Dendroarchaeology of the Elmendorf Barn

in Hurley, New York

Ana Gonzalez[1], Meghan Ladolcetta[2], David Barclay[3], Carol Griggs[4] , John Rayburn[5]

1. Columbia Unviersity 2. SUNY Buffalo 3. SUNY Cortland 4. Cornell University Tree Ring Laboratory 5. SUNY New Paltz

Hurley, New York, takes pride in its historical roots. This is clearly evident in the way in which the homeowners maintain their twenty-six stone houses, which open to the public every summer during Hurley's *Stone House Day*. The Elmendorf barn is located behind the Elmendorf stone house (both owned by Jim Decker) and the earliest section (east barn) was built in the Dutch style. The western roof was originally hung lower than the eastern, but since has been modified to a symmetrical roof style. Five attendees (two students and three advisors) of the North American Dendroecological Fieldweek were allowed to collect tree-ring samples from various posts and beams inside the barn in order to date it using dendroarchaeological processes.

Methods:

Seven posts (A-D, I-K), five beams (E-H, L) and a stud (M) were sampled in the barn; eight of these timbers were accessed from the southern loft and five from the northern loft of the barn's main structure (Figure 1). Two cores were taken from each beam or post when possible to provide replication, which helps to verify the log's internal ring pattern and reduce idiosyncrasies in the ring widths of single samples in the chronology. Samples were collected using two methods; a power drill with a bit designed for dendroarchaeology to bore dry wood, and a manually operated tree borer. A core was taken from a visible waney edge (a surface that follows the natural curve of the tree with only the bark removed) or bark if possible, in order to maximize the probability that the outermost ring in the sample was formed in the year when the tree was cut.

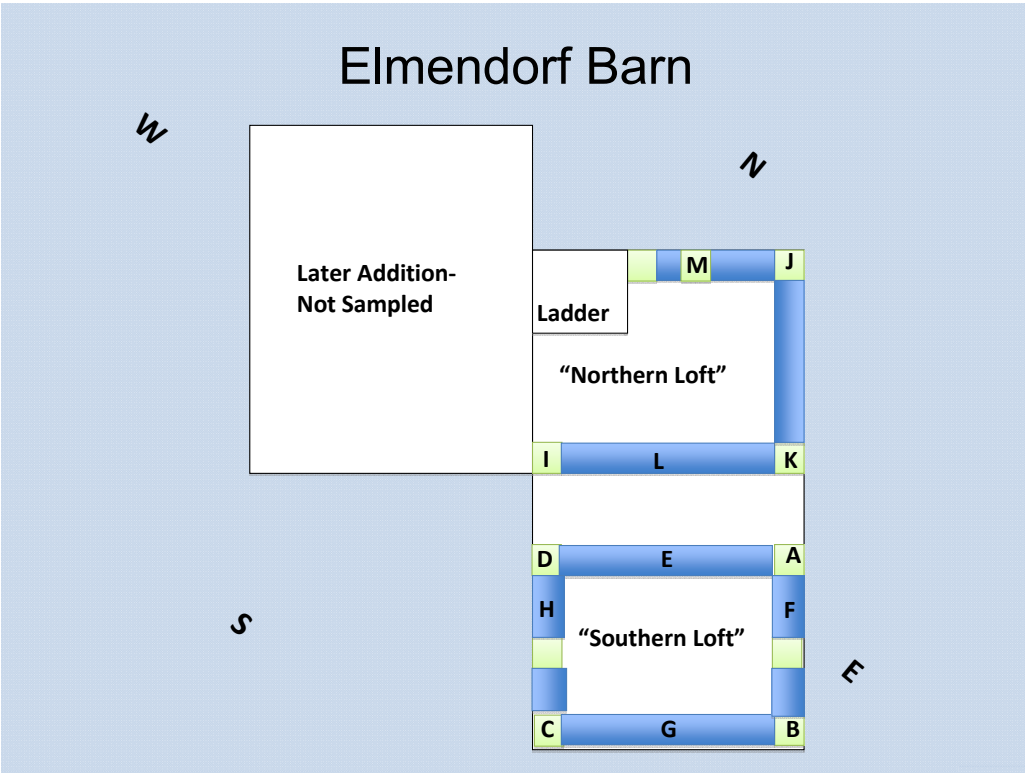

Figure 1: Plan of the Elmendorf Barn with sample posts and beams labeled by letter. Posts and a stud are represented by yellow squares and beams by blue rectangles.

The resulting cores were glued to wooden mounts and sanded from 120 to 400 grit, in accordance with standard dendrochronological methods (Speer, 2010). Trees were then identified to genus-level under a binocular microscope using the keys for identification in Hoadley (1990). Pairs of cores from the same timber were crossdated to each other by matching ring patterns. Both paired and individual cores were measured using a Velmex linear encoder system to a precision of 0.005mm. COFECHA (Holmes, 1983) and Corina (Pohl, 1995) software, free from the Lamont-Doherty Earth Observatory and Cornell Tree-Ring Laboratory online databases, were then used to crossdate samples and form chronologies. The programs were then used to compare our tree-ring chronologies with master chronologies of the same genus from the central Hudson Valley to find their calendar dates (Figure 2 and 3).

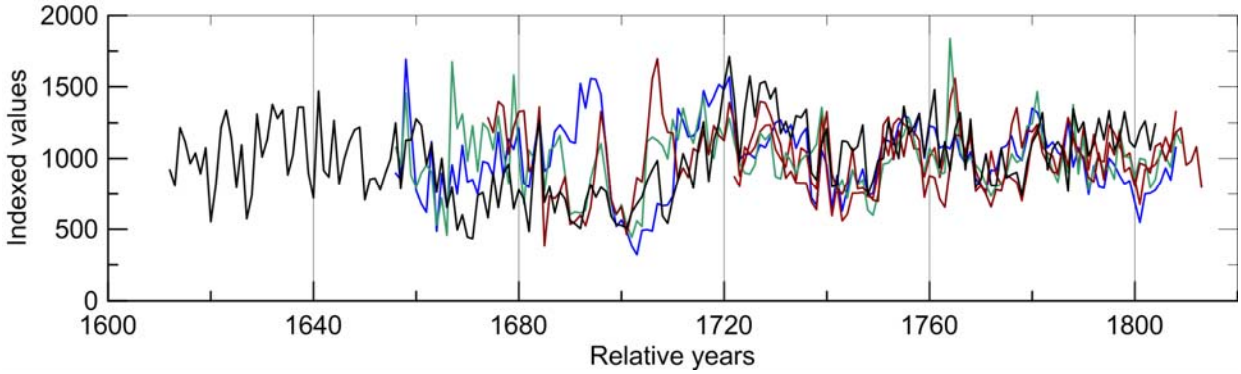

Figure 2: Elmendorf oak samples compared to each other graphically

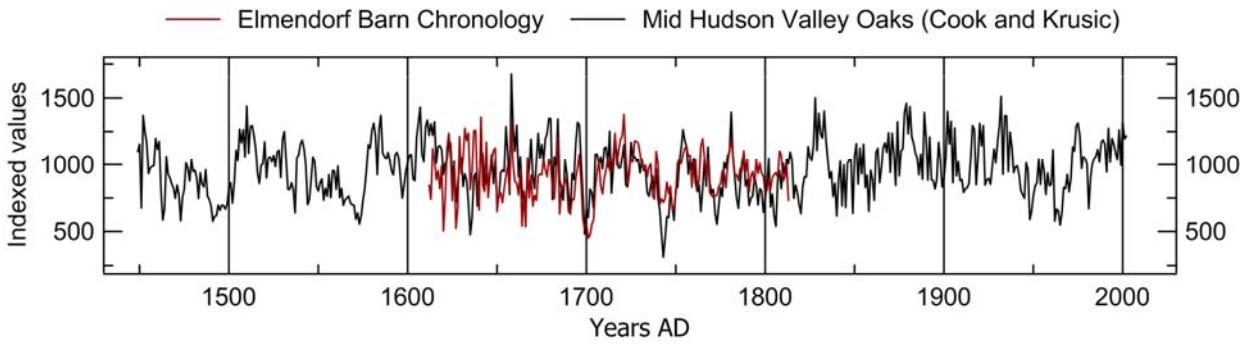

Figure 3: Elmendorf oak chronology compared to the regional master chronology

Results:

Nine of the 13 timbers sampled were of the white oak group (*Quercus* Section *Lepidobalanus*), and one (F) was of the red oak group (*Q.* Section *Erythrobalanus*). We were able to combine these into a chronology and crossdate it against a regional chronology of central Hudson Valley oaks (Pederson et al., 2013, ITRDB NY041; original data by Cook and Krusic) dating back to 1449. We found that five of these crossdated oak timbers had an outer ring dating to 1815 that we could verify due to the presence of a waney edge or bark. The remaining five had less well preserved outer rings that dated within 20 years before 1815, with none displaying an outer ring after 1815.

Since latewood was present in all of the samples with 1815 outer ring dates, we can conclude that the timber for the Elmendorf barn was harvested sometime after the end of the 1815 growing season and before the beginning of the 1816 growing season. The barn was most likely built in 1816 or a few years after, depending on the time allowed for the timbers to dry. Table 1 shows the sample timbers, their type, the last ring dates, and the quality of those dates.

The two pine timbers (G and L) crossdated with each other but not with any regional master chronology and so remain undated. The stud (M) was ash and the core sample only had nine rings, and this timber also remains undated.

Elmendorf Results

Sample	Type	Last Ring Dates	Quality
H02A	Post	1795	C
H02B	Post	1815	AI
H02C	Post	1813	B
H02D	Post	1815	AI
H02E	Beam	1815	AI
H02F	Beam	1815	B
H02G	Beam	Undated	na
H02H	Beam	1810	B
H02I	Post	1815	AI
H02J	Post	1814	B
H02K	Post	1794	C
H02L	Beam	Undated	na
H02M	Stud	Undated	na

Table 1: Sample timbers, their location, the last ring dates, and quality rating of the outer ring dates. Quality rating A indicates a precise date with the bark or waney edge present, B indicates that the last ring date is likely close to the last year of growth, C indicates a minimum date with the outermost rings lost, and an e or l following the A letter rating stands respectively for the presence of earlywood or latewood.

Discussion:

With the diversity of New York state forests, which include everything from spruce-fir to oak-hickory to maple-beech-birch, northern range and southern range species, we were surprised to find as many oaks in the barn as we did. Ten of our 13 logs sampled were of the oak genus. We also sampled a second older barn on the northern side of Hurley in which all eight of the sampled posts were also oak. This leads us to believe that the area surrounding the town of Hurley around 1815 was forested heavily enough to allow homeowners to discriminate in favor of oak logs. David Baker, the historian of the town of Hurley, writes that "the northern section of the town of Hurley was a forested wilderness until the discovery, in the 1830s, of a fine quality shale," (Baker, 2013). This suggests no lack of timbers for Hurley and similar towns in the

Hudson River Valley, despite the limited capacity of transporting goods in the 18th to early 19th centuries.

In addition to the Mid-Hudson Oak chronology, we also compared the Hurley barn chronologies against established regional tree ring records from central New York, the Albany region, and southeastern Pennsylvania and northern New Jersey. When doing this we found that the highest correlations to our chronology were produced when compared to the mid-Hudson, Albany, and central New York oak records in decreasing amounts, further supporting the hypothesis that these barns were built from local timber.

References

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