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### Exchange Items or Hunters' Tools? Another Look at Lanceolate Biface Caches in Central Oregon

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IN their article "The Pahoehoe Site: A Lanceolate Biface Cache in Central Oregon," Scott et al. (1986) reported the discovery of the Pahoehoe biface cache and noted the existence of several similar biface caches in central Oregon. These caches of lanceolate bifaces were found in sediments derived from Mazama pumice. This and other evidence was used to infer that these features considerably postdate the Mazama eruption around 7,000 years ago. The occurrence of bifaces that are "superficially similar" to Paleo-Indian projectile points in post-Mazama geological contexts was considered incongruous, requiring the need for an alternative explanation of their origin and function. Accordingly, it was proposed as a "working hypothesis" that these biface caches represent evidence of a prehistoric exchange system operating in central Oregon in Middle and Late Archaic times.

The conclusions reached by Scott et al. were, at least in part, a reaction to our earlier interpretation of lanceolate points and bifaces, some of which were found in a cache, at Lava Island Rockshelter in central Oregon (Minor and Toepel 1984). Excavated in 1981, this small rockshelter contained an assemblage of projectile points, other chipped stone tools, and lithic debitage indicating use as a hunting camp. On the basis of typological cross-dating, prehistoric occupation was estimated to have occurred during three temporal periods: Early, characterized by the lanceolate points; Intermediate, correlated with Elko points; and Late, indicated by Rosegate

points. The lanceolate points from Lava Island Rockshelter are broadly similar to specimens commonly found below Mazama pumice at Late Paleo-Indian and Early Archaic sites in the northern Intermontane West. Based on radiocarbon dates associated with generally similar lanceolate points found elsewhere in this region, a time range from 5,000 B.C. to 8,600 B.C. was suggested for the occurrence of the lanceolate points at Lava Island Rockshelter (Minor and Toepel 1984:34).

The age estimate for the lanceolate points at Lava Island Rockshelter, and the inference that their presence reflects cultural relations with late Paleo-Indian and Early Archaic peoples occupying the northern Intermontane West in pre-Mazama times (Minor and Toepel 1984:37-40), were questioned by Scott et al. Stratigraphic evidence, lithic technological analysis, XRF sourcing data, and obsidian hydration data were cited in support of the idea that these points are significantly younger than previously estimated. The determination by Scott et al. to come up with an alternative interpretation for the occurrence of lanceolate points and bifaces apparently stems, at least in part, from a basic mistrust of typological cross-dating in archaeology (e.g., Flenniken and Raymond 1986), an issue that has been addressed amply elsewhere (Thomas 1986). Accordingly, the following discussion will briefly review the four lines of evidence on which Scott et al. based their argument for a revised dating for lanceolate bifaces in central Oregon. A review of their proposal that the bifaces in these caches were intended trade items is made at the conclusion of this discussion.

#### STRATIGRAPHIC EVIDENCE

Since the Pahoehoe biface cache and the

other caches noted were found in mixed deposits of Mazama pumice, it is reasonable to conclude that these features postdate the Mazama eruption. However, the argument by Scott et al. (1986:16) that the provenience of the Pahoehoe cache and associated lithic workshop "atop or close to ground surface in the mixed Mazama tephra" suggests a recent introduction into the deposits is spurious. The eruption of Mount Mazama resulted in the sudden deposition of up to three meters of tephra in central Oregon. *All* subsequent human occupation occurred *atop* this deposit. Sediments derived from Mazama tephra are loose and friable, and are highly susceptible to movement (Davis and Scott 1986:105-112). The effect of this movement in terms of site formation processes has been well documented at the Inn of the Seventh Mountain lithic scatters located in the same general area as are lanceolate biface caches in central Oregon. At these sites, erosion and deposition have widely affected both the horizontal and vertical distribution of cultural materials within the Mazama ash-derived sediments. Considering these circumstances, it is not unusual that some relatively recent artifacts have become buried while relatively old artifacts are found near or on the ground surface. The relative position of cultural materials in the soils derived from Mazama pumice thus does not necessarily have any bearing on their antiquity (Minor et al. 1988:76-82).

### LITHIC TECHNOLOGY

The lanceolate points from Lava Island Rockshelter were described as "Haskett-like" in the original publication because these specimens correspond more closely in size and shape to the Haskett Type 1 point than to any other named lanceolate point style in the northern Intermontane West. Scott et al. (1986:15) noted the fact that the Lava Island Rockshelter points "exhibit transverse parallel

rather than the collateral flaking typical of the Haskett type" as support for the idea that the lanceolate points from this site are likely of more recent origin. It should be pointed out, however, that the modifier "like" was applied in describing the Lava Island Rockshelter specimens as an acknowledgement that differences are apparent between these points and the Haskett type (Minor and Toepel 1984:22-23). Furthermore, the difference observed in the flaking patterns does not necessarily bear on the question of the age of the lanceolate points in central Oregon, since a variety of flaking patterns are observed on late Paleo-Indian and Early Archaic lanceolate points in the northern Intermontane West (Bryan 1980).

The lithic technology experiments "undertaken to determine the lithic reduction system used to manufacture the Pahoehoe cache" are interesting, but as is the case in most replication studies the reconstruction of the stages involved is highly subjective (Thomas 1986:621). It is asserted that "all stages of the Pahoehoe biface reduction sequence found at the site are represented in the lithic debitage resulting from the replication experiment." A more convincing argument of proof that the lithic reduction system was actually replicated would require, at a minimum, some comparison of the relative proportions of the various flake types in the two samples. In relation to the larger discussion of the age and function of lanceolate bifaces in central Oregon, the lithic technology experiments are largely beside the point (so to speak).

Scott et al. (1986:13-14, 17) assert that a biface core technology was used to produce the Pahoehoe cache, and that this technology was a dominant lithic reduction strategy associated with Archaic sites in the northern and western Great Basin. A study by Flenniken and Raymond (1986) is cited to the effect that side- and corner-notched dart points prevalent

during the Archaic period (which they consider to date from ca. 6,800 to 2,000 B.P.) were manufactured using a bifacial core reduction technology. It is noteworthy, however, that in the study cited, Elko Corner-notched points were actually replicated using flakes obtained from nodules rather than by means of a biface core technology (Flenniken and Raymond 1986:604).

The assertion by Scott et al. that a biface core technology was used in making the lanceolate bifaces seems to be based largely on intuition. Considering their size (the 33 specimens from Lava Island Rockshelter range from 47 to 105 cm. in length, with a median length of 67 cm.), it seems to us at least as likely that the lanceolate bifaces under discussion could have been made on flakes obtained from nodules rather than from biface cores. In any event, a biface core technology was simply one method employed by prehistoric peoples to make projectile points. The fact that lanceolate "Paleo-Indian" points, as well as late prehistoric arrow points, can both be made from biface cores means that the occurrence of this technology is actually of little diagnostic value in terms of either function or age.

#### X-RAY FLUORESCENCE SOURCING

Scott et al. (1986:15-16) assert that the "obsidian XRF sourcing data tentatively correlating the bifaces with prehistorically used Holocene-age obsidian quarries in the Newberry Caldera (dated to 6,800 and 1,600 B.P.), suggest that the Lava Island Rockshelter cache is of more recent origin and likely falls within the same time range as the Pahoehoe cache." Elsewhere it is stated that the "sample from Lava Island Rockshelter was sourced to the Newberry Caldera indicating it apparently post-dates 6,000 B.P., the age of the oldest prehistorically used obsidian sources in the caldera proper" (Scott et al. 1986:16). There are two problems with the

conclusions drawn in these statements.

First, the XRF data presented in their Table 2 indicate that the Lava Island Rockshelter specimens were sourced to Newberry or McKay Butte. McKay Butte is located on the western flank of Newberry Volcano, and a K-Ar age of 0.58 m.y.  $\pm$  0.10 m.y. (580,000 years B.P.) was reported for this obsidian flow (McKee et al. 1976:38). As Scott et al. (1986:9) themselves admitted, "the trace element profiles of many local central Oregon obsidians, especially those in the Newberry Caldera, overlap (Hughes 1986)." This situation thus suggests that a considerable degree of caution is warranted in accepting XRF results attributing obsidian to any particular central Oregon source.

Second, the study cited by Scott et al. in support of the age estimates for the Newberry Caldera indicates that obsidian flows older than 6,800 B.P. exist at this caldera (MacLeod et al. 1981:89). That Newberry was a source of obsidian in the period before 6,800 B.P. has been demonstrated by the results of an earlier XRF analysis of obsidian artifacts recovered from below Mazama ash at Fort Rock and the Connley caves which matched at least four specimens with Newberry Caldera (Sappington and Toepel 1981). Much of the geology of Newberry Caldera, almost certainly including undocumented obsidian flows, is buried beneath Mazama ash (MacLeod et al. 1981). It is thus readily apparent that attribution to the Newberry source is not necessarily chronologically significant. Obsidian from Newberry Caldera will not be useful as a chronological indicator until each flow is chemically distinguishable and the age of each flow is established. Until then, it is unwise to use simple attribution to the Newberry source in estimating the age of obsidian artifacts.

#### OBSIDIAN HYDRATION

Scott et al. (1986:16) reported obsidian hydration measurements ranging from 1.2 to

2.5 microns and concluded that "the thin hydration rinds on all cache samples tentatively do support the stratigraphic evidence suggesting the Pahoehoe, Lava Island, and China Hat sites substantially post-date 6,800 B.P." No empirical evidence in support of this conclusion was presented, however. As these authors themselves pointed out, source-specific and site-specific hydration rates are not available for central Oregon. In view of this situation, even the fact that similar rind measurements were reported from three different localities is not necessarily significant, as specimens from different obsidian sources, recovered from contexts affected by varying temperatures (rockshelter deposits versus surface and near-surface provenience at open sites), cannot be expected to hydrate at the same rate. (For a concise review of the problems affecting the accuracy of obsidian hydration analysis, see Michels and Tsong [1980].) In fact, previous hydration studies suggest that obsidian from Newberry Caldera may be especially subject to variable hydration rates, as a result of both hydrothermal activity and the burial of earlier flows by subsequent eruptions (Friedman et al. 1972; Higgins and Waters 1972). In view of the above considerations, the hydration rind measurements presented by Scott et al. cannot be relied upon as a means of estimating the age of the lanceolate projectile points and bifaces in central Oregon.

#### EVALUATION OF THE PREHISTORIC EXCHANGE SYSTEM HYPOTHESIS

Instead of viewing the lanceolate biface caches in central Oregon as relating to late Paleo-Indian or Early Archaic (pre-Mazama) hunting cultures as was done in the report on Lava Island Rockshelter (Minor and Toepel 1984:37-41), Scott et al. (1986:20) concluded that these features "may be explained most logically within the context of a prehistoric

exchange system" that is posited to have been "contemporaneous with the production of Archaic dart points, or possibly, Late Period arrow points." Ethnographic references to use of obsidian as an item of exchange in northern California, XRF studies indicating some movement of obsidian from southern Oregon, and "lithic technological data" are all cited in support of this idea. However, when viewed in terms of the regional prehistoric context, the exchange system hypothesis is inadequate and inappropriate as an explanation for the occurrence of lanceolate biface caches in central Oregon for a number of reasons.

A basic prerequisite in any hypothesis proposing prehistoric interregional economic exchange is some evidence that items actually have been exchanged (Hodder 1980). In fact, however, at present there is no archaeological evidence from central Oregon to support any aspect of an hypothesized exchange system of the scale posited by Scott et al. It may be taken as a given that exotic obsidians from distant locations were preferred material for ceremonial artifacts in northern California; it may also be taken as a given that obsidian from various localities occurs at considerable distances from the sources as a result of incidental trading activities (Hughes 1978, 1985; Hughes and Bennyhoff 1986). However, because Newberry Caldera has not generally been included in the obsidian sourcing studies reported to date, the nonlocal occurrence of obsidian from this source has not yet been documented. Until more is known about its actual distribution and use outside central Oregon, the idea that prehistoric peoples used obsidian from Newberry Caldera, specifically in the form of lanceolate bifaces, in a controlled interregional exchange system is highly presumptuous.

The exchange system hypothesis also fails to supply a destination for the lanceolate



bifaces from the central Oregon caches. These lanceolate bifaces are distinctive artifacts and, although points of general lanceolate form have been found elsewhere, few examples closely resembling the central Oregon specimens have been reported in the assemblages from adjacent areas so far subjected to XRF analysis. Scott et al. do not offer even a single example of a locality outside the region where similar artifacts sourced to central Oregon have been discovered. There is thus an absence of evidence that these distinctive artifacts were ever traded outside the local region.

The suggestion that prehistoric peoples in central Oregon "may have used obsidian trade to offset food and material resource shortages" in a volcanically devastated environment (Scott et al. 1986:18) is not supported by Grayson's (1979) study of the effects of volcanism on prehistoric populations in this region. Analysis of the small mammal and bird remains from the Connley Caves in the Fort Rock Basin indicated that a reduction in the amount of standing water near the caves and a corresponding shift from a relatively mesic local flora dominated by herbaceous vegetation to a relatively xeric one dominated by shrubby vegetation occurred after the eruption of Mount Mazama around 7000 B.P. This shift could not be directly related to the ash fall, however, and in fact coincided with similar trends toward less effective moisture that occurred more or less throughout the Great Basin at that time. Accordingly, Grayson (1979:452-453) concluded that the eruption of Mount Mazama had little effect on the vertebrate fauna of central Oregon. It can thus be inferred that there was a similar lack of effect on food and material resources exploited by local prehistoric peoples.

Although Scott et al. admitted that the use to which the lanceolate bifaces were put after they were traded remains an open question, the intended possibilities they (1986:17-18)

suggested are unsatisfactory. The idea that these artifacts might have been used strictly as ceremonial items or as grave goods is contradicted by the hafting preparation found on several of the specimens from Lava Island Rockshelter (discussed further below). The suggestion that the lanceolate bifaces might have been further modified into functional tools (e.g., projectile points) is contradicted by their own admission that these artifacts are unsuitable for reduction into dart points "because preforms for such items are triangular, rather than slender and lanceolate-shaped" (Scott et al. 1986:17). Presumably, these lanceolate bifaces would have been even more unsuitable for manufacture into smaller arrow points. Furthermore, the conclusion that lanceolate bifaces might have been contemporaneous with Late Period arrow points (Scott et al. 1986:20) is contradicted by their own explanation for the abandonment of the prehistoric exchange network—that a change in obsidian use associated with the transition from larger dart points to smaller arrow points resulted in a decreased demand for this raw material (Scott et al. 1986:19).

The lithic technological data cited (Scott et al. 1986:18-19) are also unconvincing as support for the exchange system hypothesis. The fact that these bifaces are "uniformly the same," were "produced expediently and economically," and "were produced and stored in isolated areas" argues at least as strongly for their use as projectile point preforms by early hunters as it does for their use in a prehistoric exchange system. In particular, the highly subjective assessment that their "production emphasized a 'finished' appearance rather than functional utility" is contradicted by the evidence from Lava Island Rockshelter.

While most of the lanceolate bifaces from Lava Island Rockshelter were recovered by relic collectors from a cache, others were found apart from the cache vicinity, suggesting that they were actively used by the inhabitants

of the rockshelter. As described during an inspection of the Lava Island Rockshelter collection by Flenniken himself, a sequence of late manufacturing stages ranging from preforms to points exhibiting evidence of hafting in the form of basal-lateral grinding is represented among these specimens (Fig. 1). Points bearing evidence of hafting were found among the cache specimens as well as elsewhere in the rockshelter. The frequency and nature of the lithic debitage recovered—more than 8,000 flakes, 86% of which are less than 10 mm. in size—indicate that finishing of bifaces into projectile points was a major site activity.

The logical conclusion to be drawn from these facts is that the lanceolate bifaces and points found at Lava Island Rockshelter were finished and used at that site. Additional support for this idea is found in the horizontal distribution of the various projectile point styles in the rockshelter, with lanceolate points found largely in the south half and other point styles found largely in the north half (Minor and Toepel 1984:29, Fig. 18). This distribution strongly suggests that the lanceolate points represent a separate occupation at Lava Island Rockshelter. Based on the regional projectile point sequence, it was inferred that the lanceolate point occupation was earlier than the dart and arrow point occupations. This inference has received further support from the results of subsequent investigations for the nearby Inn of the Seventh Mountain project. Excavations at 12 lithic scatters, all of which are situated in reworked Mazama ash deposits indicating occupation after ca. 7,000 B.P., produced only projectile points similar to those from the dart and arrow point occupations at Lava Island Rockshelter. Not one lanceolate projectile point or biface comparable to the specimens from this rockshelter and the other central Oregon caches was found at any of the local-

ities in this post-Mazama site complex (Minor et al. 1988).

#### CONCLUSION: LANCEOLATE BIFACES AS EARLY HUNTERS' TOOLS

The "working hypothesis" of Scott et al. that the Pahoehoe, Lava Island Rockshelter, and other lanceolate biface caches in central Oregon were associated with a Middle and Late Archaic exchange network does not stand up to critical examination. The idea that these artifacts *substantially* postdate the Mazama ash fall is based on unsupportable interpretations of regional stratigraphy, obsidian hydration and XRF sourcing data, and lithic technology. No evidence is presented to indicate that the artifacts in the central Oregon biface caches reflect anything other than local use of local obsidian by early prehistoric peoples. Until such evidence is found, the idea that these lanceolate biface caches were somehow related to a prehistoric exchange system amounts to little more than idle speculation.

While distant peoples undoubtedly procured obsidian from sources in central Oregon, it is likely that this activity was largely restricted to informal trade between individual hunters or small hunting groups during most of the prehistoric past. Certainly, there currently is no evidence that an exchange system on the scale envisioned by Scott et al. existed in this area during the time periods they suggested.

In contrast to the relatively complex set of assumptions on which the prehistoric exchange system hypothesis is based, the distinctive artifacts found in the biface caches are more parsimoniously viewed simply as preforms for the lanceolate projectile points used by early (both pre- and post-Mazama) peoples in central Oregon. Although this interpretation may not be as exciting, it more readily answers many of the questions about the

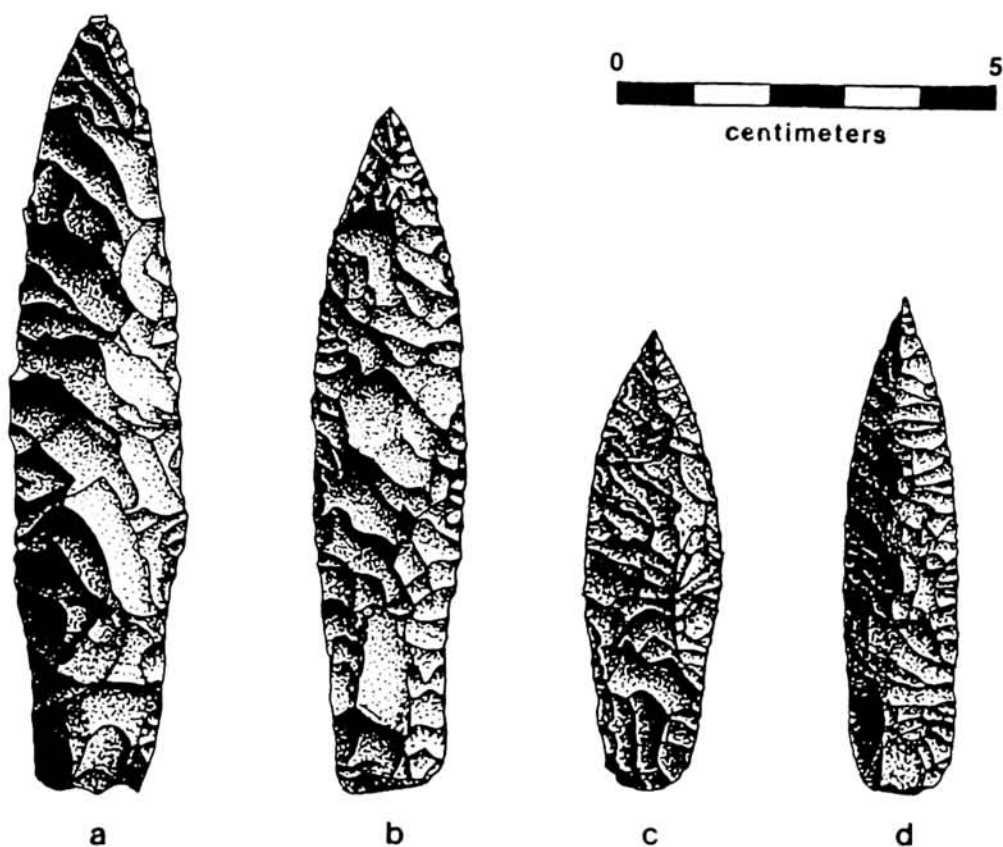


Fig. 1. Sequence of manufacturing stages represented among the lanceolate bifaces from Lava Island Rockshelter: a, preform; b, marginally retouched; c, extensively retouched; d, suitable for hafting (from Minor and Toepel 1984:21, Fig. 15).

lanceolate biface caches troubling Scott et al. (1986:17). While central Oregon contains a number of obsidian sources, a need would still exist for wide-ranging prehistoric hunters to cache preforms in strategic locations at some distance from these sources. When viewed from the perspective of game migration patterns, the isolated locations of the lanceolate biface caches in the Cascade foothills are exactly where one would expect hunters' caches to be found (Minor et al. 1988:85-88). The frequency with which lanceolate biface caches are being discovered, as well as their abandonment in antiquity, can be seen as a reflection of their relative cheapness, both in terms of raw material (which is abundant) and

production, which was accomplished with relatively little effort (Scott et al. 1986:13).

A review of early sites in the northern Intermontane West presented in our publication on Lava Island Rockshelter documents that lanceolate points were made almost exclusively before the time of the Mazama ash fall around 7,000 B.P. (Minor and Toepel 1984:37-41). The regional archaeological record indicates that triangular dart points of the Northern Side-notched and Elko styles made their first appearance shortly before this geologic event, and afterwards gradually replaced lanceolate points as the predominant style. The transition from lanceolate points to triangular dart points has been documented



locally in central Oregon in the distribution of point styles in Fort Rock Cave and the Connelly Caves (Bedwell 1970:Appendices V, VI).

Although the lanceolate projectile points from Lava Island Rockshelter and the lanceolate biface caches found at other localities in central Oregon have their *primary* cultural affiliation with pre-Mazama cultures of the northern Intermontane West, the continuation of these distinctive artifacts into post-Mazama times is fully consistent with the regional archaeological record. Within this context, the lanceolate biface caches reported by Scott et al. (1986) are more easily interpreted as preforms for lanceolate projectile points, reflecting the persistence of a pre-Mazama hunting technology into post-Mazama times.

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## Reply to Minor and Toepel: A View from Outside Lava Island Rockshelter

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WE appreciate the opportunity to respond to Minor and Toepel's remarks concerning our article describing the Pahoehoe biface cache from central Oregon (Scott et al. 1986). As we understand their criticisms, they can be broken down into four issues: (1) our estimated age for the Pahoehoe cache; (2) their estimated age for the "early" habitation of Lava Island Rockshelter, as evidenced by a small lanceolate biface cache; (3) the antiquity of lanceolate biface caches in this region; and (4) the function of the Pahoehoe and related caches. Each is addressed below.

### AGE OF THE PAHOEHOE CACHE

An absolute age for the Pahoehoe cache could not be established, but several independent analyses provided data that together suggested to us that the Pahoehoe lanceolate projectile points date to a period after the eruption of Mt. Mazama at approximately 6,800 B.P. The evidence supporting this interpretation is discussed in our original article; only concerns raised by Minor and Toepel are included here.

### Stratigraphy

Minor and Toepel dismiss our use of stratigraphic evidence (depth below surface) from the Pahoehoe site as if the problem of site bioturbation in Mazama-derived sediments was entirely resolved, and cite their investigations at the Inn of the Seventh Mountain lithic scatters as the authoritative work. However, site transformation processes

