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The Archaeology of Navajo Origins

Edited by

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Radiocarbon and Tree-Ring Dating at Early Navajo Sites

Examples from the Aztec Area

JERRY FETTERMAN

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INTRODUCTION

Navajo origins and the arrival of the Athapaskans into the Southwest are topics of considerable importance to the understanding of the recent prehistory of the Southwest. Although some researchers (C. F. Schaafsma 1992) suggest that the Navajo arrived in the San Juan Basin sometime after the Pueblo Revolt of A.D. 1680, others have suggested a post-Anasazi occupation of the basin, possibly as early as A.D. 1350 (Hogan 1989; A. D. Reed and Horn 1990), by people who shared cultural traits with the Navajo. Hester (1962a) first devised a chronological scheme for ordering Navajo archaeological materials (see Towner and Dean, this volume). The two phases of interest here are the Dinétah phase (ca. 1550–1700) and the Gobernador phase (ca. 1700–1775).

The Navajo occupation of the San Juan Basin after A.D. 1680 is well dated and has been termed the Gobernador phase. It is best known for the construction of pueblitos and presence of Gobernador Polychrome, a locally produced thin, three-color painted ware. The Dinétah phase was created to explain site components in a stratigraphic position suggestive of an occupation prior to the Pueblo Revolt but whose ceramic assemblages lacked Gobernador Polychrome (Hester and Shiner 1963; Brown, this volume). Ceramics on these sites consisted entirely of Dinétah Grayware, a ware also found on later sites (see Reed and Reed, this volume).

As a result of considerable archaeological research in association with energy development over the past decade, a number of sites with attributes of the Dinétah phase have been investigated. A recent summary of these excavation data (Brown and Hancock 1992) strongly suggests that a Dinétah phase does exist and can be tentatively dated between A.D. 1500 and 1700 (see Brown, this volume). Many researchers, although comfortable about the existence of the Dinétah phase as a discrete chronological and cultural unit (but see Schaafsma, this volume, for a different viewpoint), are not comfortable associating it with the earliest Athapaskan occupation of the Southwest. Thus, the precise chronological placement of early Navajo sites has become critical in resolving where and when the Athapaskans first entered the Southwest.

Unfortunately, even with the considerable amount of archaeological research conducted at Dinétah and Gobernador phase sites, our understanding of the chronology of these phases is poor. Perhaps our biggest obstacle to understanding the chronology is the lack of chronometric methods that date the target event (i.e., the date of occupation) with a high degree of resolution (Dean 1978). As shown below, the most common methods of dating archaeological phenomena in the area, radiocarbon dating and dendrochronology, often date events other than the target event. The dated events can significantly predate the target event as a result of cultural practices such as old-wood use (Schiffer 1982, 1986, 1987), as a result of the cross-section effect (F. E. Smiley 1985), and as a result of the destruction of the outer rings of a dated charcoal sample. (See Brown 1990 for a detailed summary of the problems associated with radiocarbon dating early Navajo materials). The following text provides several examples of how difficult it is to establish a chronology for Dinétah and Gobernador phase sites in the San Juan Basin.

THE SITES

As a result of mitigation work for the Arkansas Loop project, ten sites that contained protohistoric components were partially excavated by Woods Canyon Archaeological Consultants (WCAC). The sites are shown in Figure 4.1 and summarized in Table 4.1. All these sites were assigned a Navajo cultural affiliation based on several criteria, including the presence of the remains of forked-stick hogans, Dinétah Gray ceramics, and site layouts similar to those at later Navajo hogan complexes (Honeycutt and Fetterman 1994).

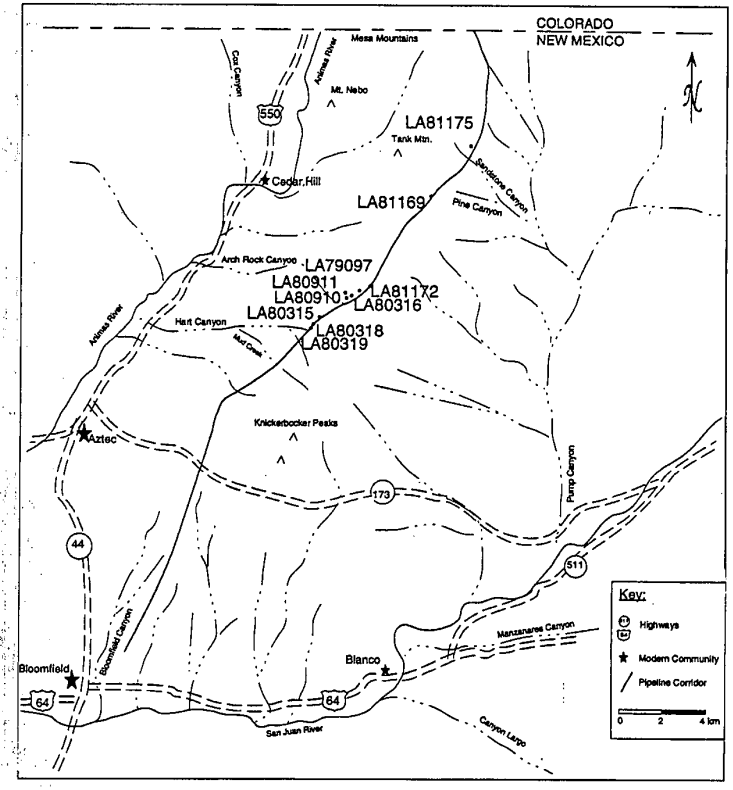

FIGURE 4.1. Map of La Plata area sites discussed in text.

The sites are primarily habitation sites that contain one or more brush shelters or simple forked-stick hogans. Located to the northeast of Aztec, New Mexico, these sites occupy sandy colluvial slopes slightly above the present-day ecotone between the Pinyon-Juniper Woodland and the sage-covered benches east of the Animas River. The location of several of the sites, buried under one meter or more of alluvium, initially suggested the possibility of an early Navajo occupation. This interpretation was supported further by the lack of Gobernador Polychrome, a purported hallmark of the later Gobernador Phase, on several of the sites (see Table 4.1).

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TABLE 4.1 Descriptive Data for Navajo Sites Discussed in Text.

Site Number	*Description*	*Gobernador Polychrome?*
LA 79097	Navajo habitation with at least one structure and outdoor work area	Yes
LA 80315	Navajo habitation with one structure	No
LA 80316	Possible Navajo habitation with storage and processing features	No
LA 80318	Navajo habitation with two structures	No
LA 80319	Navajo habitation with three structures and outdoor activity areas	No
LA 80910	Navajo habitation with at least one structure and outdoor activity area	No
LA 80911	Navajo habitation with one structure	No
LA 81169	Possible Navajo habitation with one storage feature	No
LA 81172	Possible Navajo habitation with storage and processing features	No
LA 81175	Navajo habitation with two structures and an outdoor activity area	Yes

CHRONOMETRIC DATA SET

Radiocarbon Dates from Arkansas Loop Project Sites

In order to establish temporal control for these ten sites, seventy-three radiocarbon samples obtained from secure Navajo contexts were submitted to Beta Analytic, Inc., for radiocarbon assays. The samples were composed of charcoal or charcoal-enriched soil from structures or features; individual sample numbers and proveniences are detailed in the Arkansas Loop excavation report (Honeycutt and Fetterman 1994). Unfortunately, the poor preservation of the features and structures generally did not allow for selection of high-quality charcoal for dating. Most samples were composed of the entire charcoal contents of the provenience; thus, few samples can be refined using only the outer rings of samples for dating.

These samples yielded unusually early dates, much earlier than anticipated. The dates average 637 radiocarbon years BP, with a maximum of

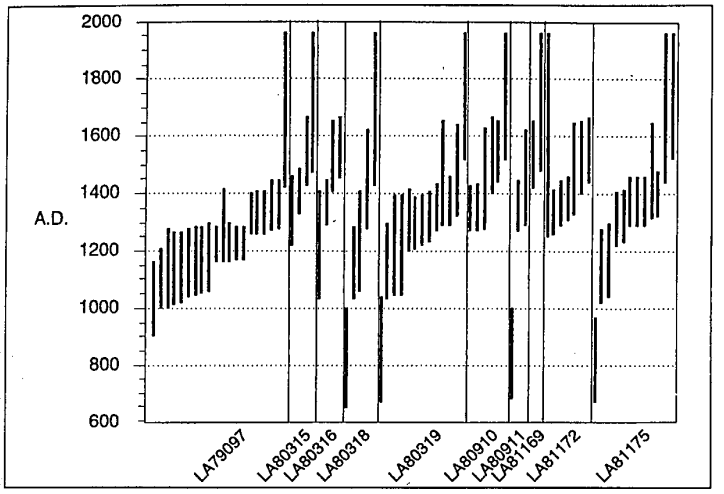

FIGURE 4.2. Radiocarbon dates from Arkansas Loop Project sites.

1220 and a minimum of 220 years BP. The average standard deviation is sixty-seven years. As can be seen in Figure 4.2, the vast majority of the two-sigma calibrated date ranges predate A.D. 1500, a time most researchers currently accept as the initial date of Dinétah phase. Although it was expected that some evidence of old-wood use would be present in the sample, the consistently early nature of these radiocarbon dates suggested, at least initially, that the early dates might reflect the true age of the sites.

Another method of evaluating radiocarbon dates is the "strong-case" approach (Schiffer 1986). These samples are all from structural elements and should provide better chronological control of the data. As can be seen in Figure 4.3, however, these strong-case dates are not significantly different from the entire corpus of dates. At least for early Navajo sites, these data suggest that the "strong-case" approach is of little utility.

In addition to sampling for radiocarbon dating, pieces of charcoal or beams were submitted to the Laboratory of Tree-Ring Research for dendrochronological analysis whenever possible. Unfortunately, as a result of erratic tree-ring growth in the area and the small size of many of the samples collected, very few of the samples dated. The few tree-ring dates available, however, do provide an important means of testing the validity of the radiocarbon dates.

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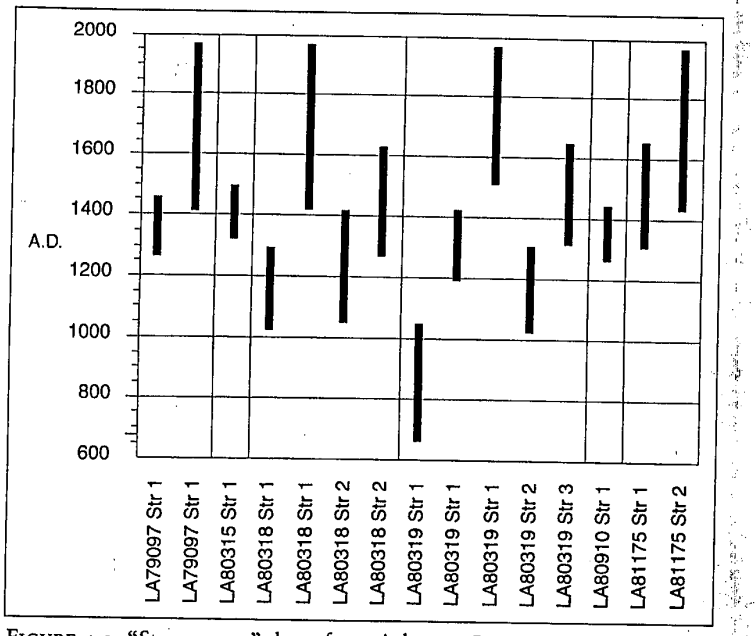

FIGURE 4.3. "Strong-case" dates from Arkansas Loop Project sites.

LA 81172: Evaluating Radiocarbon and Tree-Ring Dates

Site LA 81172 (see Figure 4.1) is a possible habitation site that contained surface features, flaked stone artifacts, and Dinétah Gray, and Pueblo IV tradeware ceramics. Of particular interest to this discussion is Feature 11, a large bell-shaped cist that was apparently used as a corn roasting pit. At the base of the pit was a 10–cm-thick deposit of charcoal beams, presumably preserved by the smothering of the fire. Eleven of the beams produced tree-ring dates. In addition, a single radiocarbon date was obtained on charcoal from the same feature (Figure 4.4).

The twelve independent dates, all derived from biological materials in the same feature, can be interpreted in several ways. It is possible, though highly improbable, that each group of dates represents a use episode and that the feature was used sporadically over a period of more than 300 years. If the dates are interpreted using the principles set forth by Dean (1978) and Ahlstrom (1985), however, a very different picture of the use of Feature 11 emerges. Because there are no cutting-date clus-

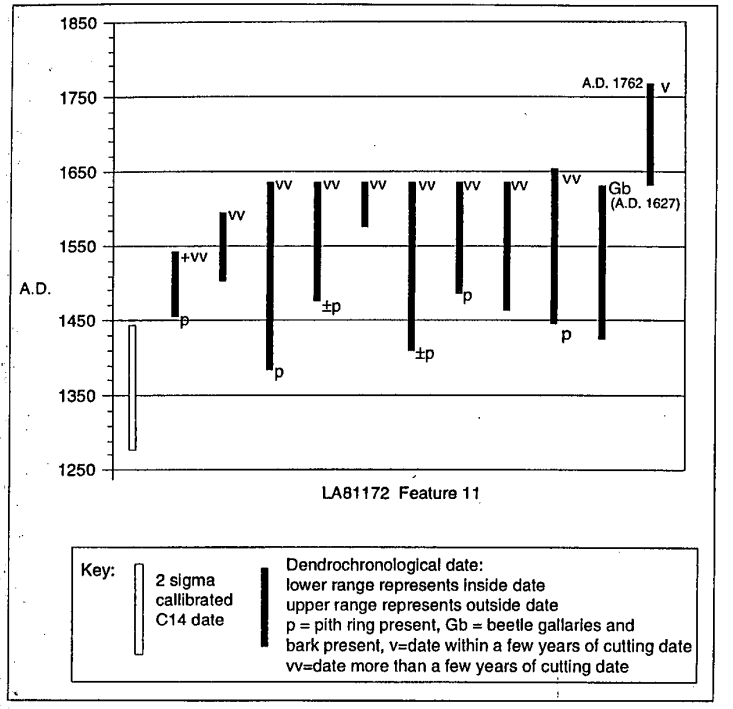

FIGURE 4.4. Dates from Feature 11, LA 81172.

ters, the latest date from the feature should give an approximate occupation date (Ahlstrom 1985). Thus, a single tree-ring date indicates the feature was in use sometime after A.D. 1762 (LTRR sample # MMN-9, 1634–1762v).

Archaeological evidence suggests that the biological materials dated were deposited in the feature during one episode of use. The disparity between the A.D. 1762 date and the A.D. 1600s dates suggests that both live wood (represented by the A.D. 1762 sample) and dead wood (represented by the A.D. 1600s samples) were used as fuelwood for the feature.

Wood used for firing the feature included pinyon logs that still contained evidence of bark (LTRR# MMN-12, 1428–1627GB). In many situations, this "cutting" date would be used to date a cultural event. It is apparent from the distribution of tree-ring dates, however, that this sample had been dead for at least 135 years prior to the use of the feature.

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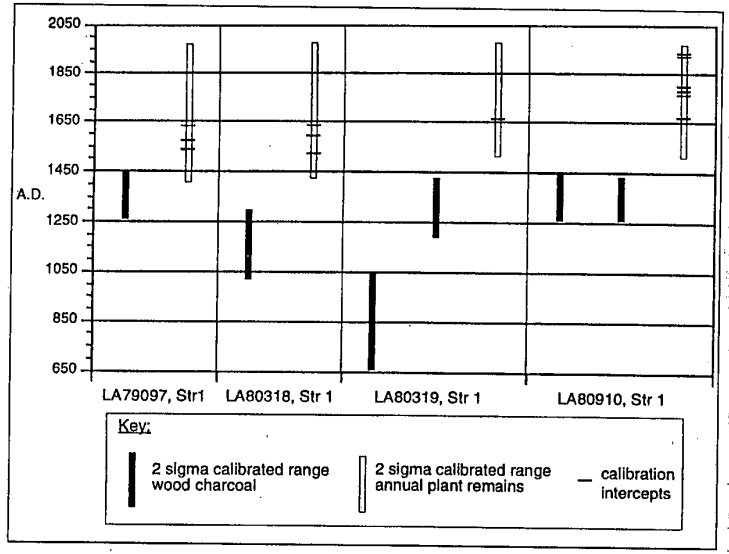

FIGURE 4.5. Calibrated dates from annual plants and wood samples.

These data clearly demonstrate the importance of processing multiple samples. Had the latest sample not been processed, the 1627 cutting date could easily have been used to infer the occupation date.

The charcoal sample (Beta #50855: calibrated A.D. 1290–1440) produced a radiocarbon date even earlier than the "noncutting" tree-ring dates, and the two-sigma calibrated range only slightly overlaps the earliest inside date from the dendrochronological samples. In addition, the inside dates for two of the logs were more than 300 years earlier than date of use of the feature. Thus, it is clear that dead-wood use and the cross-section effect can seriously skew chronological data from early Navajo sites.

In addition to temporal information, these data can provide important information on the site environment. The presence of a pinyon pine that had been dead for almost 135 years yet still retained bark suggests the environment in the vicinity of the project is relatively benign in relation to decomposition of vegetal material.

Radiocarbon Dating Annual Plants

Four sites, LA 79097, LA 80318, LA 80319, and LA 80910, were used as additional tests for the use of old wood; samples of annual plants including juniper berries, *Chenopodium* seeds, and corn kernels were submitted for radiocarbon assays. There was a sufficient number of juniper berries to process a standard sample from LA 80318, but the other samples re-

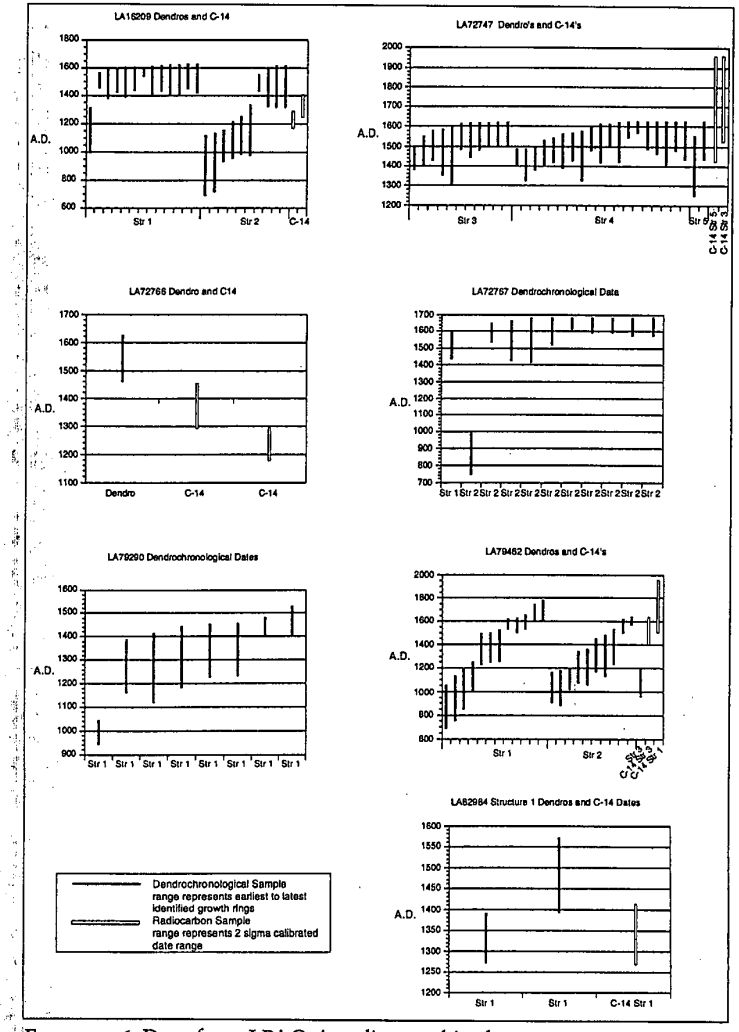

FIGURE 4.6. Data from LPAC sites discussed in the text.

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quired accelerator dating because of their small sizes. Given the annual nature of the dated materials, these dates (LA 79097 - Cal. A.D. 1420–1955 [AA10763]; LA 80318 - Cal. A.D. 1430–1955 [Beta 50854]; LA 80319 - Cal. A.D. 1520–1955 [AA10765]; and LA 80910 - Cal. A.D. 1520–1955 [AA10762]) should more accurately reflect the true age of the site occupation (Creel and Long 1986).

Figure 4.5 illustrates the calibrated date ranges for both the annual plant remains and charcoal samples. As can be seen, the charcoal samples from the structural elements predate the annual plant remains by 200 to 400 years. Thus, the dating of different materials from the sites indicates a significant problem with old-wood use and cross-section effect on the Navajo sites in the Aztec area.

This problem appears to be endemic in the Navajo archaeological record; Figure 4.6 illustrates dendrochronological and radiocarbon dates from seven Navajo sites recently excavated in the area by La Plata Archaeological Consultants (LPAC) (Steve Fuller, personal communication). The use of old wood and the cross-section effect can be seen in all the sites where more than one log was tree-ring dated. At every site with both radiocarbon and tree-ring dates, the radiocarbon dates overestimate the true age of the site, sometimes by as much as 400 years. The only exceptions to this trend are those radiocarbon dates with two-sigma ranges that extend into the twentieth century.

Dinétah Phase Tree-Ring Data

The tree-ring data from LPAC's excavations provide firm data supporting a Navajo occupation in the area prior to the Pueblo Revolt. Specifically, the tree-ring data from site LA 72747 suggest that the structures on this site were built and occupied in the period A.D. 1615–1622.

Site LA 72747 is a multioccupation Basketmaker II–Navajo habitation site (Hovezak et al. 1993). The Navajo occupation is represented by the remains of three burned forked-stick hogans and associated scatter of flaked stone,

148	249
149	5
***	
152	7
***	
154	06
155	0
156	02
157	46
158	6
159	11
***	
161	001455689
162	01122222

FIGURE 4.7. Stem-and-leaf plot for tree-ring dates from site LA 72747.

ground stone, and ceramic items. Ceramics in direct association with structure floors consist of Dinétah Gray jars and sherds.

Table 4.2 shows cutting or near-cutting dates for the three structures; Figure 4.7 presents all the tree-ring dates from the site using the stem-and-leaf technique suggested by Ahlstrom (1985). As can be seen, the dates indicate construction of Structure 3 in or slightly after A.D. 1615, Structure 4 in A.D. 1622, and Structure 5 in or after A.D. 1621. The site as a whole demonstrates a strong terminal cluster of cutting dates in A.D. 1622. The consistency of these dates could be interpreted as indicating that all three structures were occupied contemporaneously in A.D. 1621–1622.

TABLE 4.2 Summary of Tree-Ring Dates from LA 72747.

Provenience	*Sample Number*	*Species*	*Inner Date*	*Symbol*	*Outer Date*	*Symbol*
Structure 3	LPM-76	PNN	1384	p	1495	+vv
	LPM-69	PNN	1403		1546	++vv
	LPM-71	PNN	1430	p	1576	+v
	LPM-75	JUN	1358	+/-	1586	vv
	LPM-67	JUN	1313	+/-	1591	vv
	LPM-80	JUN	1487	+/-	1610	vv
	LPM-73	JUN	1447	p	1614	+r
	LPM-70	JUN	1483	p	1615	r
	LPM-74	JUN	1510	p	1615	r
	LPM-77	JUN	1511		1618	vv
	LPM-78	JUN	1502	+/-	1619	v
Structure 4	LPM-91	JUN	1403		1482	+vv
	LPM-107	JUN	1329	+/-	1484	vv
	LPM-92	JUN	1384		1489	vv
	LPM-100	JUN	1413		1527	vv
	LPM-105	JUN	1424	+/-	1540	vv
	LPM-103	JUN	1394	+/-	1560	vv
	LPM-94	JUN	1430		1562	vv
	LPM-108	JUN	1331	+/-	1574	vv
	LPM-82	JUN	1485		1591	vv
	LPM-99	JUN	1419	+/-	1610	vv
	LPM-83	JUN	1509		1611	vv
	LPM-101	JUN	1425	+/-p	1616	r
	LPM-97	JUN	1550	+/-p	1620	vv
	LPM-85	JUN	1573	+/-p	1621	r
	LPM-89	JUN	1490	+/-p	1622	+v

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Provenience	*Sample Number*	*Species*	*Inner Date*	*Symbol*	*Outer Date*	*Symbol*
	LPM-90	JUN	1466		1622	r
	LPM-81	JUN	1411	+/-	1622	+rB
	LPM-104	JUN	1482		1622	vv
	LPM-102	JUN	1438	+/-	1622	r
Structure	LPM-66	JUN	1253	+/-	1550	++vv
5	LPM-64	JUN	1441	p	1621	rB

See appendix for symbol legend.

CONCLUSIONS

Analysis of radiocarbon and dendrochronological data from the Aztec area indicates that there is a significant problem with using radiocarbon dates from wood charcoal to assess the age of early Navajo sites in northwest New Mexico. Because it is the use of such materials that has been the basis for extending the entrance of the Navajo into northwestern New Mexico back to the fourteenth and fifteenth centuries A.D., I believe such interpretations are premature. Given the problems with radiocarbon dating of wood charcoal from protohistoric sites of this time period, I also believe researchers should abandon radiocarbon dating of wood elements from these sites and concentrate on radiocarbon dating annual plants and dating using other methods. The analyses above indicate that researchers must be very careful about interpreting radiocarbon or noncutting tree-ring dates; both methods may not date the target event and, therefore, may seriously overestimate the true age of a site. It is clear, however, that the Navajo were living in the area in the early seventeenth century, and models of Navajo entry into the area after the Pueblo Revolt must be revised to incorporate these new data.

Acknowledgments. Funding for the processing of the radiocarbon and dendrochronological samples was provided by Northwest Pipeline Corporation, Meridian Oil Company, El Paso Natural Gas Company, and Williams Field Services Corporation. I wish to thank Steve Fuller, Tim Hovesak, and Leslie Sesler of La Plata Archaeological Consultants, Inc., for their ideas, data, and comments. In addition, I wish to thank Ron Towner for his diligent work arranging the symposium, editing the manuscripts, and all the work it took to follow it through to publication.

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Reexamining Gobernador Polychrome

Toward a New Understanding of the Early Navajo Chronological Sequence in Northwestern New Mexico

PAUL F. REED
LORI STEPHENS REED

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INTRODUCTION

Recent work on the nature of the Navajo occupation of the Upper San Juan River area has dramatically changed the way archaeologists describe this period. Although no consensus has been reached, many researchers working in the area now agree that the Navajo and other Athapaskans were present by at least A.D. 1500 and perhaps earlier. This is in contrast to the long-held view that the Navajo were latecomers to the Southwest, perhaps arriving just before or after the Pueblo Revolt and Spanish Reconquest (A.D. 1680–1696). Hand-in-hand with this hypothesis of a late arrival for the Navajo is the notion that Navajo culture was dramatically and irrevocably changed as a result of contact with Puebloan groups in the late 1600s and early 1700s. Among the more dramatic changes in Navajo culture that have been documented during this period are the manufacture of pottery and the use of stone masonry to construct dwellings. Recent analyses, however, have challenged the idea that Navajo culture witnessed extensive, rapid change during this period. For example, evidence suggests that the Navajo brought a ceramic technology with them to the Southwest (Brugge 1981b; Marshall 1985), and, al-

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