

**Dendrochronology of the Wixson Road Log Cabin and Benjamin Patterson Inn,
Corning-Painted Post Historical Society, Corning, NY**

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The Wixson Road Log Cabin, built in Campbell, NY, and recently moved to the Corning-Painted Post Historical Society's museum in Corning, NY, is under review by the New York State Office of Parks, Recreation, and Historic Places for a listing in the State and National Registers of Historic Places. The date of the cabin's construction is of primary importance both for the review and for an accurate exhibit of the cabin's history at the museum. Recent title and deed searches of the original location done by Carrie Fellows, indicated that the land changed hands in 1838, 1855, and again in 1863. In the NYS Census for 1865, the house was described as "log" with a value of \$30. In order to accurately date the construction of this cabin, the tree-ring patterns in the logs of the cabin were compared with both the patterns of a tree-ring chronology of the Benjamin Patterson Inn with its well-documented 1796 building date and the patterns of a modern oak chronology that dates from AD 1660 to 1981.

Tree-ring cores from both the cabin and the inn were collected with the thought that at least an approximate number of years between the construction of the inn and the cabin could be established from the tree-rings. The bark and the outer rings, mainly the sapwood, of the logs in both the cabin and the inn had been removed for construction, and the inn's posts had also been squared, thus the exact year that the trees were felled is not possible to determine from the tree-rings alone. However, the presence of a few sapwood rings at the outside of two cabin samples along with an estimate of how many sapwood rings the white oaks in this area usually contain, establish a construction date of between 1856 to 1866 for the cabin, a range of only 11 years.

Six cores from six logs on two sides of the Wixson Road Log Cabin (Figures 1A and 1B) and four cores from the top of four posts in the outer walls of the Benjamin Patterson Inn (Figure 1C) were collected by Pamela Sullivan, Carol and Katie Griggs in May 2003. The cores, 1 cm in diameter, were drilled out with increment borers and the holes filled with dowels, colored to blend with the surface of the surrounding wood. All are of oak (*Quercus* sp.). The cores were measured at the Malcolm and Carolyn Wiener Laboratory for Aegean and Near Eastern Dendrochronology at Cornell University (see Table 1).

Using techniques for standardizing dendrochronological data, a curve was fitted to each sample's ring measurements (Figure 2a). That curve was used as the "100% normal growth" line, and the measurements were divided by the curve's corresponding values (Figure 2b). This is a common technique used so that the comparison and crossdating of samples are not hampered by differences in ring-widths over the trees' lifetimes and in the rings' average sizes.

<u>Sample</u>	<u>Number of rings</u>	<u>Sample begins</u>	<u>Sample ends</u>	<u>Sapwood ring count</u>
SWC-1	1+122+1	AD 1717	AD 1840	0
SWC-2	p+ 92+12	1741	1845	0
SWC-3	1+122+1	1725	1848	2
SWC-4	±p+1+141+1	1706	1848	5
SWC-5	1+ 28+1	-----	-----	
SWC-6	1+101+1	1726	1828	0
SWC Chronology	1+141+1	1706	1848	
SPI-1	1+111+1	1668	1780	0
SPI-2	1+114+1	1624	1739	0
SPI-3	1+110+1	1671	1782	0
SPI-4	1+103+1	1638	1742	0
SPI Chronology	1+157+1	1624	1782	

Table 1. The samples, with their number of rings and AD dates (see text). “SWC” stands for Steuben County, Wixson Road Log Cabin; and “SPI” for Steuben, Patterson Inn. In the “Number of rings” column the “1+” = one partial ring before the whole rings begin, the “+1” = one partial ring at the outside of the whole rings, the “p” = pith, the center of the tree, and the “±p” = near the pith. The “sample begins” and “sample ends” dates include the partial rings. The ending dates indicate only the growth year of the outer tree ring of each sample: they are not the years that the trees were felled. The "sapwood ring count" is discussed in the text.

The samples’ data were then compared and crossdated, looking for matching patterns in ring growth. Figure 3 shows the single samples along with the chronologies combining each building’s samples. Note the similarities in the year-to-year variations in ring size: the same increase or decrease occurred from one year to the next: that is the most important pattern similarity for securely dating tree-ring sequences. The second pattern similarities that are examined are not year-to-year differences, but similarities over longer sequences of time, when the rings were generally wider or thinner. Another emphasis in crossdating is on the narrower rings, mainly the results of the same stress to all the trees. The very wide rings are commonly due to individual tree growth caused by a close branch or repair to some local damage to the cambium. The trees of the Patterson Inn are very similar, both in year-to-year change and long-term change. The trees used in construction of the Wixson Road Log Cabin chronology have more differences between the trees, perhaps due to a more diverse environment. Table 2 contains a list of the two chronologies and their dates.

The buildings’ chronologies, composed of multiple samples, were important for determining their calendar dates, since the averaging of their standardized data minimizes

any parts of the patterns unique to the individual trees' ring-widths and concentrates on the "common signal," the effect of climatic and other environmental factors common to all the trees' growth. The Wixson Road Log Cabin was built of oaks from somewhere in or around Campbell, NY, and the Benjamin Patterson Inn from oaks in or around Corning. Some differences are likely just from the fact that the felled trees did not grow in the same grove. However, the Steuben County region generally has the same climate, thus its common signal affected all the ring growth to some extent.

The cabin chronology crossdates very well with the inn chronology, as shown in Figure 4A, overlapping by 75 years. Again, note the similarities in both year-to-year and long-term time frames. They are not exactly the same, but securely crossdate because of the number of years where they are very similar. Statistical analysis indicates that the two chronologies have a Student's *t*-score of 5.28, much higher than any *t*-score with the chronologies at any other overlap, and that 68% of the year-to-year changes are the same. They end 66 years apart, with end dates of 1782 for the inn and 1848 for the cabin chronologies.

<u>Chronology</u>	<u>Number of rings</u>	<u>Chronology begins</u>	<u>Chronology ends</u>
Wixson Road Log Cabin	1+141+1	1706	1848
Patterson Inn	1+157+1	1624	1782
Wixson Road Log Cabin and Patterson Inn, combined	1+223+1	1624	1848

Table 2. The building chronologies and their combined chronology with their dates.

Figure 4B shows how the absolute calendar dates were determined for the combined building chronologies, thus each building chronology and their samples. The modern chronology of oaks used for establishing all the calendar dates is composed of 28 cores from 14 white oaks in Fire Tower, PA, at 41.19N, 79.13W, approximately 150 km southwest of Corning. The cores were collected by E.R. Cook, and the data is available on the website <http://www.ngdc.noaa.gov/paleo/ftp-treering.html> from the International Tree-Ring Data Bank. Again, there are many similarities in the year-to-year and long-term variations in the two chronologies: an excellent visual fit. Their Student's *t*-score is 6.58, and 63% of year-to-year changes are the same for the 188 years of overlap. Thus we are able to accurately date the samples, the building chronologies, and the combined chronology as listed in the tables. One exciting aspect of the Patterson Inn chronology is that the first whole ring dates to 1625, before the Fire Tower data beginning in 1660, so the available oak tree-ring data now extends back to AD 1625 for this region.

Finally, the sapwood ring count, as mentioned above, is of the most importance in determining the actual felling date of the Wixson Road Log Cabin oaks. Sapwood is composed of the outer rings of any tree, where sap is transported from the leaves to the trunk and roots: in oaks they are of a different color than the inner rings (heartwood). The rings are complete, except for perhaps the outer ring, depending on what time of year the tree was felled. When the wood is prepared before construction, they are generally removed along with the bark since they are softer than the heartwood and more prone to decay and insect infestation.

Sapwood rings were counted in nine oak samples that contain all the sapwood out to the bark from trees in central New York State. The average count is 16 sapwood rings, with a range of 11-21 rings.

There is no sapwood remaining in the Benjamin Patterson Inn samples. The 1782 end date of the chronology, with an addition of 14 sapwood rings corresponds to the 1796 building date.

The Wixson Road log cabin sapwood counts of 2 and 5 for the two samples that end in 1848, with a rounded average of 3 rings, indicates that these trees most likely were felled, and the cabin built, 8-18 years beyond the outer partial ring (1848) in our data. Thus the felling date could have been as early as 1856 and as late as 1866, with only a slight probability that the felling date is before or after that time period. It is not certain whether the cabin was built after either the 1855 or the 1863 ownership change, but certainly the cabin was not built before 1855 and is the cabin indicated in the 1865 NYS Census.

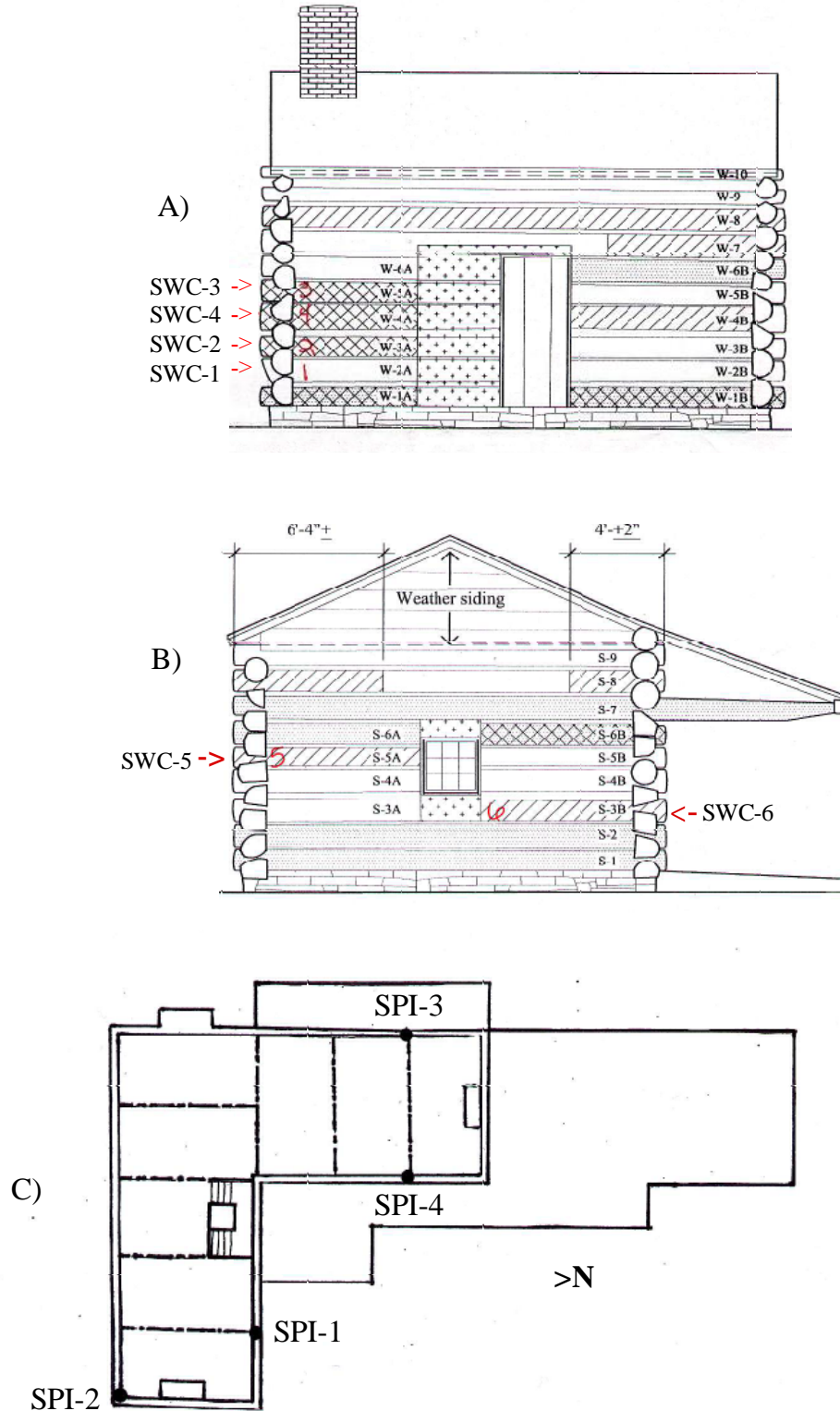


Figure 1. A) and B) The west and south exterior walls of the Wixson Road log cabin, indicating the logs that were cored. C) The attic floor plan of the Benjamin Patterson Inn, indicating the posts that were cored.

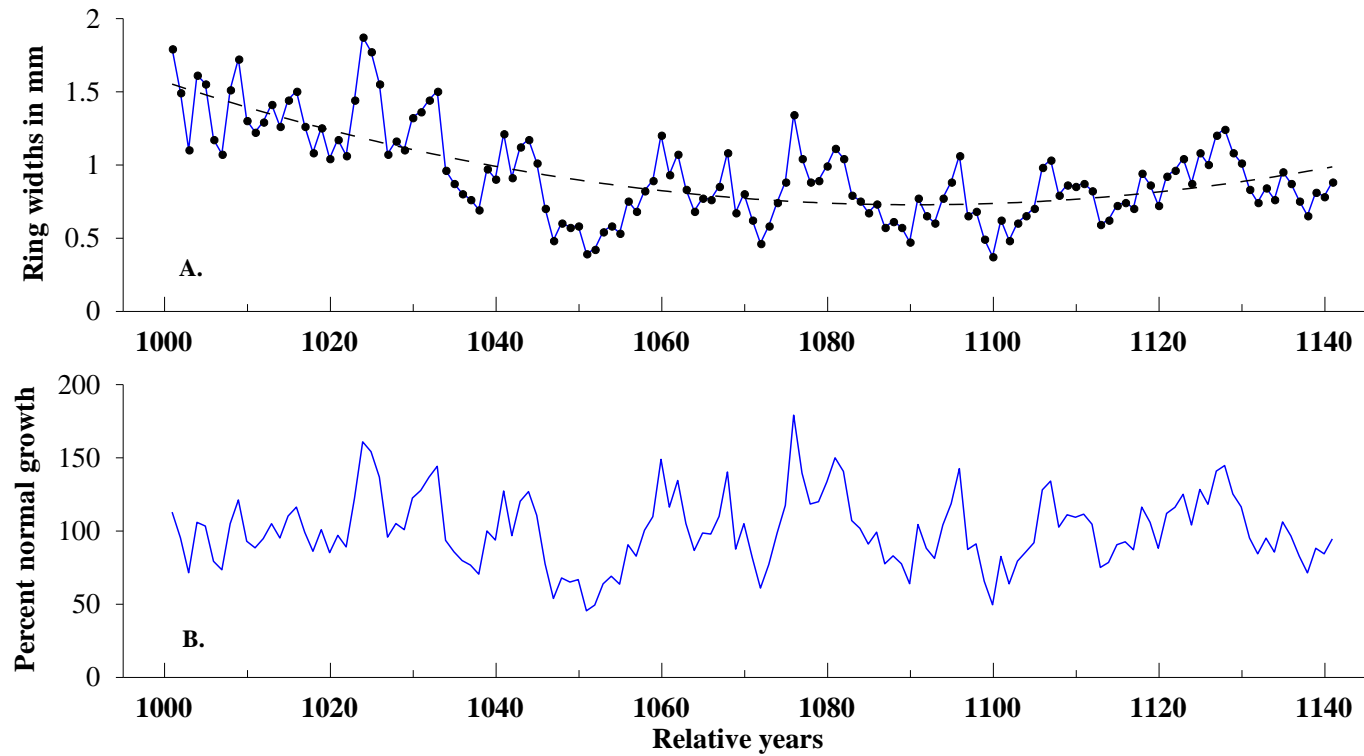


Figure 2. A. The annual raw width measurements of SWC-4, connected, and a line fitted to the data. B. The standardized data, using the fitted line as “100% normal growth,” and dividing each ring measurement by the value of the fitted line at the same year. The standardized data is the norm for looking for similar patterns in ring growth between two or more trees.

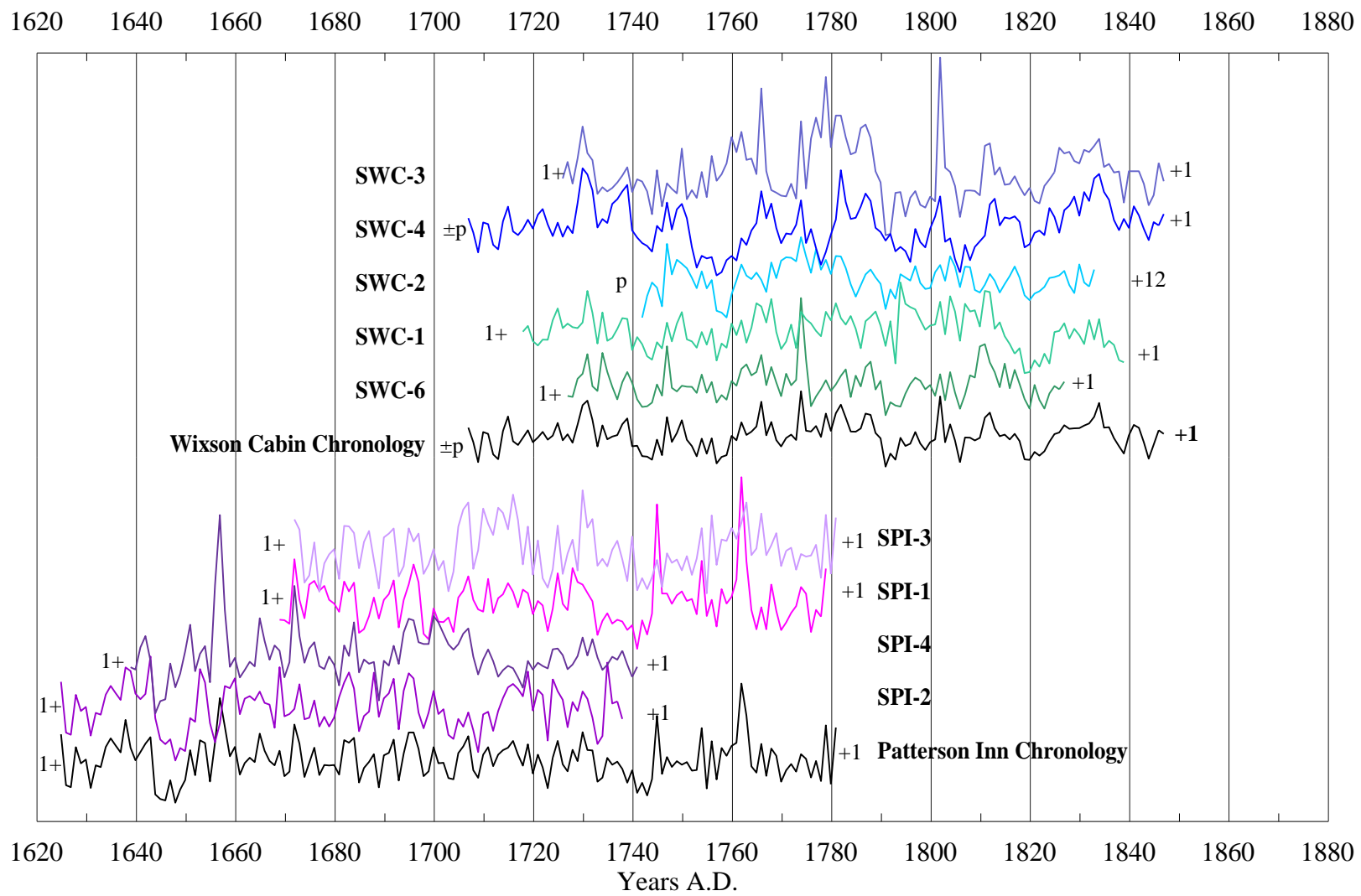


Figure 3. The Wixson Road Log Cabin and Benjamin Patterson Inn chronologies with their samples.

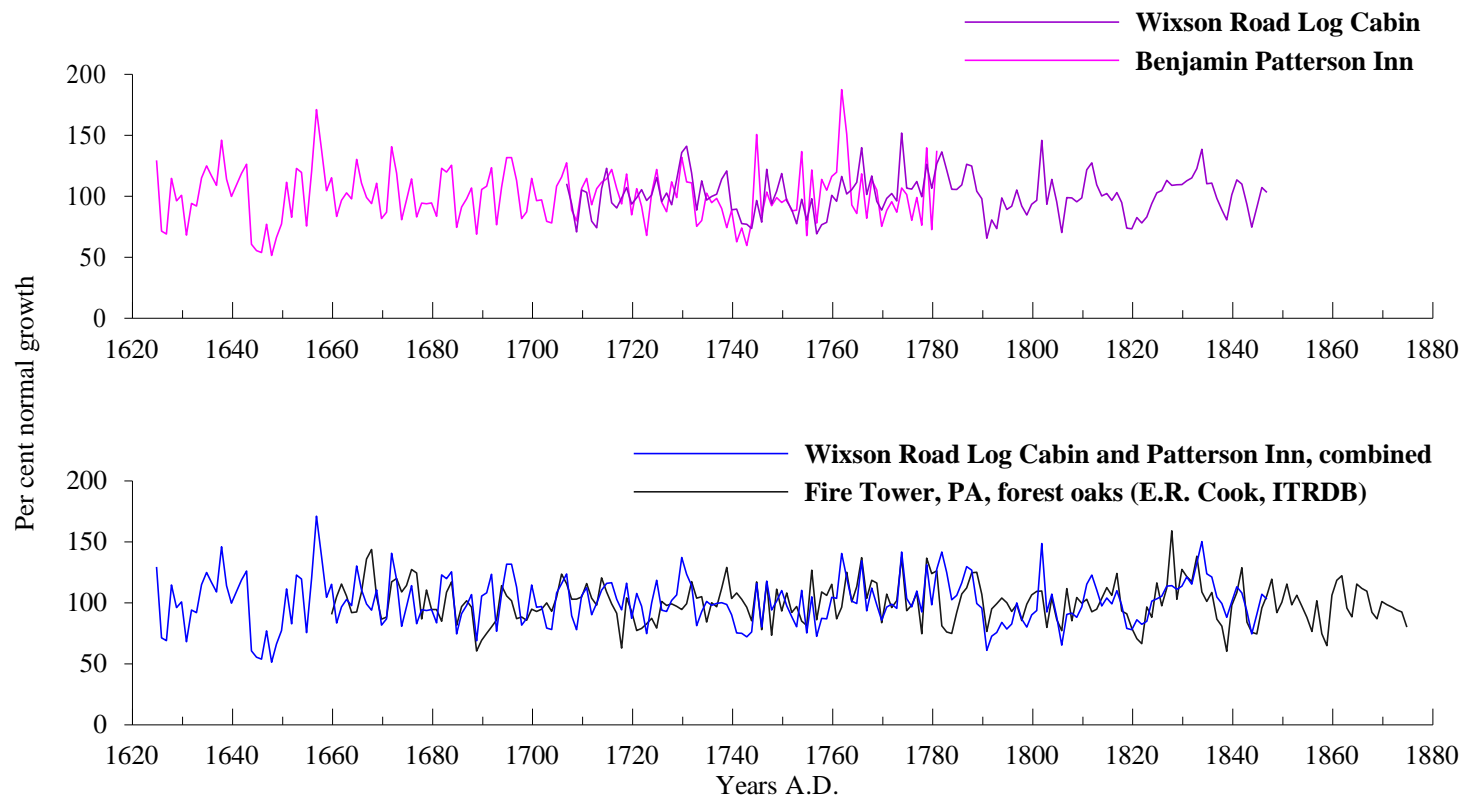


Figure 4. A) The two building chronologies. Note how the patterns are similar, especially year-to-year change in per cent normal ring growth. B) The combined building chronologies and the modern Fire Tower, PA, white oak chronology, truncated at 1875. Again, note the similar patterns in the two chronologies.