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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 Pahoehe 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 Pahoehe 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 Pahoehe and related caches. Each is addressed below.

AGE OF THE PAHOEHOE CACHE

An absolute age for the Pahoehe cache could not be established, but several independent analyses provided data that together suggested to us that the Pahoehe 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 Pahoehe 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



in the ashy soils of central Oregon are far from understood, and in this regard, the Inn of the Seventh Mountain sites were badly disturbed by historic railroad logging (Davis 1983:3) and are not typical of all central Oregon sites. Other local sites show better stratigraphic integrity with arrow points located near ground surface and dart points clustered at greater depths (Ice 1962; Davis and Scott 1984; Scott 1985; McFarland 1989). Obviously, following the eruption of Mt. Mazama, all prehistoric habitation occurred atop its ashy deposit. Our own observations (cf. Davis and Scott 1984, 1986; Scott 1985) are that, over time artifacts and debitage are covered by alluvial and colluvial deposition and primarily tend to move downward (rather than upward) through this deposit via root development and collapse, krotovina, frost heaving, and snow compaction. Thus, we maintain that under certain circumstances depth below surface does have chronometric value.

The propensity for known biface caches, including those from the Pahoehoe site and Lava Island Rockshelter, to occur at shallow depths in Mazama-derived sediments was one of several patterns that emerged from our Pahoehoe site study. We did not disregard it, as Minor and Toepel are now encouraging, since this seemed to be more than a fortuitous pattern of artifact provenience in Mazama-derived sediments. Whether our interpretations are correct or not will require further site-specific research rather than the use of sweeping generalizations based on very limited data.

Obsidian Hydration and X-Ray Fluorescence Sourcing Data

Another intriguing pattern that emerged from the Pahoehoe study was the thin hydration rinds on all of the lanceolate bifaces in the samples submitted from the Pahoehoe,

Lava Island, and China Hat caches. In our original article we discussed many of the well-known problems associated with obsidian hydration dating (Scott et al. 1986:16). However, we believed this pattern also was more than fortuitous and suggested it was indicative of a relatively recent age for the cache assemblages when compared with hydration chronologies from adjacent regions, most of which also lack source- or site-specific hydration rates or both (e.g., Layton 1972; Aikens and Minor 1978).

We also recognize that the obsidian X-ray fluorescence (XRF) source data for the Pahoehoe and other caches could be interpreted to indicate either a pre- or post-Mazama age given the current status of obsidian XRF research in the Newberry Crater and throughout the region in general. However, we find it telling that Minor and Toepel fail to admit both in their Lava Island report and in their critique of our article that, most of the major obsidian flows in Newberry Crater are, in fact, Holocene in age. In light of the stratigraphic and hydration evidence, it seemed to us that if the cache pieces were even tentatively correlated to Newberry Crater obsidian sources, we were obligated to mention the possibility that they were produced from one of the massive Holocene-aged flows.

Therefore, we believe the evidence derived from these various analyses is substantial enough to suggest a post-Mazama age for the Pahoehoe cache site.

Lithic Technology

Morphological and technological attributes of the Pahoehoe cache are unlike any known biface or projectile point type from this region. We were convinced that calling the assemblage "Haskett-like" or another paleo-Indian equivalent would leave little foundation for meaningful comparisons. In fact, the few documented pre-Mazama sites in the upper

Deschutes basin contain small, thin lanceolates that are morphologically dissimilar to the Pahoehoe and other known lanceolate caches (Cressman 1948; Jenkins 1985).

Reconstruction of the Pahoehoe lithic reduction sequence provided insight into the possible age of the Pahoehoe biface assemblage. The lithic technological evidence, found both in the debitage associated with the Pahoehoe bifaces, and on the bifaces themselves, supports conclusively that the flake blanks used to produce the bifaces were detached from a biface core (Scott et al. 1986: 10). The biface core technology is widely documented in the Great Basin and most likely was employed throughout much of the Archaic period in this region (cf. Elston and Zeier 1984; Scott 1985; Flenniken and Ozburn 1988a; Kelly 1988). We therefore concluded that the reduction technology characteristic of the Pahoehoe cache belonged to this broad time period.

Minor and Toepel question this conclusion by criticizing another replication experiment conducted by one of us (JJF; see Flenniken and Raymond 1986). However, this is a moot point because the purpose of that experiment was to simulate prehistoric projectile point breakage. It was not a replication experiment concerning an entire flaked stone reduction sequence.

AGE OF LANCEOLATE BIFACES FROM LAVA ISLAND ROCKSHELTER

Minor and Toepel's critique of the Pahoehoe cache study appears to be offered largely in defense of their interpretation of the "early" component at Lava Island. The rockshelter yielded a small cache of "Haskett-like" lanceolate bifaces that Minor and Toepel (1984) used to infer that the site was first inhabited some 8,000 to 10,000 years ago. They then constructed a model that linked the "early occupation" of the shelter to paleo-Indian hunting cultures adapted to the sage-

brush steppe of the Snake River Plain and Intermontane West. They now suggest that the "persistence" of this pre-Mazama, hunting-focused lifeway and technology accounts for the Lava Island Rockshelter, Pahoehoe, and other related caches. It is worth briefly examining the evidence from Lava Island Rockshelter since, in our opinion, it was ignored by Minor and Toepel in the same way they now argue we should treat the data from the Pahoehoe site.

Lava Island Rockshelter is a small overhang containing shallow deposits composed of colluvium (Mt. Mazama-derived sediments) from the terrace above the shelter. The shelter yielded lanceolate bifaces, broad-necked ("dart") points, and narrow-necked ("arrow") points *in situ*. Vertical overlap existed among the three artifact forms and in some areas of the shelter dart and arrow points occurred at lower levels than the "early lanceolate bifaces" (Minor and Toepel 1984: 18; Table 5). The three radiocarbon dates from the shelter all post-date 500 B.C. and, in each instance, the charcoal used in dating was obtained from depths below the recovered lanceolate bifaces (see Minor and Toepel 1984:35-36).

Minor and Toepel (1984:17) acknowledged the ambiguities presented by the projectile point distributions and the late radiocarbon dates. However, they dismissed this conflicting information by simply stating that the "site's cultural deposit was thoroughly mixed" (although they now argue that the horizontal stratigraphy was intact) and that "forest fire contamination" likely accounted for the late dates (Minor and Toepel 1984:17). But, by their own admittance (1984:17), this stratigraphic mixing was not recognized until after they received the radiocarbon dates. The agencies and mechanics of this extensive mixing in a small, protected shelter are not explained or documented in any significant detail in their report. Thus, despite consider-

able evidence to the contrary, Minor and Toepel (1984) believed that their projectile point typology was "right" while the stratigraphic, radiocarbon, and obsidian XRF source data were suspect.

Minor and Toepel ignored the above evidence because they were firmly convinced (apparently before, during, and after the excavations) that the Lava Island Rockshelter bifacial artifacts were related to the "Haskett Type I" point type of the Snake River Plain and thus were very ancient. They stressed that there were "apparent differences" and added the modifier Haskett "-like," but then proceeded to discuss the Lava Island assemblage as though it belonged to the Snake River point type. They then built the argument that because the bifaces were "Haskett-like" (in size, shape, and raw material type), they embodied all the cultural ramifications including a suspected age of approximately 8,000 to 10,000 years.

One "apparent difference" noted by Minor and Toepel in the Lava Island assemblage is that the bifaces are transverse parallel pressure-flaked whereas Haskett points exhibit collateral pressure flaking. They (preceding paper) dismiss the importance of this difference by stating that flaking patterns do not necessarily bear on the question of age. Crabtree and Butler (1964:39), on the other hand, were very concerned with the Haskett flaking pattern and offered a detailed discussion about how these points were produced.

Morphological differences between Haskett points as defined by Butler (1964, 1965a, 1965b, 1965c, 1967) and the Lava Island bifaces include the following. The widest location on Haskett points is near the tip of the specimen but on the Lava Island Rockshelter artifacts it is in the middle of the specimen. The basal section of Haskett points accounts for nearly 60% of the point, whereas on the Lava Island bifaces the basal area ac-

counts for only 10% to 30% of the biface. Also, the comparative analysis conducted by Minor and Toepel (1982, 1984) was completed on finished Haskett points described by Butler (cf. 1964, 1965a, 1967) from the Snake River Plain of southern Idaho and on 33 unfinished Lava Island bifaces found in the Deschutes River basin of central Oregon.

Thus, although the Lava Island bifaces differ from the Haskett points originally defined by Butler in shape, design, and technology, Minor and Toepel continue to maintain that the bifaces from the rockshelter are "Haskett-like" and thus, are 8,000 to 10,000 years old. They state that we have a basic "mistrust of morphological tool typologies." They misunderstand us. We are not "mistrustful" of artifact typologies; we are mistrustful only of their abuses when projectile points are forced to fit preconceived notions of type, age, and cultural affiliation.

Minor and Toepel further argue that not one example exists demonstrating that lanceolate bifaces occur in sites containing later Archaic materials. However, the best example of this phenomenon may be at Lava Island Rockshelter. Certainly, no hard evidence exists that indicates the bifaces were left by ancient "Haskett-like" hunters. Minor and Toepel criticize our article largely on the strength of their interpretation of the "early" habitation of Lava Island Rockshelter which, in our opinion, is highly suspect.

AGE OF LANCEOLATE BIFACE CACHES

A growing body of data amply demonstrates that chipped stone tool forms manufactured into a lanceolate shape do not necessarily have chronometric value in this region or elsewhere (cf. Connolly and Baxter 1986:129; Daugherty et al. 1987). Lanceolate tool forms do commonly occur in early levels of rockshelters. But examples of this tool form can also be found throughout all time periods in the

Great Basin and elsewhere in the American West, though they are frequently classified as "preforms," "knives," and "blades" (Scott et al. 1986:17).

FUNCTION OF THE CACHES

We agree that our exchange system hypothesis is speculative and acknowledged this in our article by characterizing the idea as a "working hypothesis." However, in view of Minor and Toepel's critique, we hope we have adequately demonstrated the many problems associated with their explanation for the origin and function of the caches based on their work at Lava Island Rockshelter. Their ideas are not only speculative but also suffer from their dismissal of potentially relevant data. Given our present understanding of Deschutes River basin prehistory, there is no compelling reason to regard either hypothesis as the final word on the subject.

One intriguing question concerning the Pahoehoe and other caches is why these large collections of lanceolate bifaces (30 to over 2,000 individual pieces) were amassed at various locations in the Deschutes River basin. We found no satisfying explanation for the expenditure of such effort in the production and storage of these bifaces except that they were surplus artifacts intended for trade. Minor and Toepel argue subjectively that the caches were hunter's tool stores located adjacent to major game trails. Yet they do not cite a single example of similar-sized prehistoric tool caches from this region or elsewhere in the American West. This is not surprising because, in our review of the literature, we found few comparative examples, even in regions where archaeological hunting complexes are solidly documented (e.g., Frison 1978). As we stated in our original article, throughout North America, large prehistoric chipped stone caches usually accompany human burials. We would happily entertain alternative explanations if comparative examples and

citations were provided.

The study of prehistoric trade and exchange is in its infancy in central Oregon. Reliable obsidian XRF sourcing studies began only a few years ago--with earlier efforts in this region (e.g., Sappington and Toepel 1981) being called into question by Hughes (1984:7-8). Recently, obsidian from central Oregon has been found in adjacent regions and, in one instance, as a finely-made obsidian biface (Nilsson 1989:60). However, to our knowledge, no lanceolate bifaces similar to the cache pieces have been made of central Oregon obsidian. But as XRF studies continue, and specimens found outside the region are compared with central Oregon sources, interesting patterns likely will emerge and trade networks could potentially be identified.

Minor and Toepel raise other points in an effort to discredit our exchange system hypothesis. These ideas are welcome and necessary. But their penchant for making broad generalizations instead of building specific arguments based on local data does little to further our knowledge of central Oregon prehistory. For example, they state that it is unlikely that Mt. Mazama caused enough environmental hardship to trigger the development of obsidian exchange systems. However, it was more than simply the explosion of Mt. Mazama that created the "central Oregon pumice zone" (Volland 1982). Numerous local eruptions of Newberry Crater, Lava Butte, and a number of other small cinder cones radically changed the character of the land. Several local studies indicate that these eruptions were detrimental to the vegetational landscape (cf. Scott 1985:3-4) and, presumably, to human livelihood. Other "point/counter-points" could be raised, but clearly we are working with minimal data and are merely generating intriguing ideas that merit further investigation.

Minor and Toepel's critique bears upon an issue of broader significance: how are archae-

ologists to learn about prehistoric trade and exchange, an important feature of American Indian life in this region (Steward 1938:44), if we continue to interpret all sites as "hunting camps," even when the evidence seemingly suggests the contrary? We do not question the existence of a comparatively simple nomadic prehistoric lifeway in this region. But this lifeway undoubtedly was more dynamic and perhaps less simple than we now think. The details that gave rise to prehistoric exchange systems and cultural interchange in this region currently are poorly documented and understood and will likely remain so as long as archaeologists dogmatically cling to out-dated methods and approaches to interpreting the prehistoric record of central Oregon.

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Further Comments on Pinto Points and their Dating

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VOLUME 9, No. 2, of *Journal of California and Great Basin Anthropology* included two lengthy articles intended to clarify the nature and dating of so-called Pinto points (Jenkins 1987; Vaughan and Warren 1987). These discussions were laudable attempts to define a widespread point type in the Great Basin and to provide a dating for it. They grew out of the reality of Great Basin archaeology, which has few sites with any depth or undisturbed stratigraphy, and except for dry caves consists largely of lithic collections with few distinctive artifacts other than projectile points. The result is that the archaeology of this region is