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1985
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ISSN:0023-1940

THE KIVA

Quarterly Journal of the

ARIZONA ARCHAEOLOGICAL AND HISTORICAL SOCIETY

Vol. 51 Number 1 Fall 1985

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EDITOR'S PAGE

The attentive reader will have noticed three new offerings in this issue of *The Kiva*: a new cover, a new editor, and a new section entitled "Archival Excavation." Only the third novelty requires special comment. Sooner or later, anyone who works extensively with museum collections or archival data will stumble on a gem that, although of general interest to some degree, neither fits into its discoverer's current research nor warrants a full-scale publication of its own. In these circumstances, the act of discovery is essentially nullified, except as it provides arresting party conversation. The purpose of "Archival Excavation" is to provide material of this kind a second chance. Unlike papers appearing as "Articles," contributions in this new section will not undergo formal review. Instead, they will be evaluated by the editorial staff, no doubt with the assistance of readily available authorities. It is my hope that the papers, which should typically be fairly short, will achieve one or both of two goals: to provide basic data that would not otherwise be widely available, and to show, if possible in the context of a good story, how research in archaeology and related disciplines was conducted in the past. I want to emphasize, first, that *The Kiva* will still publish "articles" based on archival research, and second, that coverage is not limited to the archives of the Arizona State Museum. The inaugural paper, which relies on material from the Field Museum in Chicago and from the Tree-Ring Laboratory at the University of Arizona, illustrates the latter point.

ANNOUNCEMENT

The Ninth Annual Ethnobiology Conference will be held on March 20–22/23, 1986 at the University of New Mexico, Albuquerque. Registration is scheduled for Thursday p.m., paper sessions for Friday and Saturday, and field trips and workshops for Sunday. For further information, contact Castetter Laboratory for Ethnobotanical Studies, Department of Biology, University of New Mexico, Albuquerque, N.M. 87131 (505-277-3348).

THE KIVA, *Vol. 51, No. 1, 1985*

THE SHEEP AND GOAT CORRAL: A KEY STRUCTURE IN NAVAJO SITE ANALYSIS

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ABSTRACT

The recent growth of interest in Navajo archaeology suffers from the lack of an analytical foundation comparable to that which structures research on the prehistoric populations of the Southwest. Observations on the data potential of the ubiquitous sheep and goat corral are offered as a contribution to the effort to develop such a basis for Navajo archaeology. These corrals provide information on site function, site chronology, duration of site use, site abandonment and reuse, seasonality of site utilization, herd sizes, movements of residence groups, and economic behavior of the sites' inhabitants.

INTRODUCTION

Recent cultural resource management activities have dramatically increased the attention devoted to Navajo archaeological sites. Such sites are quite different from the prehistoric sites usually dealt with by Southwestern archaeologists. Major differences between Navajo and Anasazi behavior mean that the former cannot be archaeologically comprehended through application of the conceptual frame of reference that is used in the study of prehistoric Anasazi behavior. Unfortunately, intensive investigation of Navajo sites is too recent a phenomenon to have generated a conceptual and analytical background comparable to that developed for the Anasazi over nearly a century of research. The situation requires that attention be devoted to the development of an analytical foundation for the study of Navajo archaeology. Our purpose here is to contribute to this effort through the consideration of ethnographic, archaeological, and dendrochronological data bearing on the nature of Navajo sites and of the data recovered from such sites.

In order to illustrate the kinds of information inherent in Navajo archaeological sites, we focus on one type of structure: the sheep and goat corral. A structure built for the use of animals is a major source of information on human behavior because of the importance of animal husbandry, especially involving sheep and goats, in Navajo economy and society. Our data derive from archaeological analysis of hundreds of sites and from interviews with Navajo informants. While direct observation accounts for many of our statements, informants originated many of these ideas and verified others. Our data

SITE/STRUCTURE	ELEMENT FUNCTION						ASPECT			DATE*	
	Wall Post	Wall Log	Brush	Dead Tree	Stump	Freshly Cut	Reused	Dead Wood	NA or unknown		
ARIZ.D:7:322					X	X				1972rLGB	(C)
Corral	X						X			1917vv	
				X					X	1922GB	(I)
		X					X			1922vv	
				X					X	1922vv	
				X		X				1923G	(I)
				X					X	1924vv	
				X					X	1924vv	
				X		X				1926G	(I)
		X				X				1928G	(I)
				X		X				1929G	(I)
				X		X				1930G	(I)
				X		X				1934cLGB	(I)
		X				X				1937GB	(I)
		X				X				1937GB	(I)
		X				X				1938G	(I)
		X				X				1958GB	(I)
		X				X				1961LGB	(C)
			X			X				1961GB	(C)
ARIZ.D:7:228											
Corral		X						X		1909++GB	(?)
		X							X	1923G	(I)
		X						X		1938++GB	(?)
		X					X			1941vv	
		X							X	1942G	(I)
		X							X	1942GB	(?)
		X				X				1946G	(I)
		X							X	1946G	(I)
		X				X				1948+GB	(I)
		X				X				1948GB	(I)
				X					X	1952GB	(?)
				X					X	1954+GB	(I)
			X			X				1954+GB	(C)
				X					X	1954GB	(I)
			X			X				1954GB	(?)
			X			X				1959+rGB	(I)
				X					X	1960+GB	(?)
				X					X	1962rGB	(I)
ARIZ.D:7:279											
Corral		X						X		1760+vv	
(Structure 5)			X			X				1905G	(I)
			X			X				1917+G	(I)
		X				X				1919G	(I)
				X					X	1922vv	
Corral											
(Structure 2)			X				?			1910GB	(I)
		X				X				1922rLGB	(C)
					X	X				1923v	(I)
		X				X				1923rGB	(C)
			X			X				1923G	(C)
			X			X				1923rB	(C)

*Tree-ring date symbol notations are described in Robinson and others (1975:6): ++and vv denote noncutting dates; all others are cutting dates. (I), (C) and (?) indicate, respectively, incomplete, complete, and unknown terminal ring condition.

Vast quantities of wood are present in the interlocked or stacked log walls of sheep corrals. Informant statements and the analysis of the structural components of corrals indicate that corral wood comes from a variety of sources (Table 1). Because almost any piece of wood can be incorporated into a corral wall, dead trees and fragments of dead trees picked up from the ground are abundant in these structures. For the same reason, wooden elements salvaged from older structures—other corrals, hogans, and so forth—are often present. Freshly cut trees occur as wall elements, posts, entry components, and brush that is piled

around the exterior of the structure to impede airflow or provide shade. The large number of wooden elements in corral walls and the variety of sources from which this wood can originate require a carefully conceived sampling scheme to maximize the amount of dendrochronological information pertinent to particular research questions, to minimize the amount of information that is irrelevant to these considerations, and to reduce field collection time. Thus, sampling must take into account the questions that are to be asked of the data, the functions of the wooden corral elements, the physical attributes of the timbers, and the probable sources of these logs. Properly sampled, wood specimens from sheep corrals contribute to the resolution of a variety of problems crucial to the understanding of Navajo archaeological sites.

CORRAL DATING

Dendrochronological dating of corral construction is complicated by the high frequency in these structures of wood from dead trees and of reused elements salvaged from older structures (Table 1). Both types of wood yield dates that are earlier than the construction of the enclosure. Such dates from reused timbers may apply to dismantled precursors of an extant corral. Dating problems caused by the use of dead wood and salvaged timbers can be resolved in two ways. First, the sampling of a corral for tree-ring material can be focused on elements likely to have been cut fresh at the time of construction, a tactic that eliminates or reduces the number of dates from old wood. Second, dates that lie outside a cluster of several dates can be identified as anomalous with respect to corral construction.

Several attributes help identify dead wood logs and reused timbers. Differential weathering, which is unlikely to result from differences of position within corral walls, is a good criterion for distinguishing old from new timbers. More heavily weathered logs can be provisionally identified as either dead wood or reused elements. Similarly, timbers that are more rotted than others can be recognized as older elements. Dead wood components often are characterized by severe insect damage, by spirally twisted wood grain that is typical of aged trees, or by both these attributes. Evidence for the root crown (actual roots or the basal flare of trunk diameter just above the roots) is a sure indicator of a dead tree that either toppled of its own weight or was torn from the ground by the builders of the corral. Absence of tool marks also indicates a dead wood element, for such timbers are easily procured without benefit of axes. Reused elements often are indicated by modifications that reveal previous use of the logs for other purposes. For example, the shaping of logs (squaring or flattening) or the presence of hewn surfaces for the support or attachment of other elements indicates prior use of the logs in something other than a corral. When posts are reused, they often are inverted so that what once was the upper end of the element is embedded in the ground. The upper ends of such elements exhibit

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a decay pattern indicative of previous burial. Timbers with the attributes of old wood should not be sampled.

Elements that were freshly cut at the time of construction are distinguished by several attributes. Freshly cut trees generally are used to make elements that must be shaped for particular functions. This is so because it often is easier to hew a living tree to the proper shape than it is to work a piece of dead wood. Load-bearing elements commonly are fashioned from freshly cut trees because old wood lacks the strength to withstand such stresses. Freshly cut elements that are likely to produce valid dates for corral construction include gate posts, gates, and horizontal stringers along the tops of the enclosure walls. In fact, any corral element that obviously has been cut to fit a particular space or to fulfill a specific function is a good candidate for sampling.

The clustering of dates from structural contexts is the most powerful tool available for the evaluation of archaeological tree-ring dates (Dean 1978). Obviously, clusters exist only when a fairly large number of dates is available. For this reason, and because a few dates are likely to be anomalous (Dean 1978:228-229), at least ten freshly cut wall timbers should be sampled in each corral. For dating Navajo corrals, a cluster can be defined as a group of three or more dates that fall within an interval of zero to five years. Clusters can include cutting dates, noncutting dates, or both, although cutting dates are preferable because they record the actual years in which trees were felled for use. In addition to offsetting the inadequacies of noncutting dates, clustering specifies years in which groups of trees were cut, thereby strengthening the relevance of the dates to the construction of the features with which they are associated. Thus a cluster of dates from probable freshly cut corral wall elements usually indicates within one or two years the year in which the enclosure was erected. Cutting dates that fall outside a cluster can provisionally be identified as anomalous, and the timbers that yielded possibly anomalous dates can be checked for attributes that denote old wood or repair elements. For example, the 1906v date from the AZ-J-44-10 corral (Table 1) is identified as old wood on the basis of its relationship to the strong cluster of dates in the 1950s.

Living and dead trees associated with corrals commonly provide information on the construction date of the enclosure. Dates from the stumps or branch stubs of trees felled or trimmed during corral construction indicate the year in which the structure was built. Such elements are distinguished from those produced by earlier or later cutting events by their direct association with the original wall of the enclosure. Steven E. Sessions (personal communication) and Navajo informants indicate that trees located inside corrals commonly are killed by sheep and goat excreta within three to five years of corral construction. Dates from dead trees inside corrals tend to confirm this relationship, although a somewhat longer time span for tree death, zero to ten years, is indicated (Table

1). For example, of the two dead trees in the corral at AZ-J-44-10, one died two years and the other seven years after construction. This apparent discrepancy is explained by the tendency of trees growing in the higher areas of sloping corral floors to survive longer than their lower counterparts. Initial tree death, however, does tend to occur within five years of corral construction.

Other events in the histories of corrals can be dendrochronologically dated through judicious sampling. Repairs or modifications can be dated when freshly felled repair or remodeling elements can be identified and sampled. Although difficult to distinguish visually from original wall elements, repair logs frequently are indicated by tree-ring dates later than the date cluster that relates to the construction of the enclosure. The possible occurrence of repair elements is another reason for collecting at least ten samples from the walls of a corral. Elements used in corral modifications, such as size reductions or additions, are more easily identified in the field. Such elements should be sampled specifically to date the remodelling. For example, the 1972 dates from Arizona D:11:487 (Table 1) come from a wall that bisects a corral constructed in the late 1940s.

At fairly frequent, often annual, intervals, foliated branches cut from living trees are piled around the outside of corrals to impede airflow. Dates from such brush elements specify years in which the corrals were used. In some cases, brush representing different use episodes can be recognized in the field and sampled specifically to date these events. In other instances, such a distinction cannot be made, and separate use events are recognized only through the dating of these elements. Since every brush element must come from a living tree, each brush cutting date represents a separate use of a corral. Therefore, identifiable brush associated with a corral should be extensively sampled.

The corrals listed in Table 1 provide several examples of the ways in which tree-ring dates from various functional contexts can be used for the temporal placement of events in the histories of these structures. Initial use of the AZ-J-44-10 corral locus in 1949 is indicated by the dates from the wool bag rack, a wooden framework that supports the large burlap bags used for wool or mohair. The extant corral probably originated in 1953 with subsequent additions or repairs in 1957 and 1959. The corral at Arizona D:7:487(SIU) probably was built in 1948 or 1949 with freshly cut wood and material reused from structures built in the 1920s and 1930s. This structure was used intermittently into the 1960s and was extensively modified in 1972. Construction in the middle 1920s is indicated for the corral at Arizona D:7:322(SIU). The enclosure was refurbished, perhaps between intervals of abandonment, in 1937, 1938, and 1958 and used into the early 1960s. Construction around 1942 with major remodeling in 1946 and 1948 is indicated for the corral at Arizona

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