Dendrochronology of the Spooner House, Jefferson County, New York

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Five samples were collected from wooden beams and planks that were part of the original section of the Spooner House in Adams Center, Jefferson County, New York. Historic records along with its construction indicate that the house was probably built between 1820 and 1830. Mark LoRusso, Architectural Historian in the Cultural Resource Survey Program at the New York State Museum sent the samples to us, along with photographs of their sources, to find out the original construction date of the house and to determine the species used in the different parts of the building.

The five samples are all cross-sections – see sample list on last page for details. Sample JSH-1 is from a wide floorboard, squared, in the first floor; samples JSH-2 and JSH-5 are from two floor joists, the former was squared, and the latter nearly a complete log, cut only on one side. Samples JSH-3 and 4 are from vertical boards, squared, in the eastern exterior wall: JSH3 is from a thick board on the inner side of the wall, and JSH-4 is from a thinner, wider, board on the wall's exterior.

The species used in the construction are: eastern white pine (*Pinus strobus*) in the floorboards, JSH-1; eastern hemlock (*Tsuga canadensis*) in the wall boards and the squared joist, JSH-2, 3, and 4; and black ash (*Fraxinus nigra*) in the nearly-complete joist, JSH-5. This house contains the first black ash that I've seen used in any construction.

At least one transverse surface of each sample was prepared by sanding and polishing; the ring-widths were measured to 0.01mm under a binocular microscope using a measuring table. The tree rings in the pine and ash samples were each measured along two radii, and the measurements averaged for each sample and species. The ring widths of the three hemlock samples were crossdated with each other to find their relative placement, then combined into a chronology. Each species' sequence was then compared to established historic and forest chronologies to determine the calendar years represented by their tree rings.

The hemlock chronology and pine sequence were each compared with our established NE North American chronologies of the same species to place them in calendar time. The hemlocks from this building has such similar patterns to hemlocks from two other buildings in Watertown, the Titus Ives (1809) and Erastus Ives (1833) houses that we have dated (Griggs, in progress 2009), that the trees probably were all felled from the same forest (Figure 1). The Spooner hemlock sequence begins in 1594 and ends in 1768, but all samples are squared with an unknown number of rings removed in that process. 50+ rings would have been removed for an 1820-1830 building date, and that number that is not uncommon for this species; hemlocks tend to grow very slowly, with average ring widths of 0.5mm or less, soon after their juvenile growth is complete.

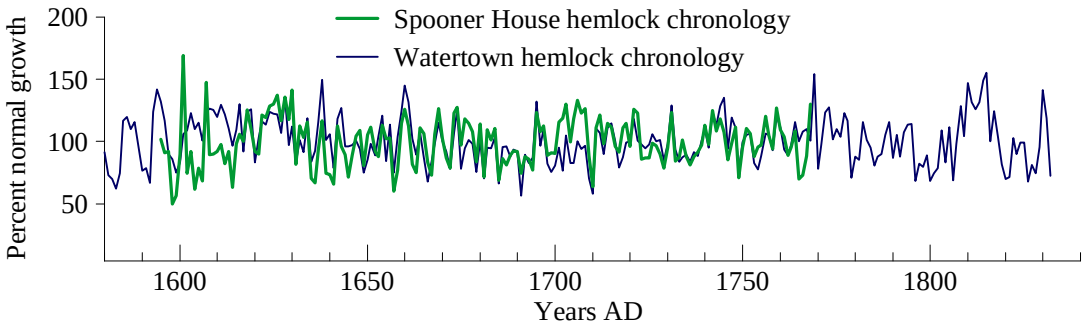

Figure 1. The hemlock chronology is here compared to the established Watertown hemlock chronology. Statistical scores are: Student's *t*-score =14.16, correlation coefficient = 0.73, 79% trend coefficient = 0.79 with 174 years overlap. The data sets have been detrended, with an average ring width being "100 percent normal growth."

The pine floorboard sequence crossdates well with our regional white pine chronology, but especially well with a pine chronology from the Beardslee House and Tavern in New Berlin, NY (Figure 2). Its tree rings date from 1752 to 1820, and its sapwood contains 22 rings. The end date of the floor board is invaluable because of the presence and number of the sapwood rings. The total radius of the sapwood is just over 4 cm, and the range of the number of sapwood rings in white pines is approximately 20 to 40 rings in about 2 to 4 cm (from 23 samples). The Spooner sample's outer ring date of 1820 is thus very close to its felling date.

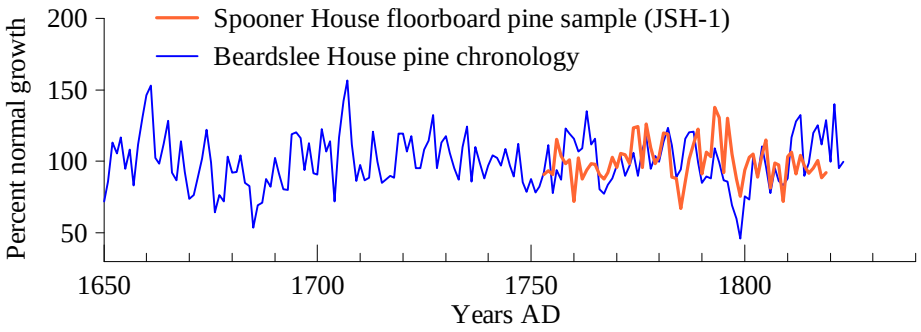

Figure 2. The Spooner pine sequence is here compared to the Beardslee House and Tavern pine chronology. Statistics between the two sequences are at the 95% significance level, but not nearly as high as between the hemlock chronologies due to the single sample, shorter overlap, and distance between the two buildings: 3.57 Student's *t*-score, correlation coefficient of 0.41, and a 70% trend coefficient with 67 years of overlap.

The ring-width patterns in the ash sample, JSH-5, were compared with all other species' chronologies plus the sequences from this site to get a best estimate of their possible dates, especially the date of it outer ring from just under the bark. A secure date for its outer ring will tell the exact felling date, thus the building date. We found that the ash does have similar patterns to the pine (Figure 3), but it is with caution that we assign the AD 1822 date as the felling date. Although the ash's ring-width patterns are similar to those of the pine board, we have not tested whether placing the patterns of a black ash in time based on its fit with the patterns in eastern

white pine is valid. However, the close end-dates of the two sequences and the presence and quantity of the white pine sapwood rings plus the history of the building indicates that an 1822 felling date for the timbers used to build this house is reasonable, if not 100% secure.

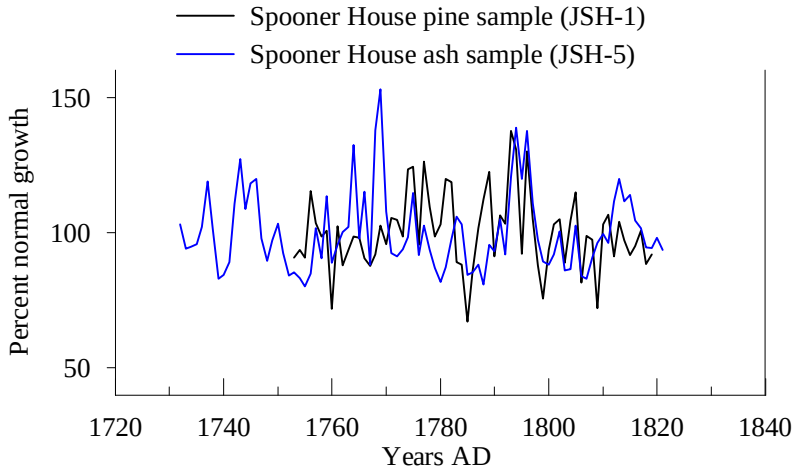

Figure 3. The similarity of the pine and ash samples is shown here. While this is not a very close match, the very narrow and very wide rings occur, for the most part, in the same years. The pine sample contains sapwood; the ash contains the "waney edge," the outer ring from just below the bark, the last rings grown before the tree was cut down, plus the complete sapwood.

The bars in Figure 4 indicate the years covered by each sample's tree-rings. Again, all samples except JSH-5, the log joist, come from squared timbers, with unknown numbers of rings taken off in the squaring process, and the presence of sapwood in the pine board is the key for the 1822 building date.

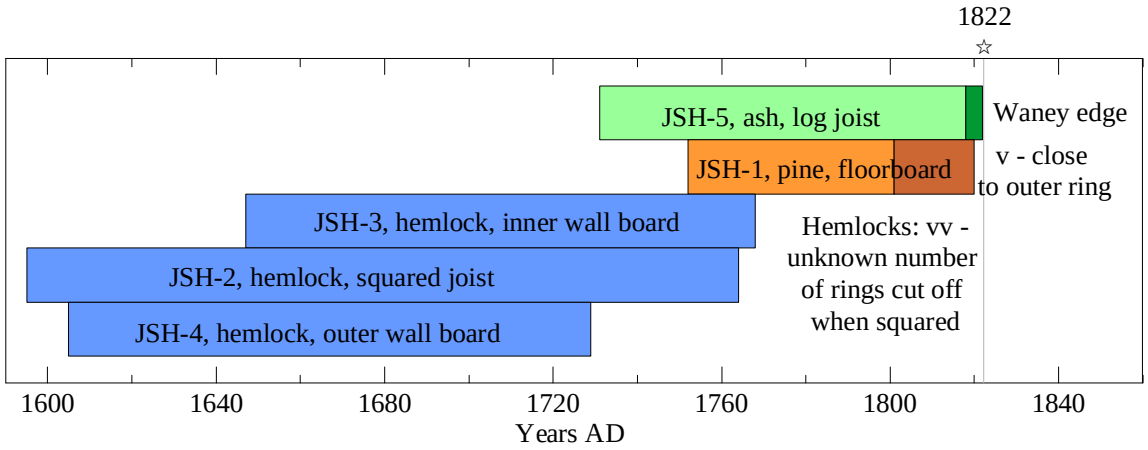

Figure 4. The bars indicate the years covered by the tree-rings in each Spooner House sample. The darker colored areas in the ash and pine samples indicate the presence of sapwood. See Appendix for list of samples and the years covered by their tree-rings.

From this analysis, we are reasonably confident that the Spooner House was built in the summer of 1822. If our assumption – that the ash sequence is correctly placed by its similarity to the pine sequence – is incorrect, the sapwood in the pine board alone indicates that the house was built in 1820 or later, but no later than 1825. The usage of eastern white pine for the floorboards and eastern hemlock species for general construction are common to that area and time; the black ash is unique, but that species is common in that region.

Appendix

The samples consist of:

C-NY-

JSH-1 Cross-section of upper floorboard, squared, 53cm wide x 2.4cm thick. Eastern white pine (*Pinus strobus*). 22 sapwood rings.

A = 1 + 61 +1v
B = 1 + 66+1v
Averaged A&B = 1 + 67 +1v 1752 – 1820+v

JSH-2 Cross-section of floor joist, squared, 15cm x 10cm. Eastern hemlock (*Tsuga canadensis*).

A = p + 170vv 1594p -1764vv

JSH-3 Cross-section of an inner plank from the exterior wall, squared, 26.5cm wide x 5cm thick. Eastern hemlock (*Tsuga canadensis*).

A = p + 122vv 1646p – 1768vv

JSH-4 Cross-section of an outer plank on same wall as JSH-3, squared, 30.5cm wide x 2.3cm thick. Eastern hemlock (*Tsuga canadensis*).

A = ±p+1+123vv
B = ±p+80+ 46vv
Averaged A & B = ±p+1+125vv 1604±p – 1729vv

JSH-5 Cross-section of floor beam, complete cross-section except one squared surface, 21.8 max diameter. Black ash (*Fraxinus nigra*). 5 sapwood rings.

A = p+ 90+1W
B = p+ 90+1W
Averaged A & B = p+90+1W **tentative only:** *1831p – 1822+W*

Notations used above: "p" – pith (center of tree) present; "±p" – inner ring is not far from pith; "+n" – incomplete or unmeasured ring(s) before or after the measured sequence; "vv" - unknown number of rings between outer ring of sample and bark; "v" – outer ring of sample was close to the bark when felled; "W" – Waney edge, the outer ring was directly under the bark when the tree was felled.