaring process. Sample 4 (1733vv) probably came from the inner portion of the same log as sample 5; its sequence ends within 20 years of the beginning year of sample 5.

Spruce sample #6, ending in 1802, is the best indicator of an earlier building phase. Its patterns do not match very well with the other two spruce samples, but they do match securely with the forest spruce chronologies of coastal Maine. The source of the two later spruce samples is farther inland – central Maine to New Hampshire. Still, those two samples both contain clear evidence of the 1809-1810 negative event (of source unknown, but the event is indicated by very small rings in most North Atlantic coastal tree-ring chronologies). Whether spruce logs from two sources would have been available in Gloucester at the same time in the early 19th century becomes the question.

Spruce sample #1 from the front sill has an end date of 1841, so was added sometime after 1841 – it does not contain bark. Its patterns match securely with those of the 1832 sample. The sill could have been replaced anytime after 1841, but probably sometime between the 1840s and 1860s.

Of note in the hemlock sequence is its highly significant similarity to the historic chronology of hemlocks from a wharf in what is now the Chinatown area of Boston, MA (see bottom of Figure 2). The Boston logs had only the bark removed and have an outer ring date of 1821. Their statistics and visual match do indicate that the Winkelman hemlocks came from a source close to those of the Boston logs, but not close enough to be from the same location. These two chronologies match better between each other than with any other forest or historic chronology available in 2008. This match, in addition to the level of similarity with each site-specific hemlock chronology in northeast North America infers that the two sources were from somewhere in the eastern Adirondack region, along Lake Champlain and the northern Hudson River valley south to Massachusetts, with the Winkelman hemlocks coming from the southeastern Adirondacks, and the Boston logs from slightly farther north.

The dendrochronological record of the Winkelman House indicates that it was originally built sometime after 1802, perhaps modified in 1833-4, then moved to its current address in 1836. The main building phases are distinct due to the differing sources of spruce logs and the range of the end dates of the samples. The date of the front sill indicates a relatively minor but necessary replacement job, most likely done around 1850.