

LATE PARACAS OBSIDIAN TOOLS FROM ANIMAS ALTAS, PERU

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INTRODUCTION

In 1959 Lawrence Dawson collected 238 obsidian bifaces and flakes at the Ocucaje Phase 9 site of Animas Altas in the Callango Basin of the Ica Valley (Figure 1, Table 1). This assemblage affords an excellent sample for the study of the lithic material pertaining to one phase of the Paracas culture in the Callango Basin. With some notable exceptions (Bencic 2000; Burger *et al.* 2000; Gero 1983; Stone 1983), the stone tool industries of prehispanic Andean cultures possessing ceramics have been ignored because they seemed less useful than pottery as chronological markers. However, analysis of stone tools offers unique insights into subsistence, cultural continuity, trade patterns, site function, ethnicity, and other topics of archaeological interest. In light of the demonstrated potential of lithic studies elsewhere in the world (*cf.* Hester and Heizer 1973), the current dearth of research on the later stone industries in the central Andes is unjustified. This study is a contribution which will help to fill this lacuna for the Paracas culture of the Early Horizon (approximately 800-50 B.C.).

Although the Paracas ceramic and textile style has been described in considerable detail (*e.g.*, DeLeonardis 1991, 2005; Kroeber 1953; Kroeber and Strong 1924; Menzel *et al.* 1964; Paul 1990, 1991; Tello and Mejía 1979; Wallace 1960, 1962, 1975, 1979), the rich tradition of Paracas stone working has yet to be described for any of the ten Early Horizon epochs. The Animas Altas collection is particularly well

suited for defining the Ocucaje 9 lithic assemblage because it is a large sample of complete artifacts with precise relative dating. As one of the largest collections of obsidian artifacts from a single Paracas site it provides the basis for a better understanding of the use of bifaces in late Paracas culture.

In this article, I offer an analysis based on the projectile point morphology and breakage patterns of the Animas Altas collection.¹ I observe that these are all bifaces that consequently do not represent a multifunctional tool kit. Moreover, the scarcity of debitage indicates that these tools were manufactured outside of Animas Altas. The ubiquity and large size of the obsidian bifaces suggest relatively easy access to the obsidian source 225 km away in the highlands of central Ayacucho. My analysis reveals evidence for the recycling and rejuvenation of the bases of the obsidian bifaces when they were broken. Finally, I suggest that some of these lithics were hafted in projectiles used in raiding, warfare, and perhaps hunting. Others could have been hafted in short handles to form knives. Additional experimental work focusing on breakage patterns is necessary to distinguish between these alternatives.

¹ Unfortunately, surface weathering prevents a full wear pattern analysis.

THE ANIMAS ALTAS ARCHAEOLOGICAL SITE

Animas Altas is roughly 40 km inland on a low hill 1.5 km to the east of the Ica River and 2 km southeast of the hacienda buildings in Callango. Animas Altas (PV62-148) was discovered by Dwight Wallace in 1958, but Lawrence Dawson encountered the site the following year without knowledge of Wallace's earlier visit (Menzel 1971:82). Adobe walls and twelve rectangular mounds dominate the site. The mounds are oriented in a north-south direction. Animas Altas covers some 100 hectares and also includes open plazas, storage structures, and temple walls. Sarah Massey studied the site, performing survey, including mapping, and surface collection, but she excavated only the temple structure (Massey 1986). During her investigations, she uncovered an unbaked clay frieze on the interior walls of the main Animas Altas temple structure. This decoration featured late Paracas iconography. Although Dawson originally referred to the site as Media Luna, it is better known to archaeologists as Animas Altas, the term applied to it by Massey.

After a survey of archaeological sites in the Callango Basin, Lisa DeLeonardis concluded that Animas Altas was the center of a small regional system in Callango and that most settlement was concentrated at that site (DeLeonardis 1991:194). John Rowe has argued that Animas Altas was an urban settlement in which producers of food and raw materials lived within the nucleated core rather than in the surrounding countryside (Rowe 1963:9). More recent survey indicates that Animas Altas was one of the two largest settlements in the Ica Valley during the late Early Horizon (Ocucaje 9; Cook 1999). Intensive collections of abundant surface materials and a small test excavation by Dawson revealed Ocucaje 9 pottery, and it is likely that the site was occupied for a very short

time, probably less than a century.² Radiocarbon measurements obtained by DeLeonardis (1997: 160) in Ica for the Ocucaje sequence suggest a date of roughly 375 B.C. for the abandonment of Ocucaje 8 sites in the Valley. Given the problems with radiocarbon dating for the period in question, one can conservatively suggest that the Ocucaje 9 occupation of Animas Altas probably occurred sometime between 375 B.C. and 100 B.C. Based on a consideration of Central Andean radiocarbon dates for this period beyond the Peruvian south coast, it can be suggested that the Ocucaje 9 occupation probably fell within the later portion of this time span (*i.e.*, 250 B.C. to 100 B.C.).

During his explorations at Animas Altas, Dawson collected all of the obsidian artifacts and debitage that were visible. Complete bifaces (N=51) or fragments of broken bifaces (N=170) constitute 92.9% of the assemblage. Dawson believed that the paucity of obsidian debitage (N=17) at the site is not the result of bias from the sampling procedures.

In Massey's later work at Animas Altas, she recovered 38 obsidian points or biface tips, four utilized obsidian flakes, and three non-utilized obsidian flakes in randomly placed collection units across the 100 hectare site. As in Dawson's sample, biface and biface fragments constitute the majority of the obsidian artifacts, in this case 85.4%. The morphology and breakage patterns of the numerous obsidian bifaces recovered by Massey strongly resemble those described in this article (Massey 1986: 299). The scarcity of

²DeLeonardis (personal communication August 1, 2001) noted that Dawson excavated some graves at Animas Altas that pre-date Ocucaje 9 (Menzel *et al.* 1964:177) and that there is some Late Intermediate Period material in scattered areas although the site was never wholly re-occupied. These other components would not have compromised the integrity of the Dawson collection which was made in those portions of the site featuring only an Ocucaje 9 occupation.

obsidian debitage in Massey's sample is consistent with Dawson's observations and the composition of the Animas Altas collection studied at the Phoebe Hearst Museum (*ibid*: 299).

Obsidian tools were particularly abundant at the Animas Altas site, but bifaces similar in size and form have been recovered at other coeval sites of the Paracas culture. Tello found obsidian points similar to those from Animas Altas during his investigations at Cerro Colorado on the Paracas Peninsula (Tello and Mejía 1979: figure 20, 6-9). These points date to Cavernas II, which is contemporaneous with Ocucaje 9 sites such as Animas Altas (DeLeonardis 1991: 178). In her research in the Ica Valley, Menzel reports finding very similar obsidian points at Tajahuana (Menzel 1971:82). Massey (1986: 299) refers to a scatter of obsidian points discovered around 1971 to the north of Casa Vieja in the entrance to the Callango Basin. She examined some of these points, which are now in private collections, and observed that they resembled those from Animas Altas in their size, shape, and breakage patterns. During her systematic survey of the Callango Basin in Ica, DeLeonardis encountered obsidian points at three smaller Ocucaje 9 sites: D-12, D-16, and D-18. The style of these points resembles that described here for Animas Altas. At one of these sites (D-12), the points were whole, while at the others, only fragments were recovered (DeLeonardis 1991:178, plates 4.1 a-b, 4.2 b-c). DeLeonardis (*ibid*:194) raises the possibility that such points may be indicative of warfare, a possibility consistent with the earthen walls, interpreted as defensive, which surround Animas Altas on its southern and western boundaries (Massey 1986).

Despite the exclusive presence of obsidian tools in the collection made by Dawson at Animas Altas, the lithic assemblage there probably included implements that were made of other raw materials. Massey (*ibid*: 293) mentions

basalt core tools, and quartzite manos and *batanes* (grinding stones) on the surface at Animas Altas. Elsewhere in the Callango Basin, a careful study of the lithic assemblage obtained at another Paracas site (PV62D12) through systematic collection and excavation revealed that only 1-2% of the stone artifacts were made of obsidian. The vast majority were made of locally available raw materials all found within 5 km of the site (DeLeonardis 1997:136, 139). These more readily accessible materials include andesite and basalt. They made up more than 83% of the artifacts found on the surface and 86% of the lithics recovered in excavations at PV63D13 (*ibid*: Table 4.7, 4.8, 8.8). PV63D13 was abandoned just prior to the occupation of Animas Altas and, although it is located some 25 km to the west on the other bank of the Río Ica, it seems likely that basalt, andesite, and other local materials might also have been heavily utilized by the occupants of Animas Altas. If this was the case, the obsidian sample discussed here would reflect only one distinctive component of the total lithic assemblage.

MORPHOLOGICAL ANALYSIS

For the purpose of this study, the Animas Altas obsidian assemblage is divided into six groups: (1) complete or nearly complete bifaces, (2) fragments from upper portions of bifaces, (3) fragments from lower portions of bifaces, (4) fragments of mid-sections, (5) fragments from one lateral edge with portions of the tip or base, and (6) miscellaneous obsidian debitage. These categories were then subdivided. The categories do not constitute a classification, but rather a heuristic device that was employed to elicit a better understanding of this collection (Table 1).

Group 1. Group 1 consists of bifaces in excellent condition (Figures 4a, b, d; 5a, b, d; 6a, b, d; and 7a, b, d), bifaces missing a single tang (Figure 2a), missing a small part of the

distal end (Figure 2b), and bifaces missing both a tang and a small part of the distal end (Figures 4f and 5f). It was required that original forms be easily reconstructible. It is worth noting that the complete or nearly complete bifaces make up 33.2% of the sample (35.7% if debitage is excluded). Of these bifaces, 51 were in excellent condition. Fourteen showed some damage to the tip, 28 were missing a tang, and 6 had lost the tip and a tang.

Ninety-six percent of the bifaces from Animas Altas are triangular. Measurements based on the complete or nearly complete (and therefore reconstructible) triangular bifaces (N=76) were computed. The bifaces vary in length from 2.2 cm to 5.7 cm. The modal length is 3.6 cm, and the mean length is 3.75 cm. They range from 1.7 cm to 4.0 cm in width, but almost all of them fall between 2.0 cm and 2.8 cm. The modal maximum width is 2.4 cm, and the mean maximum width is 2.5 cm. The thickness of the bifaces is quite standardized and is almost never less than 0.5 cm or more than 0.8 cm. The mean thickness is 0.6 cm.

The length/width ratio may be calculated to give a better idea of the proportions of these triangular bifaces. Ratios of 9:1 to 2.5:1 were recorded, but most bifaces fall into the range of 1.3:1 to 1.7:1. Nine of the bifaces were substantially shorter than the mean or modal length, and had ratios below 1.3:1. Similarly, 10 of the other bifaces were substantially longer than the mean or modal length and had ratios greater than 1.7:1.

The triangular bifaces were also weighed. However, because of breakage on the tips and tangs, not compensated for in the weight calculations, these figures are less representative than the other measurements. Weights vary from 1.9g to 15.4g. The lightest complete biface weighs 2.1g. The modal weight is 4.8g, and the mean weight is 5.4g.

Two bifaces (Figures 4a, b; 5a, b) were distinguished from the triangular bifaces because of their lanceolate form. They have greater length and narrower proportions. Their measurements provide an interesting contrast to the proportionally wider triangular bifaces. Their length/width ratio is 3.1:1. The mean length of the lanceolate bifaces is 6.9 cm, and the modal length is 6.5 cm; both are substantially larger than comparable figures from the triangular bifaces. On the other hand, all three are 0.7 cm thick with a mean average width of 2.1 cm at the base, figures quite similar to those from the triangular bifaces. Not surprisingly, the lanceolate bifaces are heavier than most of the triangular bifaces, with a mean weight of 11.8g and a modal weight of 12.5g.

The lateral edges of the Animas Altas bifaces are usually straight or slightly convex. On some of the smaller pieces, the convexity is more marked, perhaps due to reworking. The basal edge is usually straight, although a few fragments show an intentional concavity (e.g. Figures 4e, 5e, 6b, 7b).

The flaking of the obsidian bifaces from Animas Altas consisted of removing relatively large primary flakes by percussion to produce a pre-form, and then bifacially removing a simple row of small trimming flakes along all three margins. The flakes taken from the lateral edges of the tool are short and both faces of the tools are usually dominated by the irregular flaking which preceded the edgework. A single biface edge may show short, wide percussion flaking (4.0 mm x 4.0 mm), and longer thin pressure flaking (3.0 mm x 7.0 mm). The direction of the force of the flaking is roughly parallel on an edge, but is not parallel to the flaking on the other edges. Occasionally, the lateral flaking creates a serrated edge (Figures 4g, 5g). Basal thinning usually consists of a single row of four to six small flakes taken from each face. Both types of thinning can occur on a simple biface.

One large biface with a concave base has unusual basal thinning. Twelve small and regular flakes have been removed to shape and thin the basal edge (Figure 4e).

Transverse sections of the biface are usually biconvex with varying degrees of facial flattening. The edge angle as estimated with a goniometer is usually less than 25° . A few pieces exhibit alternate beveling, *i.e.*, alternative faces on different edges, with edge angles up to 60° . Another biface was beveled on both working edges unifacially and also had a steep edge angle. This produced a plano-convex cross section. Finally, two pieces were beveled on a single working edge. The pieces displaying beveling are a minority of the collection.

Group 2. Group 2 consists of small distal tips and larger upper portions (including the tips) of projectiles. Although these two sub-categories were distinguished largely on the basis of size, an overlap was permitted in the 2.5cm to 2.9cm range in order to include tips from large and small points.

a) Thirteen distal tips were recovered, varying in length from 1.5cm to 2.9cm. The largest of these tips is from a long lanceolate biface similar to two described earlier in this paper. The most common length is 2.2cm. The width of these tips ranged from 1.6cm to 2.7cm. The three tips whose width was 2.5cm or greater were from tools with rounded, rather than pointed, tips. This may have been from secondary retouching since none of the tools from Groups 1 or 2b have tips resembling these. The most common type of breakage is a transverse break which would have run parallel to the base of the tool (Figures 3b, 6g, 7g). Much less common is a complex break which results in two straight lines forming an oblique angle at the bottom of the fragment (an oblique break).

b) Upper sections of bifaces are much more common than tips. Forty-seven of these were found at Animas Altas. They range in length from 2.9cm to 5.7cm, and from 1.9cm to 3.7cm in width (2.2cm to 2.5cm being the most common range). Some of these upper sections are quite large and are comparable in size to the largest of the complete bifaces. The largest of these fragments (16-14343) weighs 13.8g. These fragments suggest that the large bifaces may have been more frequently produced than the statistics on whole or nearly whole bifaces would suggest and that longer ones were more likely to get broken.

Two types of breaks are found on most of the upper fragments from the bifaces. The most common break is concave curved, usually occurring roughly perpendicular to the axis of the biface (Figures 2d, e, f; 4g; 5g). This concave breakage usually spans the width of the fragment. A minor variation of this is a break similar to the oblique break described for bifaces, except that one or both lines are curved. The next most common break is transverse across the width of the fragment, usually perpendicular to its axis. A few oblique breaks also occur.

Group 3. Group 3 includes small basal fragments and larger lower fragments of the bifaces (including the base). As in Group 2, the subdivision is numerically based on height, but also includes some subjective judgement.

a) Eight basal fragments were collected. They range from 1.2cm to 2.5 cm in length, and 2.3cm to 3.0cm in width. Curiously, two of these are from lanceolate bifaces (Figures 3c, 6h, 7h). Because only three complete lanceolate bifaces were collected by Dawson, the three base fragments probably reflect a pattern of breakage and, by extension, use which differs from that of the triangular bifaces. A straight break roughly parallel to the base is found on six of the frag-

ments. The remaining two have rounded convex breaks.

b) Thirty fragments of the lower portion of bifaces were found (Figures 4e; 5e). As mentioned earlier, this subgroup was defined as having the base and part of the adjoining mid-section. These range from 2.3cm to 5.5cm in height (with most being below 4.1cm), and in maximum width from 2.0cm to 3.7cm (most falling in the range of 2.4cm to 3.1cm). Of these fragments, eleven had one of the tangs missing from the base. Once again, the overwhelming majority of breaks are transverse, usually running parallel with the base. Four fragments show the removal of part of the lateral edge. The flute-like flake that was removed was widest at the distal end and tapers as it approaches the base. This type of breakage is sometimes attributed to the impact of a projectile point. Several fragments have more complex breakage patterns.

Group 4. Group 4 consists of fragments which are missing both tip and base, but display portions of both lateral edges (Figure 3d). Twenty-six body fragments were found with both lateral edges intact. These fragments are fairly small, with most being 2.8cm to 3.7cm in height, and 2.1cm to 3.2cm in width. By definition, two of the edges of these fragments were created by breaks. Most fragments have transverse breaks on both edges, although often only one of the breaks is perpendicular to the biface's axis. Less common are fragments with straight breaks and only one fragment shows a curved or oblique break. The curved and oblique breaks usually occur on the lower edge of the fragment (as defined by greater width). Finally, there are a few fragments with more complex breakage.

Group 5. Twelve fragments with only one lateral edge were recovered from Animas Altas. Three of these seemed to be pieces of the tip which had been roughly halved along the axis

(Figure 3e). In addition, there were six other fragments which had portions of one lateral edge and part of the basal edge.

Group 6. Very little debitage (17 pieces in all - 7.1%) was recovered in the surface collection, despite conscious effort to locate it. Only one small fragment showed remnants of primary cortex. The remainder are interior flakes. The largest of these is 4.9cm by 4.5cm with a thickness of 1.6cm (Figure 3f). One smaller interior thinning flake was collected.

The absence of large numbers of primary flakes and the presence of interior flakes suggest that the obsidian was brought to Animas Altas as finished bifaces or as preforms to be completed at the site. Given the paucity of debitage, it seems more likely that the tools arrived as completed bifaces which were sometimes repaired and reworked there.

PROVENIENCE OF THE SOURCE MATERIAL

All of the stone artifacts collected by Dawson at Animas Altas were made of obsidian. Visually, most of the obsidian was opaque and gray, but some of it was translucent, with occasional dark streaks. Thirteen percent (N=31) of the Animas Altas artifacts were analyzed to determine the source of the obsidian used in their manufacture. These measurements were conducted at the Lawrence Berkeley Laboratory in collaboration with Frank Asaro and with the assistance of Helen Michel. Thirty of these fragments were tested using X-ray Fluorescence, and provenience was identified using measurements for five trace elements. A single fragment was tested by neutron activation as a control over the X-ray Fluorescence. Neutron activation provides high precision measurements for more than two dozen trace elements. The procedures used have been described in detail in another publication (Burger and Asaro 1979:287-288). Both methods indicated that all thirty-one

artifacts were chemically identical and were therefore made of obsidian from a single source (*ibid*:211, figure 11). The measurements from the Animas Altas artifacts collected by Dawson matched those of actual geological material from the Quispisisa Source near Sacsamarca, Province of Huanca Sancos, Department of Ayacucho (*ibid*; Burger and Glascock 2000). On these grounds, it can be stated with confidence that the obsidian came from a distance of about 225 kilometers.

It remains uncertain where the bifaces were made. They could have been manufactured near the quarry or in a community located between the Quispisisa area and Animas Altas. As noted, the scarcity of debitage and the near absence of flakes with cortex strongly argues against production at the site itself.

Judging from a recent review of obsidian tools from the southern highlands (Burger *et al.* 2000), the vast majority of obsidian tools throughout prehistory were significantly smaller than those from Animas Altas. Moreover, the size of the Animas Altas bifaces when originally produced was larger than that suggested by the average biface in the assemblage because many of these are the result of reworking broken points to a squatter, but still functional, form. Thus, it is likely that most triangular points at Animas Altas were originally closer to the 5.7cm length of some unworked artifacts than the mean length of 3.75cm calculated for the entire group of triangular points. The lanceolate bifaces from Animas Altas were still longer at 6.9cm. These impressive dimensions suggest relatively easy access to the exotic raw material from the distant obsidian source at Quispisisa in Ayacucho.

DISCUSSION

The relative proportion of fragment types and the kinds of breakage which are present at

Animas Altas have the potential for indicating the use of the tools. However, before these archaeological remains can be confidently interpreted in this light, additional experimentation must be carried out concerning the types of breakage which occur while using obsidian knives and arrows.

An examination of the cross sections of the broken edges of the bifaces at Animas Altas reveals that most breaks are roughly perpendicular to the ventral and dorsal surfaces. This pattern, referred to as lateral snap, results when impact occurs on one end of the artifact and the break occurs in an entirely different section of the artifact (Purdy 1975:134-135). Such a break could result from dropping an obsidian knife on a hard surface or from shooting it as a projectile against a hard object. However, it would not result from twisting a knife against a hard surface. Some of the biface points seem to have been broken by pressure applied to the tip. The resultant break is conchoidal and flake-like rather than flat.

It can be suggested that a wide basal area was preferred for hafting. Apparently, when a triangular biface broke, the basal portion was, when possible, retained for reworking. Some broken biface tips show evidence of use wear along their edges produced after the breaks had occurred, suggesting their opportunistic reuse. The reworked basal sections could be transformed into squatter versions of the original larger triangular points. Indeed, many of the bifaces (perhaps some 80%) show some evidence of such reworking. This scenario would help to explain the considerable range in the height/ width proportion of these points which contrasts with the homogeneity in thickness and the predominance of the triangular form.

A few bifaces have working edges that are beveled in cross section. This beveling may be the outcome of resharpening.

Based on late Paracas and early Nasca iconography, it can be suggested that at Animas Altas, some obsidian tools may have been hafted for use as darts or spears, and utilized in raids and hunting (Burger and Asaro 1979). Judging from the iconography of Ocucaje 8-10 pottery, some bifaces may also have been hafted on knives associated with the taking of trophy heads. However, the absence of distinctive knife breaks suggests that the Animas Altas obsidian bifaces were not used as knives in household or ritual contexts. This conclusion may be unwarranted if, as Dwight Wallace suggests (personal communication, February 17, 2002), a jabbing and rocking motion rather than a sawing or slicing motion was performed with late Paracas knives. This possibility can generally be evaluated by use-wear experiments, but not in the case of the wind-blasted animas Altas collection.

The conspicuous dearth of obsidian unifaces and utilized flakes likewise suggests that the lithic assemblage studied from Animas Altas does not represent a multi-functional tool kit. Rather, it appears that the lithics recovered by Dawson make up a narrow range of tools, projectile points and perhaps knives. Obsidian projectile points have been encountered in their original hafting in late Early Horizon contexts. Frédéric Engel (1966), for example, published a well-preserved obsidian-tipped dart from the Paracas Necropolis. Points of comparable size have been recovered from Ocucaje 10 graves at the Hacienda Ocucaje in Ica. These were held in wooden foreshafts by a combination of resin and cotton thread. The foreshafts, in turn, were connected to long cane shafts.

If some of the obsidian bifaces from Animas Altas were utilized as the tips of darts or spears, what was their target? While wild game could have been the goal, the most common animal remains encountered at late Paracas sites are the domesticated llama and guinea pig. Wild game

consists primarily of small animals such as birds, which would have been hunted using slings (e.g., DeLeonardis 1997:276). In contrast, there is empirical evidence suggesting that, at least in some cases, the intended victims of the obsidian-tipped projectile points were human.

At the site of Karwa, on the shores of Bahía de la Independencia (Figure 1), an obsidian point was found lodged in a human forearm. It had pierced the arm of its victim with so much force that the point had penetrated the other side of the arm bone (Engel 1966: figure 59). This vivid evidence of the function of obsidian bifaces probably dates to the late Early Horizon. Similarly, Ravines (1967) reports an obsidian point from Huancavelica that caused the immediate death of its victim. Thus, the bifaces of Animas Altas may have been produced for use in warfare as well as for the bagging of occasional wild camelid or deer.

The possibility that the obsidian bifaces were primarily weapons of war has been raised by earlier investigators who were cognizant of the prominent fortifications at Animas Altas and the coeval Ocucaje 9 center of Tajahuana. The latter center has three to six parallel fortification walls protecting the northern and eastern side of the site. These walls are 2 m in height (Massey 1986: 295). Massey (*ibid*:301) argued that:

The construction of defense walls, the presence of shallow burials within architecture, the large numbers and random distribution of obsidian points at Animas Altas, the isolated scatter of obsidian points at the entrance of Callango and the subsequent abandonment of the region lend support to a conquest theory.

While the lithic analysis offered here cannot test Massey's bold hypothesis, the results are consistent with the interpretation of the Ocucaje 9 obsidian points as weapons and, therefore, they do not preclude using the bifaces in an argument positing inter-group violence as a

cause of the abandonment of the Callango Basin following Ocucaje 9.

The likelihood that some of the obsidian bifaces may have been set in a short straight wooden haft for use in battle or as knives in ceremonies is supported by the late Early Horizon and early Early Intermediate Period iconography of the south coast. For example, a famous Nasca 1 painted textile (Sawyer 1979:131, figure 2) features a decapitator with a hafted triangular point. There are numerous depictions of the Oculate Being in flying position holding a trophy head in one hand and a knife with a short, straight haft and triangular point in the other. Wallace (personal communication, February 17, 2002) reports finding one such representation in a Chongos style midden in the upper Cañete Valley. Although depictions of darts with possible obsidian tips do appear in some textiles, they are less frequent than those of knives. This is true of images on ceramics, as well:

From Ocucaje 8 to Nasca 6, the pottery styles of Nasca and Ica show representations of black tipped darts and knives. The more naturalistic of these depictions can be linked to archaeological finds of obsidian weapons at local contemporary sites. This has led Lawrence Dawson to hypothesize that many of these are representations of obsidian objects (personal communication). Beginning in Ocucaje 8 the hypothesized obsidian knives are associated with the taking of trophy heads in the iconography.

Burger and Asaro (1977:15)

One of the few published examples of an actual ceremonial knife appears in Disselhoff (1972:277). This early Nasca knife was a triangular obsidian blade hafted in a delicately painted palate of a dolphin.

A second focus of this article is the source of the raw material for the obsidian bifaces described here. As noted, all of the obsidian was

brought from a single geological source 225 km away. This source, the Quispisisa Source, is at 3,780 meters above sea level. It would have taken a llama caravan some two weeks to carry the volcanic glass to the Callango Basin from the quarry in central Ayacucho. The large size of the bifaces suggests a relatively easy access to the source area or its products, but the clear evidence that the bifaces were recycled and rejuvenated rather than discarded suggests that, once acquired, the obsidian bifaces were highly valued. One of the more striking findings of this study is that the bifaces were apparently not made at Animas Altas because obsidian debitage is extremely rare at the site judging from systematic surface collections and excavations.

On Peru's south coast, the pattern of acquiring bifaces made of Quispisisa obsidian apparently did not originate with the occupation of Animas Altas. DeLeonardis has documented a similar pattern for the nearby site of PV62D12, which predates Animas Altas. At PV62D12, as at Animas Altas, the only projectile points were made of obsidian. A sample of them was analyzed by neutron activation at the University of Missouri Research Reactor in collaboration with Michael Glascock, and all of these materials likewise proved to be made of obsidian from the Quispisisa Source (personal communication Lisa DeLeonardis August 1, 2001). Obsidian debitage was so rare at PV62D12 as to suggest to DeLeonardis (1997:279) that the artifacts were acquired as blanks or preforms. She also noted that in contrast to the "reckless use of local lithic materials and tools", obsidian was reworked for further use rather than being discarded. DeLeonardis (*ibid*:136-139) believes that this general pattern of obsidian use may have begun by early Paracas times and consequently is not a good temporal indicator of late Paracas occupations. Additional work on Paracas lithics will be necessary to evaluate this hypothesis.

Nevertheless, it is clear that the pattern found at Paracas sites such as Animas Altas and PV62D12 differed significantly from that found in much earlier and later sites along the south coast. For example, at the Late Preceramic site of San Nicolás on the shores of the Nasca drainage, obsidian from the Quispisisa Source was used for a wide range of tools rather than just bifaces. Moreover, there is considerable chipping debris including primary flakes with cortex which indicates that obsidian was being imported as nodules and then transformed into tools on site (Burger and Asaro 1977, Vescelius 1963). Similarly, recent work by Kevin Vaughn at Marcaya, an Early Nasca village, indicates that obsidian was brought to the site as nodules from the Quispisisa Source (Vaughn and Glascock 2002).

To understand why variability in obsidian acquisition and production occurred, we will need to know far more about the economic and political organization of Peru's south coast prior to the Middle Horizon. While at present we may not be able to explain the pattern of lithic procurement and production observed at Animas Altas and why it differs from these earlier and later sites, we cannot ignore its implications. At the very least, the ubiquity in the Callango Basin of numerous large obsidian bifaces made of exotic highland material manufactured in an unknown location undermines the image of self-sufficient village life that has so often characterized discussions of the Paracas culture.

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<i>Condition</i>	<i>Detail</i>	<i>Number</i>	<i>Percentage</i>
Complete bifaces		51	21.40%
Nearly complete bifaces	Tang missing	28	11.80%
Fragmentary bifaces	Upper section (including tip)	47	19.70%
	Tip	13	5.50%
	Bottom section (including base)	30	12.60%
	Base	8	3.40%
	Body fragments (both lateral edges)	26	10.90%
	Body fragments (one lateral edge)	9	3.80%
	Fragments with two contiguous sides	6	2.50%
	Fragments of tip with one lateral edge	3	1.30%
Debitage		17	7.10%
Total		238	

Table 1. Tools and tool fragments analyzed from, Animas Altas, Ica Valley, Peru.



Figure 1. The Ica Valley and vicinity with the locations of Paracas sites mentioned in the text (after DeLeonardis 1991).

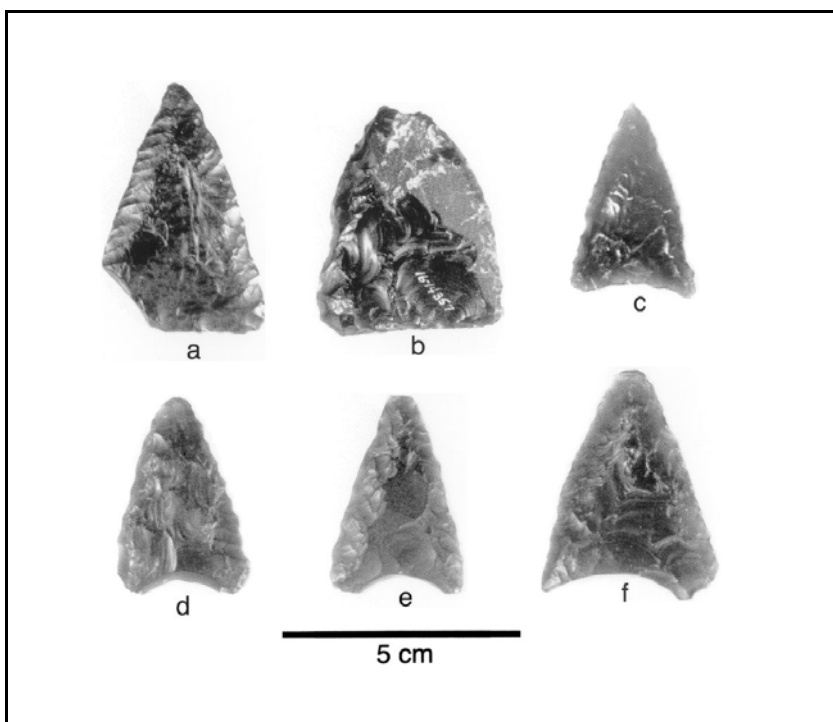


Figure 2. Obsidian bifaces from Animas Altas, Ica Valley; *b* is also shown in Figures 4f, 5f; *c* is also shown in Figures 6b, 6b (photograph by Richard L. Burger).

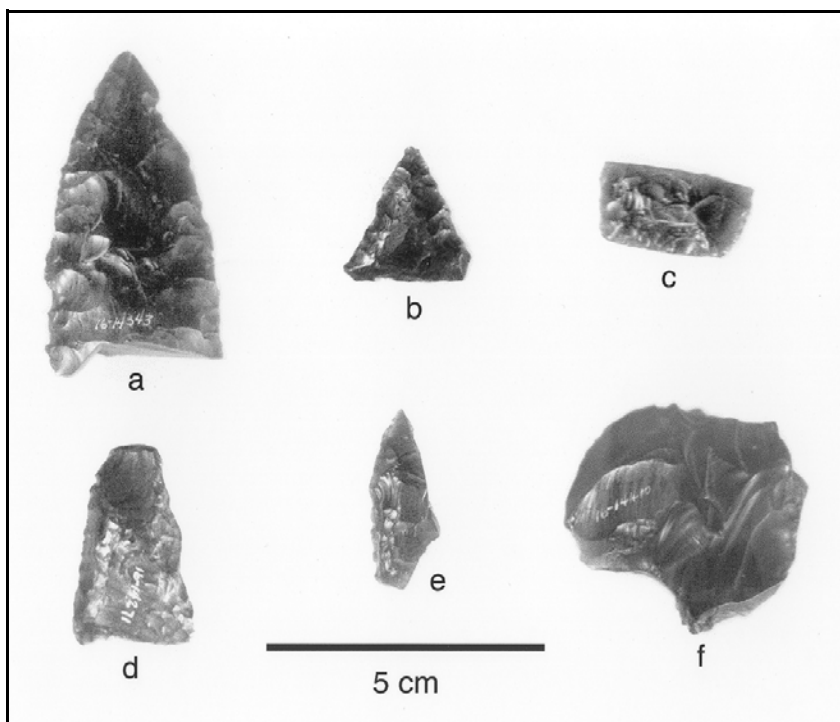


Figure 3. Obsidian bifaces, biface fragments and debitage from Animas Altas, Ica Valley; *b* is also shown in Figures 6f, 7f; *c* is also shown in Figures 6h, 7h (photograph by Richard L. Burger).

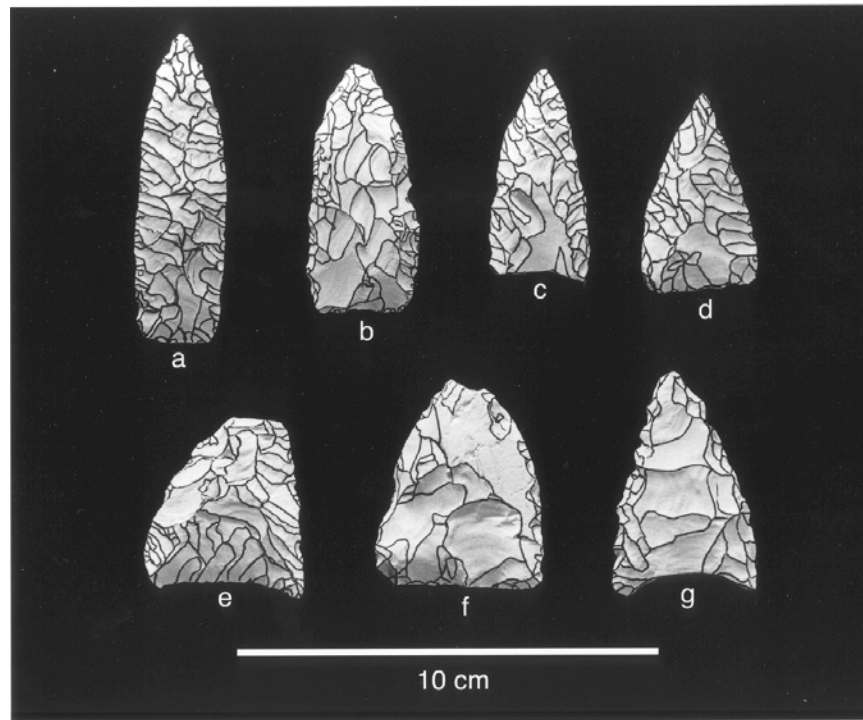


Figure 4. Animas Altas obsidian bifaces and biface fragments coated to highlight chipping technique; f is also shown in Figures 2b, 5f (photograph by Sergio J. Chávez).

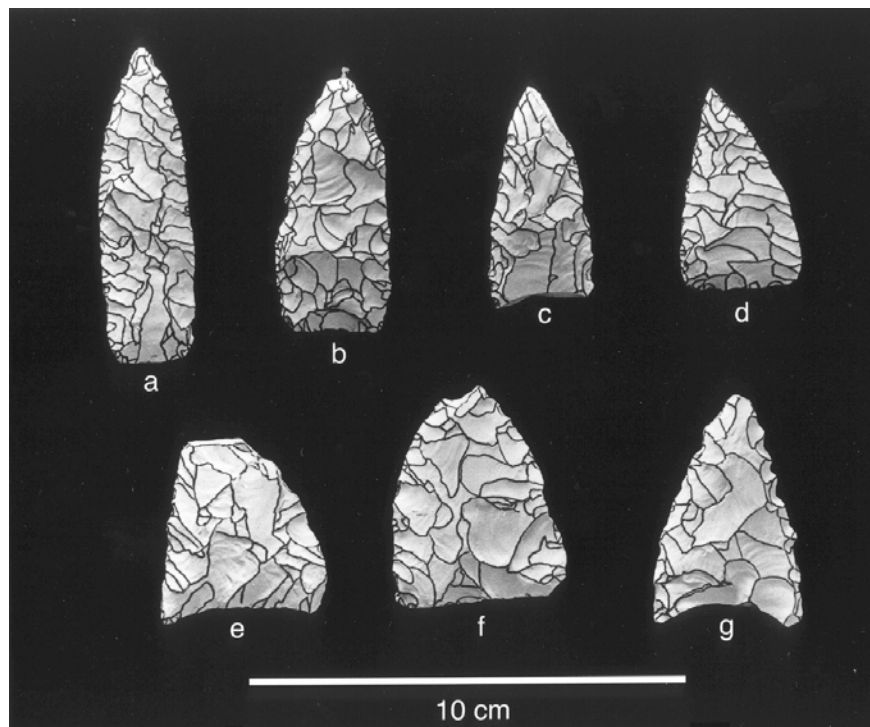


Figure 5. The reverse sides of artifacts in Figure 4; f is also shown in Figures 2b, 4f (photograph by Sergio J. Chávez).

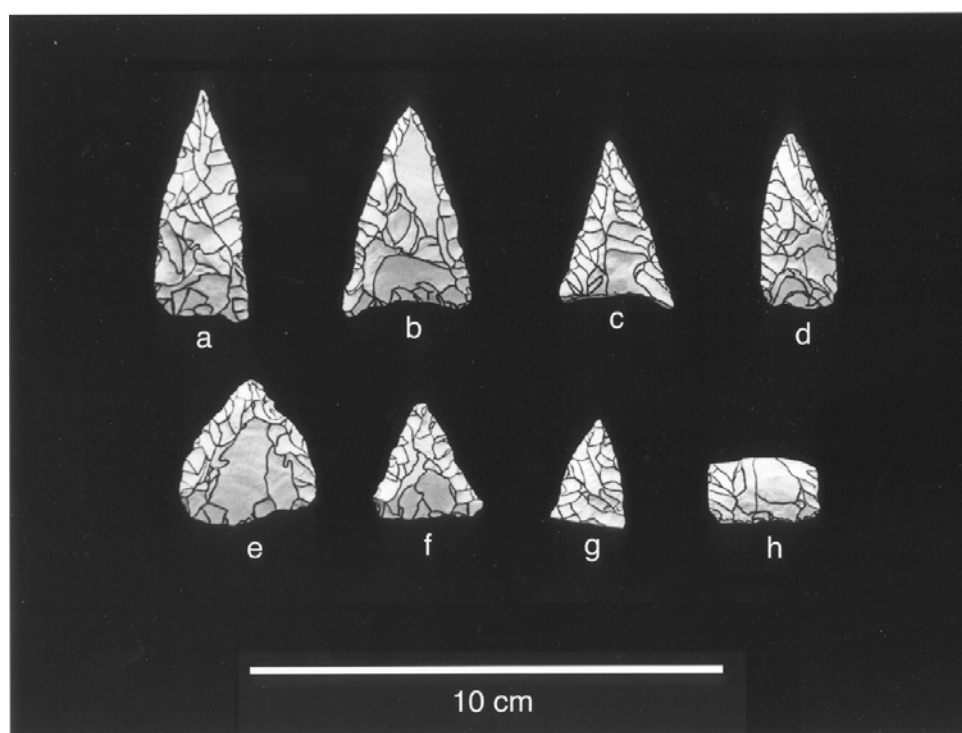


Figure 6. Animas Altas obsidian biface fragments coated to highlight chipping technique; *b* is also shown in Figures 2c, 7b; *f* is also shown in Figures 3b, 7f; *h* is also shown in Figures 3c, 7h (photograph by Sergio J. Chávez).

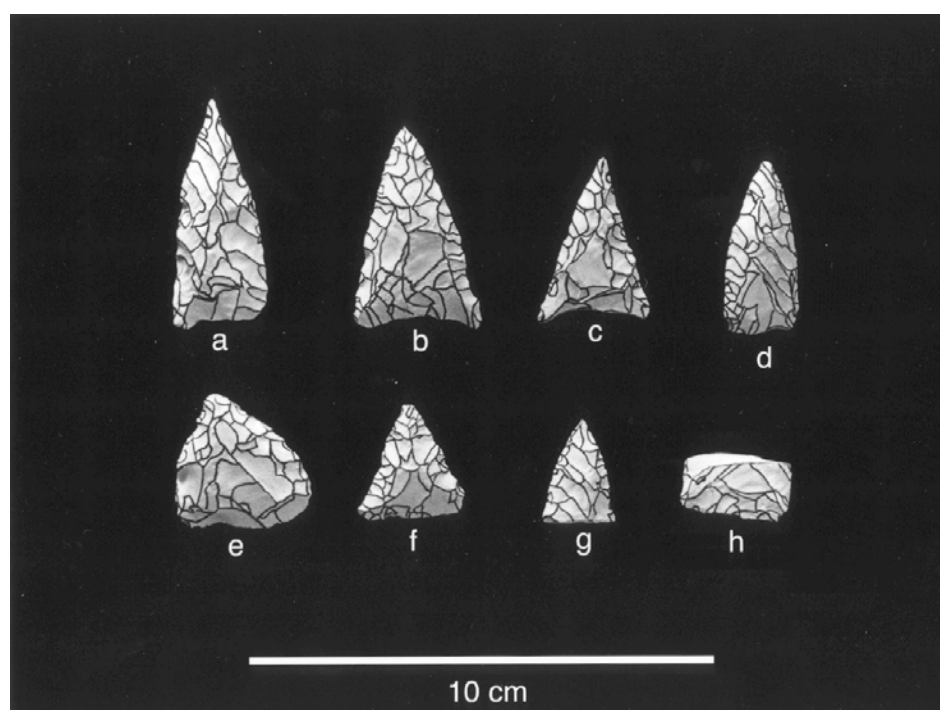


Figure 7. The reverse sides of artifacts illustrated in Figure 6; *b* is also shown in Figures 2c, 6b; *f* is also shown in Figures 3b, 6f; *h* is also shown in Figures 3c, 6h (photograph by Sergio J. Chávez).