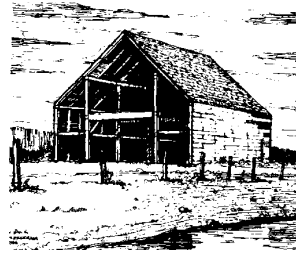


DUTCH BARN PRESERVATION SOCIETY NEWSLETTER



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Dating Buildings Using Dendrochronology

By Walter Richard Wheeler

Dendrochronological analysis has long been used as a method to determine the cutting date of wood elements used in buildings. By comparing growth rings observed in the wood elements of a structure, it is possible to determine the year—and sometimes the time of year—that the wood was cut by using this technique. This is possible because the response of trees to their climate is reflected in the type and size of rings that are generated each year, and because these rings vary from year to year.

Andrew E. Douglass introduced the basic techniques of dendroanalysis at the beginning of the 20th century. Structures in Europe dating back to the Iron Age have been successfully dated using this method.



Figure 1 The Pieter and Rachel (van Alen) Winne house, c. 1723. Photograph Aug. 2003.



Figure 2 The Daniel Pieter and Jannetje (DeForest) Winne house, c.1750, stripped to its frame. Photograph March 2003.

More recently, studies in New England and in tidewater, Virginia have yielded definitive results and changed our understanding about seventeenth and eighteenth century architecture.

The field techniques are fairly simple. Candidates for sampling are selected from among the wood components of a building or other feature. A good sample can only be taken from wood that has not been significantly degraded by powder post beetles, mold, or other infestation. The sample area must be free from knots, burl, and not crotch wood. The best samples contain 100 rings or more. For all of the examples cited below, William J. Callahan used Bartholin incre-

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ment bores to extract samples. A specialized type of hollow drill bit, Bartholin bores were developed by Danish dendrochronologist Thomas Bartholin specifically for field sampling. A sample approximately the width of a pencil is extracted from the bit.

The cores for the various examples cited here were sent to Ed Cook at the Lamont-Doherty Tree-Ring Laboratory, where they were glued to grooved mounting blocks and sanded to a high polish. The rings were then measured to a precision of ± 0.001 mm. The COFECHA computer program was used to cross date the samples (Cook and Callahan 2004a:3).

Successful dating to cutting year requires that a wany edge be preserved on the structural component that is being sampled. A wany edge is basically a bark edge, with or without the presence of the bark, but with the cambium layer—the outer, growing, ring just under the bark—intact. Wood that lacks a wany edge can only be dated as “cut some time after” since an undetermined number of outer layers have been removed. However, when only a few wany-edged samples are possible at a site, samples from sources without wane can help corroborate the dates determined from the samples with wane.



Figure 3 Bill Callahan displaying a sample from one of the D.P. and Jannetje (Deforest) Winne house first floor beams. Photograph Dec. 2003.

Ideally, ten samples are taken from every structure, or part of the building that appears to have a different construction history. The use of multiple samples allows cross-checking of the results, and allows for the possibility of discovering multiple cutting dates for the various structural elements used in a single building campaign. In a building such as the Glen-Sanders house in Scotia, twenty samples were taken.

Dendro sampling at the Winne houses, Bethlehem, Albany County, New York.

See figures 1,2, and 3.

Hartgen Archeological Associates, Inc. was retained by the Metropolitan Museum of Art to conduct archeological excavations and oversee dendro sampling at the Daniel Pieter and Jannetje Deforest Winne house, to support its interpretation when a portion of it is installed in the renovated American Wing of the museum. Samples were taken at the same time (December 2003) from the nearby house of Pieter and Rachel (van Alen) Winne, Daniel Pieter's parents. The oak beams of the older Winne house were determined to have been cut (with one exception) in 1723, and so the house was probably constructed during 1723-24 with minor alterations thereafter.

Of the ten samples taken from the Daniel Pieter and Jannetje (Deforest) Winne house six were determined to have cutting dates of 1750. Of the remaining three samples, one was not datable, one sample yielded a date of 1718 but had no bark edge, and the remaining two samples had cutting dates of 1747 and 1748. These results point fairly conclusively to a construction date of 1750 or 1751 for the house (Cook and Callahan 2004a:6-7). Both houses were two-room dwellings with a centrally located chimney, frames comprised of bents, and the steeply-pitched roofs typical of those houses constructed by descendants of the earliest European settlers of the region. The dating of the oak samples taken from both houses was greatly facilitated by recent work done on four houses in New Paltz.

The Glen-Sanders house, Scotia, Schenectady County, New York.

See figures 4 and 5.

Hartgen was similarly retained by the journal *American Furniture* to oversee the dendro-analysis of the Glen-Sanders house in Scotia. A team of three authors is writing a paper for this year's edition of that journal, and the dating of the house—or more specifically its main staircase—is central to their thesis,



Figure 4 The Glen-Sanders house, c.1713, 1771, and 1802. HABS photograph, c.1934.

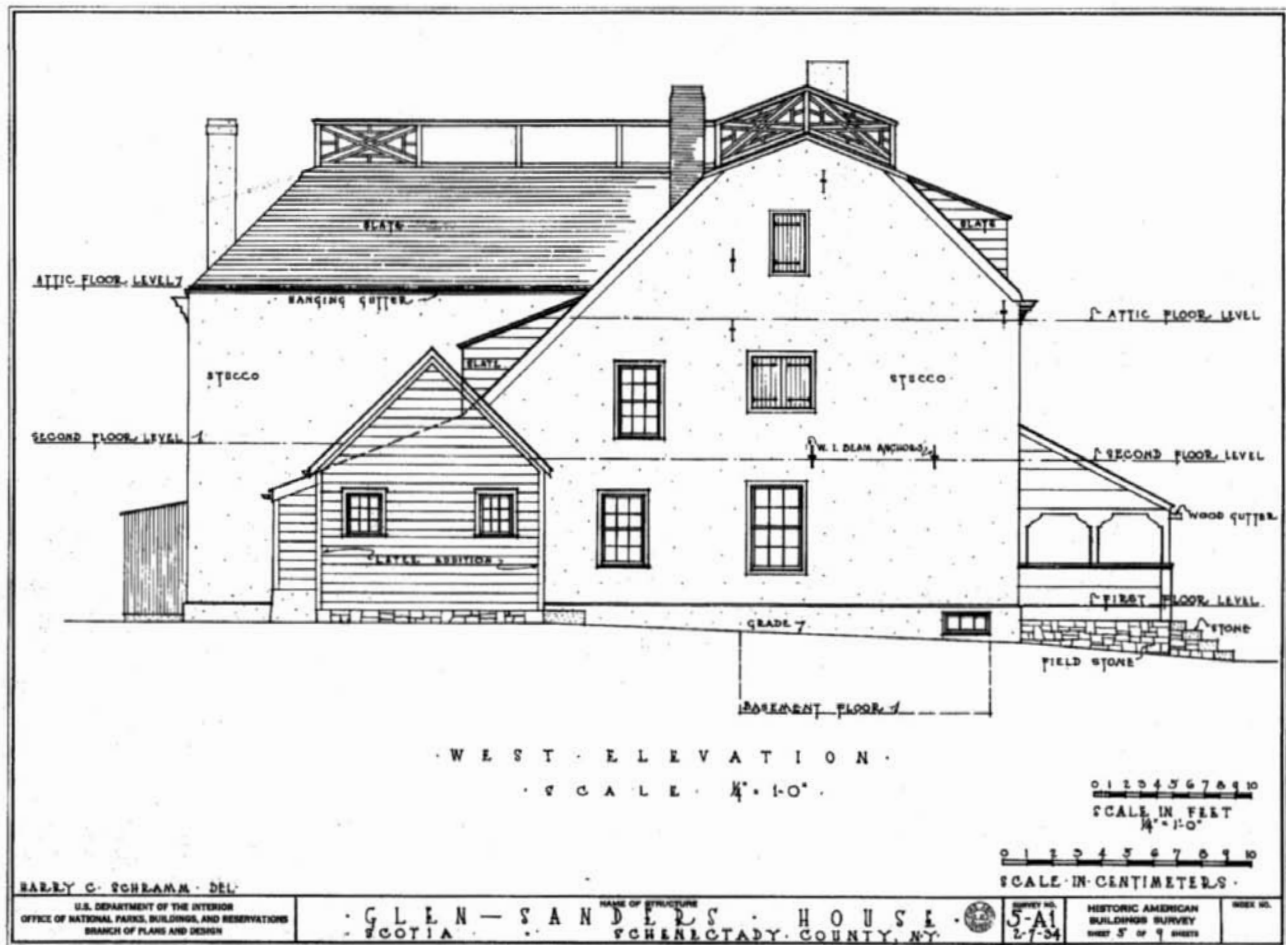


Figure 5 HABS measured drawing of the west elevation of the Glen-Sanders house, 1934.

which proposes an “Albany school” of carving/planning/turning in about the 1710-1740 era. The authors are comparing surviving woodwork in houses from that period with *kasten* that have descended in the families who lived in these houses and with additional examples whose provenance connects them with the Albany region. Three *kasten* have survived from the Glen-Sanders house and so offer a good comparison with the elaborately turned and planed staircase in the dwelling.

Previous to the work at the Glen-Sanders house, no reliable data set (what the pros call a *master*) was available for pine in the Albany area. Several years ago, Hartgen had attempted to secure dates for several samples from the Albany stockade of c.1756, with unsuccessful results. Work done since then, including the aforementioned dating of oak samples from New Paltz and pine structural members from the Schuyler house in Schuylerville, created a small body of reference material that ultimately facilitated the dating of the two Winne houses.

The challenge with the Glen-Sanders house was that its structural elements were all pine or hemlock. Even with the successful dating of oak elements from the two Winne houses, it was unclear whether or not a definitive date could be obtained from samples

taken from the building. The first task was to assess the building, looking for candidate sample sites. Unfortunately, many structural elements from the seventeenth and eighteenth centuries bear the results of the workings of powderpost beetles or other pests. Degradation of the wood makes a sample essentially useless for dating purposes. Ten candidate sample sites were identified during the initial site visit.

The Glen-Sanders house has a particularly complex construction history which was only partially intuited in the past. An almost total lack of written history didn’t help the situation. Add to this the presence of date irons on the front of the building declaring its construction date as 1713, and you can begin to appreciate the chorus of “we already know when the building was built” that was heard.

As it turns out, the building was constructed in at least three, and possibly four, campaigns. It was clear that the gambrel roof on the west wing of the house (said to date to c.1680 by local historians) was unlikely to have been constructed before 1755, when that type of roof saw broad popularity in the region. The hipped gambrel roof of the east part of the house (facing the street) probably bore the same construction date, but certainly not the 1713 of its irons. The west wing was constructed as a wood frame with

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brick facing, and the east has stone bearing walls. The staircase that was the focus of study is located at the juncture between these two houses. A lean-to fills the L between the two earlier parts of the house. The HABS drawings from 1934 identified this as the earliest part of the house. See figure 5.

In fact, the two hemlock samples taken from the lean-to both yielded a cutting date of 1802, just after the wedding of owners Johannes Sanders and Albertina Ten Broeck in November 1801 (Reynolds 1911:l:54). Of the remaining samples, only three retained bark edge, and record cutting dates of 1769, 1770, and 1771. Three additional samples without waxy edges indicated cutting dates sometime after 1747, 1751, and 1768. This included samples from the basement, first and second floor and attic of the "1713" portion of the house and the attic and second floors of the "1680" part of the dwelling. The samples from the basement and first floor of the "1680" part of the house were initially inconclusive. The clustering of cutting dates for these samples around the year 1771 roughly correlates with the purchase of the house by Johannes and Deborah (Glen) Sanders from heirs John Glen and John Glen, Jr. in 1765 (Reynolds 1911:l:54).

With inconclusive results for the lower portion of the "1680" part of the house, a second round of testing was conducted. Altogether, eight samples from joists supporting the first floor of this portion of the



Figure 6 Bill Callahan taking a sample in the basement of the Glen Sanders house, June 2004.

house were taken. None of the samples retained their waxy edges. A total of five datable samples indicated cutting dates some point after 1662, 1662, 1684, 1686, and 1689. These were imperfect samples however, with an indeterminate number of rings having crumbled off due to the work of powderpost beetles. Bill Callahan, who conducted the fieldwork, was of the impression that there may have been about 20 years missing from each sample. Adjusting for this observation, the date c.1709 may better represent the era we're looking at for that portion of the building. This correlates well with a 1713 construction date.

Alan Miller, one of the co-authors of the forthcoming article, and I postulate that the 1713 irons came from this portion of the house and were removed in 1771 when the east wing was built. The earlier part of the house was apparently truncated at its east end at that time (to make room for the new wing), since what survives of the building doesn't include a cooking fireplace. The irons probably secured the brick on the east side of the house to the frame, similar to those on the Van Alen house in Kinderhook, which are similar in style and record the date 1737. As originally constructed the Glen-Sanders house was likely a story and a half in height with two or three chambers on its first floor.

The DeFrest house, North Greenbush, Rensselaer County, New York.



Figure 7. The David DeFrest house, c.1771. Photograph June 2004.

Samples from the David DeFrest house (owned by Karen and Chuck Fisher) were taken immediately after work was completed at the Glen-Sanders house. The house has typically been dated to c.1765, based upon a cast iron fireback bearing this date and the presence of the house on the 1767 Bleecker map of the Rensselaer Manor (Bleecker 1767). The structural elements of the DeFrest house were all pine.

A total of eight samples were taken from the first floor joists in the house; five from what is apparently the older portion of the house, and three from a wood-framed addition dating to c.1820-1840. All of the samples had bark edge present. Four of the five samples from the older portion of the dwelling revealed cutting dates of 1771, while the fifth appears to have been cut in 1765.

The discrepancy between the traditional c.1765 date and the determined date of c.1771 for the construction of the house needs to be addressed. The inconsistency may be attributable to one or more causes. Of course the presence of a dated fireback does not necessarily mean that the house was constructed contemporaneously—it could have been brought to the site at any time after the initial construction of the dwelling—so it can't be used as hard evidence in the dating of the house.

With respect to the presence of the David DeFreest house on the 1767 map, two possibilities need to be considered. First, while the map is dated 1767, the original is now lost and is only known from an engraving published in 1850. Thus, while the Bleecker map is routinely used as a tool to determine whether or not a structure existed in rural Rensselaerswyck by 1767, it is entirely possible that the map was updated after its initial drafting, and that houses constructed after 1767 were added to the map on a piecemeal basis. In support of this interpretation is the fact that while a majority of the houses are keyed to a numerical list, several merely have names appended to their illustrations, and a third group have letter designations. Against the theory of the DeFreest house having been added to the map at a subsequent date is the fact that it has a numerical designation—it is indicated as #61 in the east manor—but it is located on the wrong side of the street, now known as Blooming Grove Drive or the Old Troy Post Road. This structure, whether located as indicated on the 1767 map or on the present site, may have been a wood-framed building that was replaced by a brick house in 1771.

Samples from the c.1820-1840 wood-framed wing are not yet datable. The reason for this is twofold. First, the master chronology is not yet secured for the early 19th century for coniferous trees. Secondly, the samples were from structural elements which are significantly smaller in size—they contained between 34 and 59 rings—and are too small to yield definitive results at this point in time (Cook and Callahan 2004b:5). The dating of the newer part of this house will have to wait.

Opportunities for Future Research

The work done on the DeFreest and Glen-Sanders houses has firmly established a pine master for the Albany area reaching up to 1771 and as far back as

c.1550. This will allow us to date samples taken from historical archeological contexts in the region, so long as they preserve structural integrity and have many edges. The first result of this new tool is the positive dating of a sample taken during the recent (2003) excavations in Albany at the Douw-Quackenbush distillery in Albany. The pine tree that was hollowed out for use as a drain pipe was cut in 1792, confirming a working thesis that the distillery—initially constructed in the 1750s—was renovated c.1790.

Preliminary examination of the structure of the John Evert van Alen house in DeFreestville, Rensselaer County, reveals that its structural elements are cut from both oak and pine. Thus testing at this site presents an unusual opportunity to correlate the masters for both these species. Furthermore, the house is known from period correspondence to have been constructed during 1793-1794, so the relationship between the known construction period of the house and the harvesting dates for its wood structure will better inform us about the process of constructing a dwelling in the late 18th century.

Application of dendro dating to barns and other outbuildings

Although few samples taken from New World Dutch Barns have heretofore been submitted for testing (the dating of a Ho-Ho-Kus, Bergen County, New Jersey, example being a notable exception – see Huber 2004), many structural fragments from now-lost buildings are in our members' private collections. With the establishment of masters for both the oak and pine series in the Albany region, it is now a real possibility for such structures to be dated.

Although elements from hay ricks may prove too small to furnish the adequate number of rings for a datable sample, no such problem would hinder the dating of the massive structural elements typically encountered in New World Dutch barn anchorbeams and columns. A casual survey suggests that beams and columns with many edges intact are not uncommon. Dating of a number of these structures will ultimately provide us with a clearer tool to assess the evolution of the New World Dutch Barn and its associated structures.

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*Walter Reed Wheeler works as a Restoration Architect for Hartgen Archeological Associates. He has co-authored two books on architecture in New York State: **A Neat, Plain, Modern Stile: The Architecture of Philip Hooker and his Contemporaries, 1796-1836** and **The Marble House on Second Street.***

He is a trustee of the Dutch Barn Preservation Society.



HAY BARRACK REPORT

October 2004

After 9 years of storms in its exposed location, the Carl Touhey Hay Barrack required a new top. It was built in 1995 by members of the Dutch Barn Preservation Society. (DBPS Newsletter, Fall 1995)

Pictured here is the beautiful new thatch installed by Chris Bromfield, a master Thatcher of English extraction, out of Falmouth, Massachusetts.

(Photograph (right) by Phyllis Lillienthal, Oct. 15, 2004)



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