Summer 6-29-2012

Dendrochronological Analysis of the Ridenour House and Barn, Somerset, Ohio 43783

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Tree Ring Dating Analysis of the Rouskoff Barn,
Somerset, Ohio 43783

Sampled: 23 May, 2012

Report submitted to Mayor Tom Johnson

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General:
This is the final report describing the tree-ring dating (dendrochronology) of beams in the Rouskoff Barn. On the 23rd of May 2012, Greg Wiles, Nick Wiesenberg, Will Cary, and Lauren Vargo sampled timbers in Rouskoff Barn under the supervision of Mayor Tom Johnson. The objective of this work was to provide calendar dates for the felling of the timbers used in construction.

Dendrochronology is the science of analyzing and dating annual growth rings in trees. Its first application was in the dating of ancient Indian pueblos of the southwestern United States (Douglass 1921, 1929). Andrew E. Douglass is considered the "father" of dendrochronology and developed the application of tree ring data to archaeological dating. The dendrochronological methods first developed by Douglass have evolved and been employed throughout North America, Europe, and much of the temperate forest zones around the world (Baillie, 1982, 1995).

Methods and Analyses:
Twenty-one white oak cores were taken from timbers within the Rouskoff Barn. The double crib log barn was sampled throughout the structure based on the condition of the wood available. The floor, a basement post, and the rafters are a few of the locations sampled (Table 1).

Cores were prepared and crossdated by Sarah Appleton, Will Cary, and Andy Nash using standard dendrochronological techniques (Figure 1; Holmes, 1983; Stokes and Smiley, 1968). The samples were carefully glued into grooved mounts and sanded to a high polish to reveal the annual tree rings clearly. The rings widths were then measured under a microscope to a precision of ±0.001 mm and then crossdated against each other (Figure 1). The cross-dating of the measurements was assisted by the COFECHA computer program (Holmes 1983).

COFECHA is used to first establish internal, or relative cross-dating among individual timbers from the house. This step is critical because it locks in the relative positions of the timbers to each other, and indicates whether or not the dates of those specimens with outer rings are consistent. Subsequently, the internally cross-dated series are each compared with independently established tree-ring master chronologies compiled from living trees and dated historical tree-ring samples. All of the "master chronologies" are based on completely independent tree-ring samples. In the Rouskoff Barn study, the regional composite master dating chronologies are derived from more than 500 ring-width series from old growth living trees and historical structures across Ohio (Figure 1). All dating results were compared with independent dating masters and in each case the dating reported here is verified as correct.

Results:
The oak samples were successfully crossdated with our calendar-dated master series (Figure 2). The oak samples with outer rings from the Rouskoff Barn show cut dates after the growing season of 1831 and 1832 (Figure 3) (Table 1).

Summary:
Outer ring dates show that many of the timbers used in construction of the Rouskoff Barn were cut in 1831 and 1832. Other samples were taken from the barn and date to a similar time period but do not include the outer ring.

Table 1: Table of the outer calendar dates for twenty-one cores sampled from the Rouskoff Barn. The presence of the outer rings (cut dates) is indicated. Note that only those cores that were successfully dated are included in this table.

Rouskoff Barn				
Sample ID	Date calendar years AD	Location	Species	Presence of Outer Ring
ROSC01	1828	Basement Post	Oak	No
ROSC02	1832	Floor	Oak	Yes
ROSC03	1832		Oak	Yes
ROSC04	1820		Oak	No
ROSC05	1821		Oak	No
ROSC06	1832		Oak	Yes
ROSC07	1830		Oak	No
ROSC08	1830		Oak	No
ROSC09	1831		Oak	Yes
ROSC10A	1798		Oak	No
ROSC11	1831		Oak	No
ROSC12	1831		Oak	Yes
ROSC15	1826		Oak	No
ROSC16	1827		Oak	No
ROSC17	1831		Oak	Yes
ROSC18	1803		Oak	No
ROSC19	1751	Rafter	Oak	No
ROSC20A	1779		Oak	No
ROSC21	1831		Oak	No
ROSC22	1831		Oak	No
ROSC23	1830		Oak	No

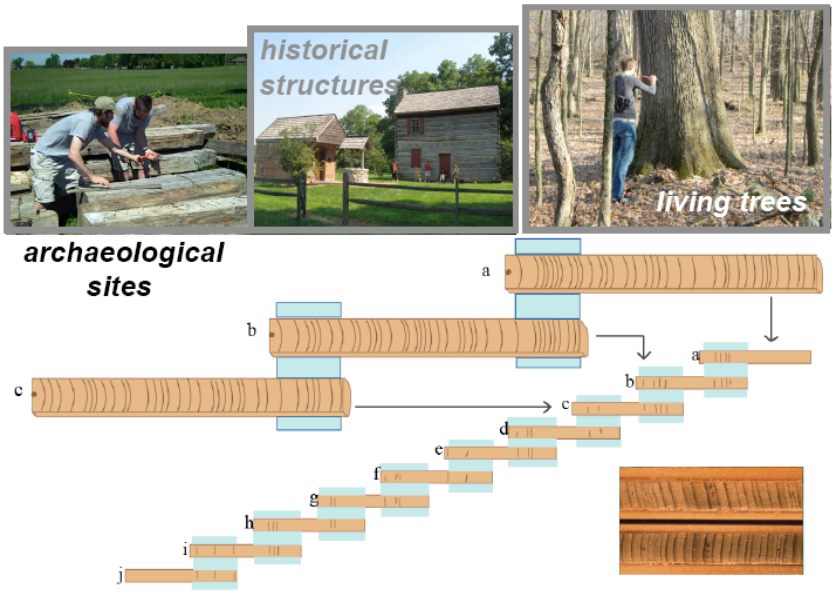

Figure 1. This diagram illustrates the process of tree-ring crossdating. Patterns in ring widths from historic structures and wood associated with archeological sites are matched to living tree-ring chronologies and thus calendar dates can be assigned to each ring.

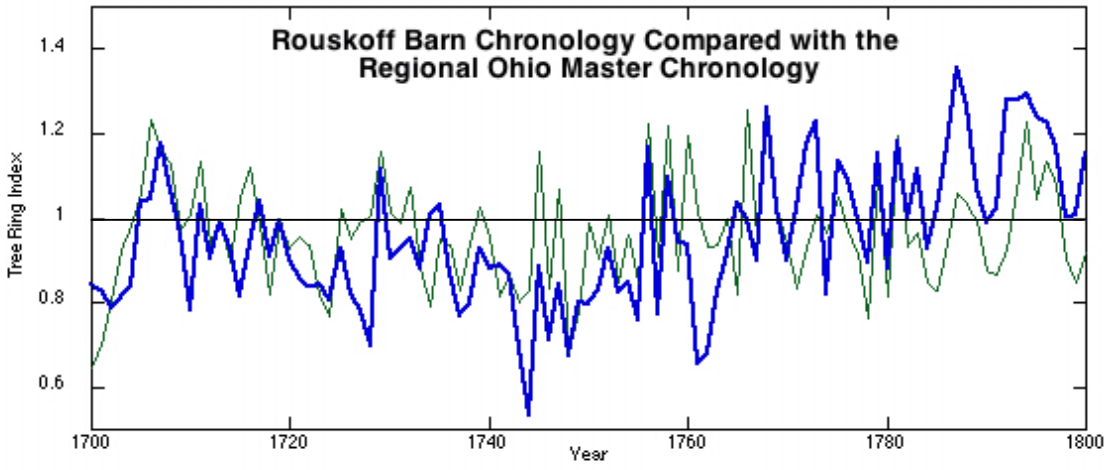

Figure 2. Regional Ohio ring-width series (green) compared with the Rouskoff Barn chronology (blue) consisting of the twenty-one dated samples.

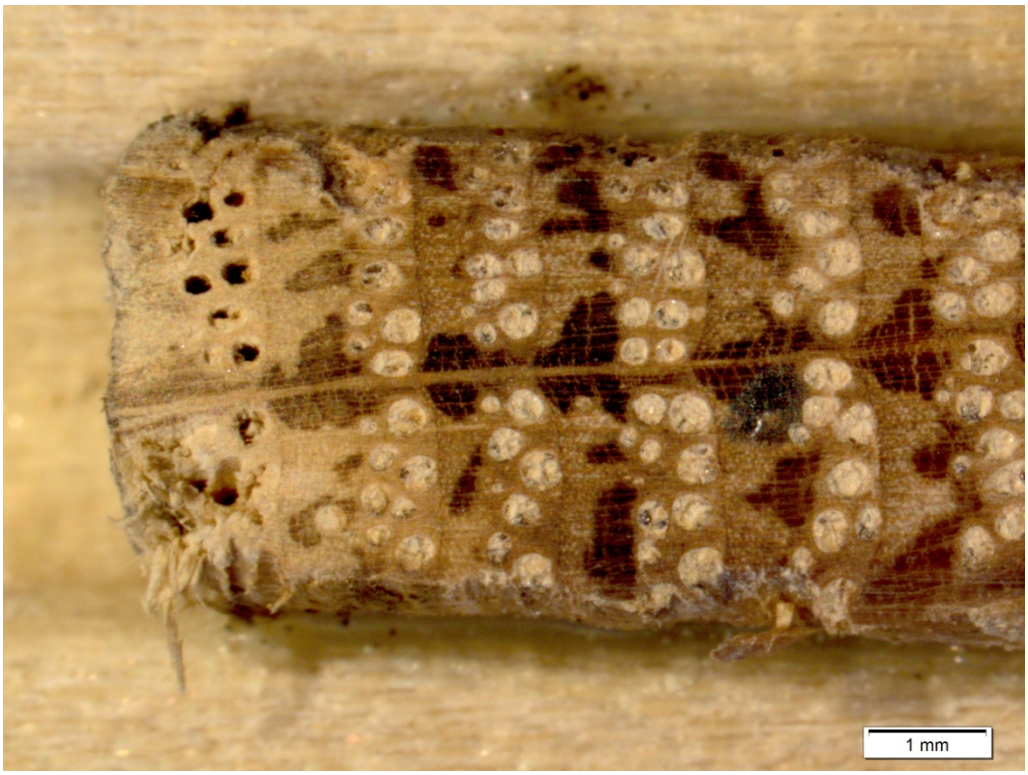

Figure 3: Photograph of sample ROSC11 with an end date of 1831.

References:

Baillie, M.G.L. 1982, Tree-Ring Dating and Archaeology. Croom Helm, London and Canberra. 274 pp.

Baillie, M.G.L. 1995, A Slice Through Time: Dendrochronology and Precision Dating.B.T. Batsford, Ltd., London

Douglass, A.E. 1921, Dating our prehistoric ruins: how growth rings in trees aid in the establishing the relative ages of the ruined pueblos of the southwest. Natural History 21(1), 27-30

Douglass, A.E. 1929, The secret of the southwest solved by talkative tree-rings. National Geographic Magazine 56(6), 736-770.

Holmes, R. L. 1983. Computer-assisted quality control in tree-ring dating and measurement. *Tree Ring Bulletin*, 43 (1), 69-78.

Stokes M. A., and Smiley, T. L., 1968, An introduction to tree-ring dating: Tucson: University of Arizona Press.

The College of Wooster Tree Ring Lab was established in 1998 by Dr Greg Wiles and is part of the Department of Geology at The College of Wooster in Northeast Ohio. The lab provides numerous opportunities for undergraduate research. The lab works on a variety of projects in Ohio and Alaska dating historical structures, glacial advances, and climate analysis using tree-ring records. To date the Wooster Tree Ring lab has dated over one hundred historical structures across Ohio and western Pennsylvania. For more information on past projects please look us up at http://www3.wooster.edu/treering/photos/default.php.