



Archeology Program

National Park Service
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Tree Ring Dating at Mesa Verde National Park

Tree-ring dating, or dendrochronology, has been an integral part of archeological research at [Mesa Verde National Park](#) (NP) since 1923, when members of the National Geographic Society's First Beam Expedition collected samples from Cliff Palace, Spruce Tree House, and other sites (Douglass 1929, 1942; Nash 1999; Nichols 1963; Smiley 1947). The full dendrochronological potential of the park, however, has not yet been tapped. Dendrochronological research on archeological and living wood in the park holds the potential to more accurately date building construction phases and provide insights into climate changes and human adaptation to these changes.

Since 2006, I have been involved in an archeological tree-ring dating program that focuses on collecting samples from some of the last datable beams remaining in the park. This project involves five separate sub-projects.

The first goal is to ensure that all previously collected but unanalyzed tree-ring specimens collected at Mesa Verde NP have been analyzed and, hopefully, dated by specialists at the Laboratory of Tree-Ring Research (LTTR), University of Arizona. Approximately 400 previously unanalyzed specimens have been located and sent to the LTTR. Although the analysis of those specimens is ongoing, dozens of new dates have already been obtained.

The second goal is to collect new tree-ring specimens from back-country cliff sites that still contain datable wood. In addition to the five well known Mesa Verde cliff dwellings that are open to the public (Balcony House, Long House, and Step House on Wetherill Mesa; Cliff Palace and Spruce Tree House on Chapin Mesa), there are nearly 600 documented cliff sites within the park boundaries, ranging from small masonry granaries, to large cliff sites. Of these, roughly 250 are known to contain wood, but only about one tenth (24) of those contain wood from secure contexts that are likely to be datable. The other sites contain lintels, wall pegs, or loose wood specimens that are of the wrong species or who are too small to be datable.

New dates have confirmed previous results from sites such as Painted Kiva House and Mug House; new dates have also been obtained for a historic ladder leading to Painted Kiva House, a Navaho sweat lodge on Chapin Mesa, and the Sun Temple.

The third goal of the project is to re-examine the Schulman Grove in Navajo Canyon, which is home to Douglas fir trees that may have been manipulated by pre-Columbian inhabitants of Mesa Verde in order to produce stems for construction beams of predictable size and shape (Nichols and Smith 1965).

In the 1940s, pioneering dendrochronologist Edmund Schulman visited a grove of trees (later named Schulman Grove) in search of living trees that would help him bridge a gap in a tree-ring chronology between its recent portion, based on the analysis of living tree cores, and its ancient portion, based on the analysis of archeological cores (Schulman 1946). The recent section begins at A.D. 1288; the ancient portion ends at A.D. 1274, leaving a small but significant gap created, in part, by ring growth anomalies caused by the "Great Drought" (Douglass 1929). Because Mesa Verde was known, even in the 1940s, to have been depopulated in the A.D. 1280s or shortly thereafter, Schulman looked for old living trees, not archeological sites, for specimens that would bridge the gap. In 1947, he discovered and cored a tree that yielded an inner date of A.D. 1150, making it by far the oldest tree known in



Ladder and beams in a kiva at Spruce Tree House, Mesa Verde. Photo by [Ranger Kathryn](#)

the park and one of the oldest Douglas fir trees anywhere in the Southwest (Schulman 1947). The Schulman Old Tree is still alive and we collected new cores from it in order to help bring the Mesa Verde chronology up to 2009. We also collected other samples from the Schulman Grove, including cross sections of dead trees.

The fourth goal is to identify ponderosa pine trees from which the living inner bark, or cambium, had been harvested prehistorically for famine food. At various locations in the greater North American West, including southern and western Colorado, there is evidence that indigenous populations peeled the bark off of ponderosa pine trees during periods of resources stress (Martorano 1990, 1999). A systematic search for such peeled bark trees has never occurred within the park boundaries. After conferring with park ecologists,

we examined ponderosa pine groves in Bobcat Canyon, Morefield Canyon, and elsewhere. Only two peeled-bark trees were found in the park. A forest fire in the park burned these trees in 2000; the remaining bark from the dead trees fell off in about 2005. A core from the scare face was taken in an effort to date the cambium-harvesting event. The specimen is currently being analyzed, but the trees were well-watered when living, and the ring series does not show the requisite variability or length to be able to match the sequence to the established chronology.

The fifth goal of the project focuses on distance learning and public outreach. The Denver Museum of Nature & Science has an extensive *Science in Action* program that enables middle school students in Denver and the surrounding seven-county area to ask questions, via a live closed-circuit satellite television broadcast link, to scientists carrying out research in the field. The program was used to introduce the children to tree-ring dating. Teachers and students involved in the *Science in Action* program receive written and video resources in advance of the main event, and are expected to become familiar with the scientist and the research presented. As such, the *Science in Action* meets numerous state and local science standards. The project is also involved with development of a children's book on tree-ring dating. Artist and author Mary Ann Bonnell has co-authored a book entitled *Talkative Tree-Rings: A Simple Guide to the Amazing Science of Tree-Ring Dating* (Nash and Bonnell 2009).

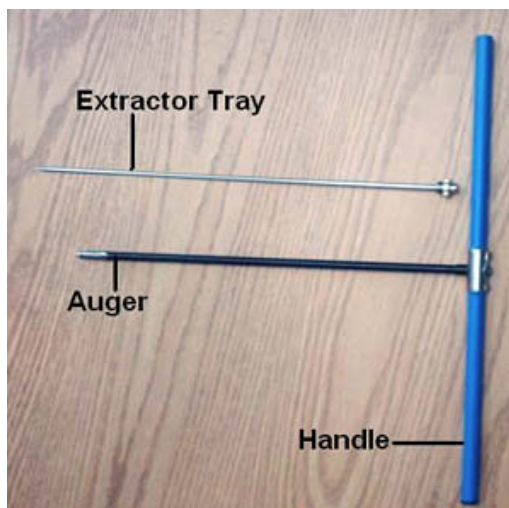
Conclusion

Mesa Verde NP is a world heritage site that contains remarkable archeological wood resources. These resources have, on one hand, suffered decades of abuse from visitors from the 1870s to the 1920s and beyond. On the other hand, these same resources have received significant dendrochronological research attention. This current project is designed to tie up many loose ends left behind. To make the data available, a new goal of the project is to develop a data base of all known tree-ring dates from Mesa Verde NP and to write a history of the research. This lasting contribution to archeology and climate change will ensure that the information from tree-rings will be available longer than the trees.

By Stephen E. Nash, the Denver Museum of Nature & Science

References

- Dean, Jeffrey
2001 *Dendrochronology of Archaeological Sites on Wetherill Mesa, Mesa Verde National Park, Colorado*. Unpublished manuscript on file, Mesa Verde National Park.
- Douglas, Andrew Ellicott
1929 The Secret of the Southwest Solved by Talkative Tree Rings. *National Geographic* 56(6):736-770.
- 1942 Crossdating at Mesa Verde National Park. *Journal of Forestry* 40:347-348.
- Martorano, Marilyn
1990 Culturally Peeled Ponderosa Pine Trees: Great Sand Dunes National Monument. *The San Luis Valley Historian* 22(3):26-32.
- 1999 Culturally Peeled Ponderosa Pine Trees In *Colorado Prehistory: A Context for the Rio Grande Basin*, edited by Marilyn A. Martorano, Ted Hoefer III, Margaret A. Jodry, Vince Spero, and Melissa L. Taylor, pp. 155-165. Colorado Council of Professional Archaeologists, Denver.



Tree ring increment borer, an instrument used to take core samples from trees.

Nash, Stephen
 1999 *Time, Trees, and Prehistory: Tree-Ring Dating and the Development of North American Archaeology 1914-1950*. University of Utah Press, Salt Lake City.

Nash, Stephen and Mary Ann Bonnell
 2009 *Talkative Tree Rings: A Simple Guide to the Amazing Science of Tree-Ring Dating*. Manuscript on file, Department of Anthropology, Denver Museum of Nature and Science.

Nichols, Robert F.
 1963 Dates from Site 1060 Pithouse, Mesa Verde National Park. *Tree Ring Bulletin* 24(1-2): 12-14.

Nichols, Robert F. and David G. Smith
 1965 Evidence of Prehistoric Cultivation of Douglas-Fir Trees at Mesa Verde In *Contributions of the Wetherill Mesa Archaeological Project*, edited by D. Osbourne pp. 57-64. *Memoirs of the Society for American Archaeology* 19.

Schulman, Edmund
 1946 Dendrochronology at Mesa Verde National Park. *Tree-Ring Bulletin* 12(3):18-24.

1947 An 800-year-old Douglas Fir at Mesa Verde. *Tree-Ring Bulletin* 14(1):2-8.

Smiley, Terah L.
 1947 Dates from a Surface Pueblo at Mesa Verde. *Tree-Ring Bulletin* 13(4):30-32.

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