EARLY ARCHAIC SQUARE-STEM DART POINTS FROM SOUTHEASTERN UTAH

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The third and final season of excavations at Old Man Cave in southeastern Utah (Geib and Davidson 1994) resulted in the unanticipated recovery of square-stem dart points in association with open-twined sandals from early Archaic deposits. These points are reminiscent of Gypsum or Gatecliff Contracting Stem points, which are securely dated to the late Archaic for both the Colorado Plateau and Great Basin, sometime after about 3000 cal. B.C. (see Holmer 1978, 1986; Tipps [1995:52] proposes a beginning date of about 3500 cal. B.C.). The points from Old Man Cave lack the tapered stem of Gypsum points and are thus morphologically distinctive. Nevertheless, had they been found in other circumstances, I likely would have assumed that they were late Archaic in age, characterizing them as some
sort of Gypsum variant. Indeed, the Old Man Cave specimens are virtually indistinguishable from some of the Gatecliff Contracting Stem points from Hidden Cave (see comparisons below). Most significantly, the stemmed specimens from Old Man Cave retain evidence of hafting pitch identical to pitch remnants seen on the stems of Gypsum/Gatecliff points from cave sites (e.g., Holmer 1980a:Fig. 17i, m, n). The traces of mastic indicate that the Old Man Cave specimens, like Gypsum/Gatecliff points, were "glued" to dart foreshafts instead of being tied on with sinew.

The square-stem points from Old Man Cave are associated with open-twined sandals, which are early Archaic diagnostics (see discussion of sandal dating in Geib 2000). To be certain of their temporal placement, two samples were radiocarbon dated: grass stems from around one of the points, and pitch on the base of another point. Radiocarbon dates on the grass stems of 7300 ± 100 B.P. and 7340 ± 60 B.P. on the pitch confirm their stratigraphic assignment to the early Archaic. These points demonstrate that the practice of gluing dart points to foreshafts instead of tying them on with sinew began thousands of years earlier than previously thought for a portion of the Colorado Plateau. Given that several millennia separate the points reported here from Gypsum/Gatecliff points, the technological shift to adhesive hafting seen in the late Archaic may still lack local precedent. This report describes and illustrates the points, presents the results of radiocarbon dating, and discusses some implications of the findings.

THE SITE

Old Man Cave is a small shelter (15 by 10 m) formed in Cedar Mesa Sandstone within a tributary of Comb Wash that drains the northeastern edge of Cedar Mesa (Figure 1). Looters had extensively disturbed much of the shelter, but excavation revealed that portions of an early Archaic component remained intact. During three short seasons of work at the site we managed to sample both the strata and features of this early occupation and unravel the history and processes of deposit formation. A preliminary report on the first two seasons of work at the site is available (Geib and Davidson 1994), as well as a master's thesis on the analysis of plant remains from early Archaic feces (Hansen 1994). A final site report is in preparation and anticipated to be finished by the end of 2001.

The ashy and organic-rich early Archaic deposits at the site, designated as depositional unit III, varied in thickness from a minimum of about 10 cm to a maximum of 80 cm. The area of thickest accumulation was the north-central portion of the cave, where up to nine layers of varying content and thickness were identified; unfortunately ground moisture had rotted much of the uncarbonized organic remains in this area. Early Archaic deposits across much of the rest of the site were thinner, with three layers generally identifiable. Preservation was excellent, however, especially where the deposits had accumulated upon massive roof spalls in the central portion of the shelter. The dry layers yielded abundant grass chaff and other nonartifactual organics, as well as occasional human feces, open-twined sandals, and cordage.

Chronological control for the early Archaic occupation of Old Man Cave is provided by nine radiocarbon dates that range in age from ca. 6600 to 4800 cal. B.C. The most intensive period of use was during the earliest part of this range, up to about 5800 cal. B.C., during which the bulk of the unit III deposits accumulated.

PROVENIENCE

Excavations at Old Man Cave recovered three square-stem dart points (Figures 2 and 3). One of these was in looter backdirt (Point 0.1.1), but the other two came from intact early Archaic layers. Point 575.7.1 was found in situ within a tightly packed, 10–15 cm thick layer of grass stems and chaff (mainly Sporobolus sp.) and other organics. Found along with the point were netting fragments of Dogbane (Apocynum sp.) and cordage, portions of open-twined sandals, and a one-hand mano. With no sign of rodent or other intrusion, the point was clearly associated with the matted grass stems.
Figure 1. Location of Old Man Cave.
Figure 2. Illustration of the square stem points from Old Man Cave.

Figure 3. Photograph of the same points illustrated in Figure 2.
Table 1. Dimensions (in millimeters) of the Square Stem Points from Old Man Cave.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Point 0.1.1</th>
<th>Point 566.1.1</th>
<th>Point 575.7.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>27 (45–50)</td>
<td>31 (45–55)</td>
<td>32 (45–50)</td>
</tr>
<tr>
<td>Width</td>
<td>21 (25–27)</td>
<td>28 (25–27)</td>
<td>25 (27–28)</td>
</tr>
<tr>
<td>Thickness</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Stem Length</td>
<td>8</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Stem Width</td>
<td>7</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses represent estimates of original size prior to breakage.

and other organics. Point 566.1.1 was recovered from the screen while sifting an ashy deposit from underneath the organic layer; it came from a test unit 1 m away from where point 575.7.1 was retrieved.

THE POINTS

Condition and Dimensions

All three points are fragmentary, with their tips broken by bending fractures, likely the result of impact. Two of these also exhibit breaks of one (point 575.7.1) or both (point 0.1.1) barbs, and one corner has been snapped from the stem of the 575.7.1 specimen. An interesting feature is the occurrence of a red pigment stain over the bending break of the 0.1.1 point. This specimen also has what superficially appears to be a slight burination of the blade margin; the origin of detachment however is not the flat surface created by the bending break but the opposite margin of the point. This fracture resulted from an overshot during pressure flaking.

Table 1 presents the measurements for the points. Because none of the points are whole, the length measurements are estimates. Because their barbs are broken, estimates are also given for the original widths of points 0.1.1 and 575.7.1.

Material

All of the points are made of chert. Points 566.1.1 and 0.1.1 are of gray chert identical to that available from the Honaker Trail Formation, the closest exposures of which occur along the San Juan River just down from the mouth of Comb Wash. Point 575.7.1 is of a dark brownish red chert that is commonly available from limestone beds within the local Cedar Mesa sandstone. These cherts indicate a localized selection of raw materials, a pattern that was equally apparent in the debitage from the Archaic deposits of the cave.

Production Technology

The blades are incurvate in plan and section, a shape that does not seem to be the result of resharpening. Both long and transverse sections of the points are slightly convex and moderately symmetrical, with the edges centered on the midlines for the most part.

The three points exhibit a range of production characteristics. The best-made is 566.1.1, which was finished by a series of narrow (ca. three mm wide), semiparallel, diagonal pressure flakes removed in a systematic fashion to produce a very sharp edge. The flaking pattern for both faces is generally down to the right, with most flakes from the left side extending past the midline; those from the right are shorter and more-or-less collateral, but still parallel. The flakes on the blade have partially obliterated the notching (stem-forming) flakes, which are expansive and lunate shaped.

Point 575.7.1 is similar to the previous example in that one face was partially finished by a series of nar-
Table 2. Radiocarbon Determinations for the Square Stem Points from Old Man Cave.

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Material</th>
<th>PN</th>
<th>(^{14})C Age</th>
<th>(^{13})C/(^{12})C Ratio</th>
<th>Calibrated 1 Sigma Range</th>
<th>Calibrated 2 Sigma Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-77870</td>
<td>pitch</td>
<td>566.3</td>
<td>7340 ± 60</td>
<td>-24.1%</td>
<td>6170–6050 B.C.</td>
<td>6345–6010 B.C.</td>
</tr>
<tr>
<td>Beta-77871</td>
<td>grass</td>
<td>575.4.1</td>
<td>7300 ± 100</td>
<td>-12.1%</td>
<td>6190–6000 B.C.</td>
<td>6365–5955 B.C.</td>
</tr>
</tbody>
</table>


row, semi-parallel, diagonal pressure flakes. In this case they are also mainly down to the right from the left side whereas those from the right are collateral and parallel; from both sides they meet at the midline. On the reverse side, which was the original ventral surface of the flake blank, the flaking pattern is not as finely done, but this seems to be the result of a depressed surface topography along one side that would not allow flakes to extend to the midline. The producer only removed short, non-invasive flakes from the left margin; had the artisan tried to remove longer flakes they would have terminated in a step or hinge.

The flaking pattern of point 0.1.1 is unpattemed, consisting of collateral expanding flakes. Some of the flakes are relatively wide, six to seven mm, and extend past the midline, resulting in a well-thinned point. The stem of this point on the side shown in Figure 2 appears somewhat odd because the flake scars are those of the original flake blank; they parallel the direction of detachment from the core. Most shaping of the stem occurs on the opposite side, which is the ventral surface of the flake blank.

As a final note about production technology, it is worth mentioning that none of the points exhibit abrasion of the stem as do most early Archaic stemmed points such as Pinto or Bajada. Basal grinding is certainly not necessary for glue-on points and indeed it is absent from Gypsum points.

Pitch

The stems of all three points retain pitch adhesions, some up to about 1 mm thick. Prior to dating, point 566.1.1 retained the most pitch, enabling the removal of 0.01 g of this material for radiocarbon dating. In an attempt to identify the likely source for the mastic, the remaining residue (ca. five mg) on this point was removed for pollen analysis. Slides were prepared by dissolving the scrapings in isopropyl alcohol, then mixing the residue with glycerol and mounting it on glass slides. The sample was nearly devoid of pollen; after scanning three slides, Susan Smith of the Paleoecology Laboratory at Northern Arizona University observed just four pollen grains. It is perhaps significant that three of the pollen grains were pinyon-type (the fourth was a grass pollen grain). If the mastic was pinyon pitch this would come as no surprise—pinyon grew in the vicinity of Old Man Cave by at least 6600 cal. B.C. as evidenced by the recovery of bark, twigs, cone parts and needles of this plant from the earliest cultural deposits at the site (Coulam and Sharp 1993).

Radiocarbon Dating

The two samples submitted for radiocarbon analysis were 42.2 g of grass stems (Sporobolus sp.) and 0.01 g of pitch. The pitch (PN566.3) was removed from the base of point 566.1.1, whereas the sample of grass (PN575.4.1) was collected during excavation from around point 575.7.1. The samples were submitted to Beta Analytic, where both received standard pretreatment. The grass sample was analyzed by the beta-decay method but the pitch sample was forwarded to the Lawrence Livermore National Laboratory for AMS dating. The results, corrected for isotopic fractionation, are presented in Table 2.

Because the dates are statistically contemporane-
Figure 4. Examples of Gypsum/Gatecliff points from the Colorado Plateau; from Holmer 1980a: Fig. 17 g-n, 1980b: Fig. 36 j-n.
Figure 5. Examples of Gatecliff points from Hidden Cave and Gatecliff Shelter that are similar to the points reported here; from Pendleton 1985: Fig. 55 w, Fig. 56 e, h, and Fig 57. f; Thomas and Bierwirth 1983: Fig. 81 c, g.
ous ($T = .11; X^2 = 3.84$) and the points apparently represent almost identical depositional intervals, the dates were averaged ($7329 \pm 54$ B.P.). The calibrated 1 sigma range for the average is 6185 to 6050 cal. B.C., while the 2 sigma range is 6225 to 6010 cal. B.C. The radiocarbon dates support the early Archaic temporal assignment based on stratigraphy and sandal associations.

**COMPARISONS**

The three square-stem points from Old Man Cave are clearly similar to Gypsum or Gatecliff points (Figure 4). The chief differences are with the stem and blade shape. With few exceptions Gypsum/Gatecliff points on the Colorado Plateau have a constricting stem in contrast to the square stem of the points reported here. The blades of Gypsum/Gatecliff points also tend to be excursive rather than the incurvate form on the Old Man Cave specimens. Nonetheless, if the point sample is large enough it is conceivable that the range of variability for Gypsum/Gatecliff points might include the points considered here. This indeed seems to be the case for Hidden Cave where, as I mentioned at the start of this paper, a few Gatecliff Contracting Stem points are quite similar to the Old Man Cave square stem points. These are shown in Figure 5. It is interesting to note that sandals produced by open-twining were also recovered from Hidden Cave (Goodman 1985:265–266, Fig. 91b), although this likely has nothing to do with the potential age of the square stem points from that site.

Tipps (1988:85–86) tentatively defined the type San Rafael Stemmed to accommodate a group of dart points from the northern Colorado Plateau that have wide, slightly expanding stems with square bases. The points described here can be distinguished from this proposed type by having shorter, straight-sided stems.

Other comparisons can be made with the stemmed points described as Type 10 by Black (1986:141-143) from 5GN289 of Taylor Park within the Gunnison Basin of Colorado. The points that he illustrates, which are shown in Figure 6, resemble the square-stemmed points from Old Man Cave. The association of the four 5GN289 specimens with a hearth dated $2650 \pm 180$ B.P. supports a late Archaic age (Black 1986:55). Black (1986:143) speculates that his stemmed points from Taylor Park might be part of a morphological continuum that began.
during the fifth millennium B.P. with Summit Stemmed, a type named by Gooding (1981).

CONCLUSION

I have described square-stem dart points recovered from the early Archaic deposits of Old Man Cave and verified their temporal placement by radiocarbon dating mastic from the base of one point and grass associated with another point. The potential age range based on the two dates is 6225 to 6010 cal. B.C. Because these points are morphologically distinctive from most Gypsum/Gatecliff points and date thousands of years earlier, a new type may be called for. The geographical distribution of this point style is currently unknown. The points are associated with open-twined sandals, a type of early Archaic footwear found across the entire Canyonlands section of the Colorado Plateau. Cowboy and Dust Devil caves are notable sites yielding open-twined sandals, but to my knowledge square-stem points similar to those reported here were not recovered from the early Archaic deposits of these caves. Thus the points and sandals likely have different distributions that just partially overlap.

The advent of Gypsum points during the late Archaic seems a major change in point technology because the type signals a change in hafting technique. Despite previous changes in point morphology, most of the changes did not constitute major departures from preceding types—a shift in notch angle or placement of the notch along the blade. Gypsum points (until now) appeared to mark the beginning of when hunter-gatherers started gluing their points to foreshafts rather than binding them on with sinew. As Holmer (1986:112) observes in his discussion of Gypsum points, “no example of earlier point styles can be found that bears any evidence of the use of pitch as a hafting element.” The square-stem points reported here not only provide evidence for early Archaic use of pitch in hafting but reveal a hafting method that is essentially no different from that of the late Archaic.

Holmer (1986:112) presents a believable account for why gluing points to foreshafts with pitch would replace the prior technique of binding them on with sinew. His history of the spread of this technique, however, may require revision based on the Old Man Cave evidence. The practice of pitching stemmed points to foreshafts has a record of use on a portion of the Colorado Plateau thousands of years earlier than previously known. This technique might have been just a short-lived experiment that fell into disuse only to be reinvented a few millennia later, at which time it was quickly and widely adopted, spreading up the Colorado River and across the Intermountain region during late Archaic times, as Holmer (1986:113) suggests. Alternatively, the technique might have lingered as a minor component of the technological repertoire on the Colorado Plateau (or in the adjacent mountain basins of Colorado) until the late Archaic. If the latter is true, and the square-stem points reported here represent a predecessor to Gypsum points, then there is no need to look to the Mexican highlands for the source of the innovation.

As a final note, the finding of these points near the close of this century highlights that much remains to be learned about Archaic projectile point styles and culture history on the Colorado Plateau.

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