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The Effects of Grinding Stone Reuse on the Archaeological Record in the Eastern Great Basin

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ARCHAEOLOGISTS are aware that many factors change archaeological sites after they have been initially deposited. One kind of post-depositional phenomena that could change the material record is the scavenging and reuse of manos and metates from older sites by the later inhabitants of an area. If this has occurred, even on a limited basis, grinding tools may be disproportionately represented on older sites. In this paper I will argue (1) that the scavenging and reuse of grinding stones by hunter-gatherers should be expected on theoretical grounds under many circumstances and that this behavior has occurred in the Great Basin and elsewhere, and (2) that there is a statistically significant bias in the occurrence of grinding stones toward Late Prehistoric sites in the eastern Great Basin. I will then discuss the consequences of such a pattern for archaeological interpretation of site function.

REUSING GRINDING STONES: THEORETICAL EXPECTATIONS AND EMPIRICAL CASES

By identifying the conditions under which grinding stones should be reused, some predictions about the archaeological record can be made. On the most general level, grinding stones should be reused more often in mobile hunter-gatherer societies where the transportation of material culture is a limiting factor. Reuse can include the use of grinding stones from nearby, older sites or the caching of previously used grinding stones. Only the former behavior would significantly shift the distribution of grinding stones toward later sites unless these artifacts were incorporated into caches. On a more local level, less reuse, even in mobile societies, would be expected when suitable raw materials were locally abundant. However, even where raw material is abundant, the costs of making grinding stones probably plays a role in whether they were made when needed, or collected ready-to-use from nearby archaeological sites. Gifford (1940:116) noted that "over a month" was required to peck and grind what was probably a large trough metate. Experiments by students at the University of Utah show that pecking and grinding of a metate can take from less than an hour to over a hundred hours, depending on the size and material type used. Even mano construction can take several hours after the appropriate material is found (see Pastron 1974: 101). On the other hand, some grinding implements require very little preparation. However, for the purposes of this study, it is not necessary to argue for reuse in every case because the issue here concerns a shift in the *frequency* of grinding stones. On theoretical grounds, the reuse of grinding stones should occur when they were

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easier to obtain from nearby archaeological sites than by carrying in finished grinding stones, or by making new tools.

A survey of the ethnographic literature indicates that grinding stones were scavenged and reused. Isabel Kelly (1964) reports for the Kaiparowits band of Southern Paiute, "Metate, mano similar to Kaibab; one side of metate used. *When possible obtained from prehistoric site*" (Kelly 1964: 152, italics added). For the Kaibab band she reports, "The mano *invariably was picked up at an archaeological site*" (Kelly 1964: 37, italics added). Hough (1901: 294) writing on Apaches in northeastern Arizona states, "The absence of metates from the surface, coupled with the presence of broken manos, was remarked at Forestdale, and it was learned that the former were carried off by Indians who make use of them around their camps, *only working out a metate if an ancient one can not be secured*" (italics added). In a somewhat different situation, but one that illustrates the reuse of grinding stones, Lowie (1924) notes, "At Whiterocks, Utah, I saw three or four metates in my interpreter's house . . . . They had been *dug up in ploughing* and were used by the Ute women for grinding coffee" (Lowie 1924: 204, italics added).

Artifact scavenging and reuse is known in other areas as well. I refer to two cases as examples. Brumbach, Jarvenpa, and Buell (1983: 31-32, 47-48) document this behavior for many artifact types among the Chipewyan in Canada. In Australia, when Alyawara-speaking aborigines need to grind seeds, they routinely look for abandoned or cached tools in habitation sites rather than manufacture new ones (J. F. O'Connell, personal communication 1982).

It is also known that in some cases, metates and manos were cached (Wheat 1967: 36). While caching does not demonstrate that grinding stones were being picked up at archaeological sites, it shows that the costs of transporting grinding stones were of concern to Great Basin hunter-gatherers. Minimizing transportation costs would also be the motive behind reusing grinding stones. If this was the case, then when prehistoric grinding stones were closer to a gathering site than a cache, it is reasonable to expect that the former would be used before or along with the cache of grinding stones. This would bias the occurrence of grinding stones toward later sites and yield a distorted picture of grinding stone use at earlier sites where grinding stones may have been used, but are no longer present.

THE ARCHAEOLOGICAL DATA

The question addressed here is: Are there statistically significant differences in the frequency of grinding stones between Late Prehistoric and earlier archaeological sites in the eastern Great Basin? To address this question quantitatively and on a regional level, the University of Utah computerized site-record files (ARIS) were used to compare the occurrence of grinding stones between single-component Late Prehistoric sites and single-component Archaic sites in a large block of western Utah (Fig. 1). This area was chosen because several large archaeological survey projects, including the MX missile project (Janetski 1980), resulted in this area having the largest, most accurate, machine-readable data file for the region. Not only were many new sites added to existing files, but the infusion of funds enabled most of the information on previously recorded sites to be checked for accuracy and filtered prior to encoding. After this process, there were 1,976 recorded historic and prehistoric sites within the study area.

To address the above question, it was necessary to eliminate multi-component sites from the analysis. Also, criteria for determining the age of the sites had to be established. Late Prehistoric sites were identi-

fied by the presence of brownware ceramics or, more frequently, the presence of Desert Side-notched projectile points. Thus, the late group of sites dates to post ca. A.D. 1100 - 1200. Earlier sites were identified using Archaic projectile point types with the exception of Elko Corner-notched points which have too long a time span in the eastern Great Basin to be meaningful for this study (Holmer 1978). All Fremont sites were eliminated. For this study, only early vs. late hunter-gatherer periods are compared and the exclusion of the Fremont does not alter this comparison.

Table 1 shows that the presence of grinding stones is significantly biased toward Late Prehistoric sites, as defined here. The difference is significant at the 0.05 probability level.

DISCUSSION

This study shows that the reuse of grinding stones can bias the distribution of these tools toward later sites and shows that such a pattern exists in the archaeological record in western Utah. This does not mean that other factors have not affected the distribution of grinding stones, but suggests that where the reuse of grinding stones has occurred, a frequency shift in grinding stones would be present no matter what other factors were at work. For example, it may be possible that there was a shift in diet, or a change in settlement pattern during Late Prehistoric times. Even if there were several subsistence/settlement shifts, grinding stone reuse could still have occurred and would affect the observable material record. This not only affects how we interpret function at the earlier sites, but affects how we identify and interpret subsistence/settlement shifts.

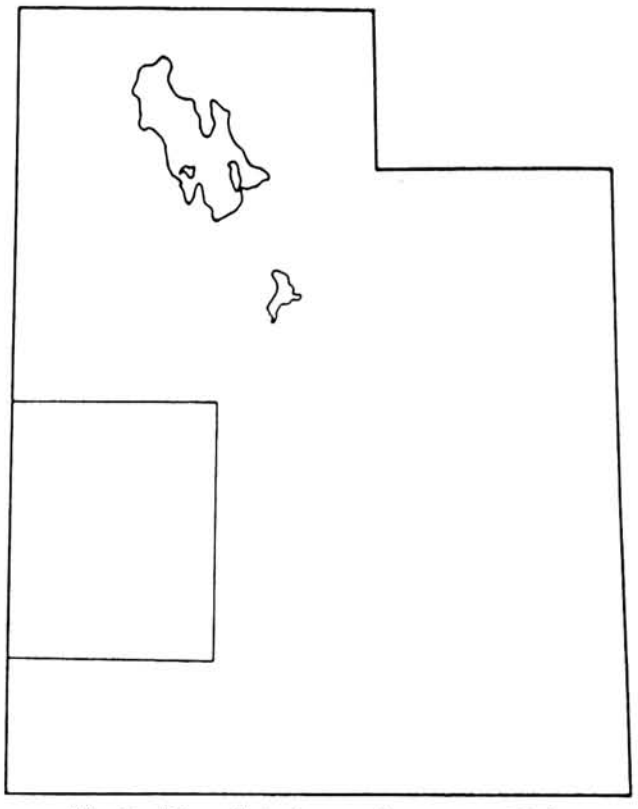

Fig. 1. Map of study area in western Utah.

The presence of a frequency shift in grinding stones toward later sites has serious implications for creating and using site-

Table 1

GRINDING STONE DISTRIBUTION FOR SINGLE-COMPONENT ARCHAIC AND LATE PREHISTORIC SITES IN STUDY AREA

	Total Sites	Grinding Stones Absent	Grinding Stones Present	Percent Present
Archaic	109	88	21	19
Late Prehistoric	60	40	20	33

Chi square = 4.17 with 1 degree of freedom

Significance = 0.042; the above distribution is significant at the 0.05 level.

function typologies. In short, many Archaic sites could be mislabeled as to their function where typologies use (1) site-specific criteria to ascribe function and; (2) the *absence* of ground stone to make *positive* statements about site function. Site-function typologies should be designed to evaluate sets of sites occurring in an area. Such a set should be seen as a system in terms of both occupational and post-depositional processes. In this way, the effects of the reuse of grinding stones (and other post-depositional phenomena such as the reuse of projectile points) would stand a better chance of being seen and accounted for.

Another issue revolves around the relationship between the use of positive and negative evidence in the context of site-specific versus regional levels of analysis. While it is true that *positive* site-specific evidence is desirable, it does not follow that *negative* site-specific evidence is equally useful. In part, this problem stems from using negative evidence on a site-specific level. Consider the hypothetical interpretation, "There are no grinding stones at this site, so it is probably a hunting camp." On a site-specific level alone, this is a dangerous interpretation. Further, this interpretation cannot then be placed on a "regional" scale by simply adding up all of the site-specific interpretations. Such a practice cannot even begin to account for post-depositional processes of which the reuse of grinding stones is only one example.

On another level, the problem is exacerbated by the site-specific orientation of many cultural resource management programs. The process by which archaeological significance is determined and avoidance/mitigation plans are developed is typically site-specific and hinders breaking out of this mold onto a truly regional level. To carry out a regional study, it is not enough to simply enumerate all of the sites with each treated separately with respect to function. It is necessary to consider the sites on a regional level from the outset as an occupational and post-depositional system. This way, some of the post-depositional occurrences pertinent to an area can begin to be recognized making negative (and positive) evidence more usable and our understanding of the past more realistic.

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