IT'S ABOUT TIME

A HISTORY OF ARCHAEOLOGICAL DATING IN NORTH AMERICA

Edited by

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CHAPTER 9

Dendrochronology and Historical Records: Concordance and Conflict in Navajo Archaeology

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Tree-ring and historical records are the most precise dating techniques available for studying the recent past. Whether or not an individual historic reference or tree-ring date accurately places a specific event in time, however, is a question archaeologists must seriously consider. Historical records have provided the only independent means of verifying tree-ring dates; dendrochronology, on the other hand, has often confirmed historical reconstructions and provided a check on historical references.

Historical records and tree-ring dates are both precise and, presumably, accurate. Historical records are often precise to the year, month, day, or even hour. Tree-ring dates are precise to the year, and in some cases, to the tree-growing season (Dean and Warren 1983). The accuracy of tree-ring dates is confirmed by their agreement with hundreds, if not thousands, of like specimens that cross-date with the master tree-ring chronology for a given area. Likewise, the accuracy of historical documents is confirmed by their agreement with other documents reporting the same event or phenomena. Prior to their acceptance by archaeologists and historians, however, both dendrochronological dates and historical records must be assessed in terms of their accuracy and reliability.

Because of their precision, dendrochronology and historical records have been intertwined since dendrochronology's beginnings early in the twentieth century. Unlike the use of tree-rings to calibrate radiocarbon or ceramic time scales, dendrochronology and historical records

Wood also notes, however, that seemingly independent historic observations may have originated from a single source, and that, therefore, duplication does not imply corroboration.

Evaluating Tree-Ring Data

Like historical documents, tree-ring dates must be evaluated individually within their contexts. Unlike historical documents, we know the individual dates are accurate if they are properly cross-dated. We know they are accurate because the tree-ring sequences cross-date with hundreds or thousands of other trees that responded in the same way to broad climatic patterns across a broad area. If a sample does not cross-date with the master chronology, it is simply not given a date.

The interpretation of tree-ring dates, however, must be performed using specific methods. Dendrochronologists such as Haury (1935), Bannister (1962), Dean (1978), Ahlstrom (1985), and Nash (1997b) have developed specific criteria for evaluating tree-ring dates; these include (1) the types of dates, (2) the date range, (3) the range of cutting dates, (4) the presence of date clusters, (5) the identification of construction events, (6) the possible behavioral explanations for "anomalous" dates, and (7) the presence of other lines of evidence that support (or do not support) the dates.

Tree-ring dates give precise years of cambial growth on specific samples. Thus, as Dean (1978) pointed out two decades ago, the dated event on a tree-ring sample is a biological, not cultural, phenomenon. It is completely independent of archaeological or cultural events. It is necessary for archaeologists and dendrochronologists to relate the biological event of ring growth to the cultural event of interest.

Noncutting tree-ring dates indicate the growth year of the last ring on a sample, not the year the tree died. Thus, single noncutting dates can provide only a terminal date before which tree death could not have occurred. In contrast, cutting dates denote the year of tree death. Assuming the tree was cut by humans, cutting dates generally date both a biological (tree death) and a behavioral (tree felling) event. A single cutting date, however, may not date the target event of interest (Dean 1978). The tree-ring date itself is an accurate and precise measure of the year (and possibly season) of tree death, but if the event of interest is the use of dead wood, for example, the date may be irrelevant.

Date clustering is perhaps dendrochronology's greatest strength (Ahlstrom 1985; Haury 1935). A cluster of cutting dates, defined as

three or more cutting dates in the same tree-growing year, helps identify anomalous dates and various past human behaviors. Ahlstrom (1985) suggests that a strong terminal cluster in a date distribution, defined as a group of cutting dates at the end of a distribution, is a good indicator of building construction. Anomalous dates, for example a cutting date that occurs several years earlier than a terminal cluster, may indicate behaviors such as beam reuse. Similarly, a tree-ring date that postdates construction typically indicates repair of a structure. Date clustering is important and can be accomplished only by the collection and dating of an adequate number of samples.

It is clear that both dendrochronologists and historians have developed methods for evaluating their respective datasets. It is imperative, however, that archaeologists investigating the Protohistoric and Early Historic periods (Wilcox and Masse 1981) learn to employ these methods in their analyses. The discussion that follows suggests that few researchers interested in the Navajo occupation of the Southwest have used either discipline to the fullest extent possible.

Tree-Ring Dating, History, and Navajo Archaeology

Navajo archaeology offers one of the best frameworks in American archaeology for evaluating the relationship between tree-ring dates and historical records. The examples offered below discuss the use of dendrochronological and historical data to assess the Navajo entry into, occupation of, and abandonment of their traditional homeland of Dinétah in northwestern New Mexico. Other examples of overlap between historical documents and tree-ring dates generally relate to one particular site, such as Walpi (Ahlstrom et al. 1991) or Acoma (Robinson 1990). The Navajo case, however, includes more than 1,000 sites spread over much of northwestern New Mexico and northeastern Arizona. There are literally hundreds of tree-ring dates from these sites and an abundance of historical documents and oral histories relating to the Navajo occupation of and mobility within the northern Southwest. With one notable exception, however, both archaeologists and historians have generally used historical records uncritically and ignored much of the archaeological and dendrochronological data.

Concordance in Navajo Archaeology: The Black Mesa Project

The best example of concordance between tree-ring data and

tionable second-hand reference that describes a process, not an event, and that was translated through at least two languages.

The archaeological and dendrochronological support for the Late Entry–High Plains model is virtually nonexistent. As of this writing, there are no known, well-dated, pre-1540 Athabaskan sites on the High Plains. James Gunnerson (1969, 1987) describes Apachean sites in northeastern New Mexico, but none can be demonstrated to have been occupied earlier than the late 1600s. Wilcox (1981:234) suggested more than 15 years ago that "once some of these sites [pre-1540 Athabaskan sites] are identified—or are shown not to exist—it will be possible to better evaluate this model and alternatives to it." In the nearly two decades since Wilcox proposed his model and after much additional field work, the earliest Athabaskan sites on the High Plains are still the Apache sites described by Gunnerson (1969).

Significantly, there are no historical documents relating to the traditional Navajo homeland in northwestern New Mexico where the earliest dated Navajo sites are located. This lack of written documentation does not mean, of course, that the Navajo were not present in Dinétah at the time; it is simply a function of Spanish interest elsewhere. On the other hand, there are tree-ring dated Navajo habitation sites—not generalized Athabaskan camps—in northwestern New Mexico that date to the 1500s (Hancock 1997; Sesler and Hovezak 1996) and radiocarbon-dated sites that date to the early 1400s and late 1300s (Hogan 1989; Reed and Horn 1990). These data suggest that the earliest sites occupied by Athabaskan-speaking peoples in the Southwest are not on the High Plains at all but occur in the upper San Juan drainage. Nevertheless, many archaeologists and historians still accept the Late Entry–High Plains model as *the* explanation of Athabaskan entry into the Southwest (cf. Hendricks and Wilson 1996; Schaafsma 1996).

In fairness to Wilcox, all of the early tree-ring-dated Navajo sites were investigated after his 1981 publication appeared (Wilcox 1981), and at that time, the only archaeological evidence of a pre-1680 Navajo occupation of the Dinétah was Hall's (1951) tree-ring dates from a single hogan. Nevertheless, Navajo oral traditions are clear and unambiguous regarding the location of their homeland as Dinétah. Largely uncritical acceptance of meager historical data led Wilcox to develop the Late Entry–High Plains model.

The Refugee Influx. The second example of discordance between historical and dendrochronological data concerns the supposedly massive immigration of Puebloans into the Navajo country following the

Reexamination of the archaeological and dendrochronological evidence for a massive immigration suggests that the hypothesis has been severely overstated as a factor in Navajo cultural development.

Two types of archaeological evidence have been used to support the Puebloan immigration model: Gobernador Polychrome ceramics and pueblito masonry structures. Gobernador Polychrome, a high-fired, tricolor ware, has been described as "Navaho made but Pueblo inspired" (Keur 1944), and has been cited as strong evidence of a refugee influx (Hester 1962). Recently, however, Michael Marshall (1991, 1995) demonstrated that Gobernador Polychrome rarely constitutes more than 10% of the ceramics on any pueblito site and that Puebloan trade wares rarely constitute as much as 8% of the ceramics. If Gobernador Polychrome was made by Puebloan refugees, they apparently produced very little of it. In addition, Reed and Reed (1996) and Sesler and Hovezak (1996) demonstrated that Gobernador Polychrome was manufactured prior to the Pueblo Revolt of 1680 and possibly as early as 1630. These new data do not invalidate the idea that Gobernador Polychrome was "inspired" by Puebloans, but they do eliminate post-Revolt refugees as the source of that inspiration.

The masonry pueblitos of Dinétah were hypothesized to be refugee constructions because they were made of stone, which is not a traditional Navajo building material, and dated to the historic period on the basis of evidence for metal tools and historic period ceramics (Kidder 1920). With one notable exception, pueblito masonry is "columnar-style construction" (Powers and Johnson 1987) and is more similar to Apache masonry (Donaldson and Welch 1995) than to traditional Puebloan or Anasazi styles. Nevertheless, Hogan (1991) argued that Navajo masons used local archaeological ruins as "templates" for their construction efforts.

Extensive dendrochronological analysis of nearly 1,000 tree-ring samples from more than 60 pueblitos demonstrates conclusively that all but two of the supposed refugee sites were built almost 20 years *after* the supposed refugee influx and that the vast majority of the "refugee pueblitos" were built more than 30 years after the purported mass migration (Towner 1996, 1997). There are no other sites in the Navajo country that were occupied during the interval when refugees could have been entering the area. Despite the historical and archaeological evidence, however, the "Refugee Hypothesis" is still widely accepted (Plog 1997).

Tapacito Ruin (LA 2298). The third example of discordance between tree-ring data and the historical record involves the one