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The Still Bay points of Blombos Cave (South Africa)

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ABSTRACT

We present the results of a technological and morphometric analysis of all the Still Bay points ($n = 371$) recovered from the 1993 to 2004 excavations at Blombos Cave. We have been able to reconstruct the manufacturing sequence of the bifacial points from initial shaping, by direct internal percussion, to finished morphology, by direct marginal percussion. Identifications of impact fractures and manufacturing breaks are based on comparisons with experimental and archaeological bifacial points of verified function, i.e. Paleoindian points from bison kill sites, replicates of Solutrean points mounted as spear-heads or arrow-heads and shot into adult cattle, and experimental replication on local raw materials. Our analysis shows that: (a) only a minority of the points are finished forms, and that a large number of pieces are production failures, a situation known at bifacial point production sites of later ages; (b) morphometric and impact scar analyses should take into account this process and distinguish finished points from preforms and unfinished points; (c) there were at least three different kinds of raw material sources and that there is a marked increase in the frequencies of silcrete with respect to the M2 and M3 phases at Blombos; (d) three kinds of evidence prove that some of the points were hafted axially and used as spear tips; (e) production of bifacial points was a primary activity at the site but the hypothesis of intergroup exchange of Still Bay points cannot be sustained on the basis of present evidence; and (f) the Still Bay phase appears to initiate a trend to relatively rapid changes in specialized hunting weaponry and that this innovation is congruent with other innovations such as bone tools, shell beads and engraved ochre of the M1 and M2 phases at Blombos.

1. Introduction

The late Middle Stone Age of South Africa between 77 and 35 ka contains three technocomplexes known as the Still Bay, the Howiesons Poort and the post-Howiesons Poort. These lithic phases have a wide distribution, are in stratigraphic succession (two sites, Diepkloof and Sibudu, include all three phases; Rigaud et al., 2006; Tribolo et al., 2005; Wadley, 2007; Porraz et al., in press) and are characterized by quite different hunting weapons and technologies. The Still Bay has foliate bifacial points made on flakes or blocks (Henshilwood et al., 2001a), the Howiesons Poort (HP) has a technology characterized by the production of small blades retouched into segments and other backed pieces (Delagnes et al., 2006; Singer and Wymer, 1982; Soriano et al., 2007; Wurz, 2000, 2002) and the post-Howiesons Poort has mainly unifacial points on flakes, similar to Mousterian points (Villa et al., 2005; Villa and Lenoir, 2006). Formal bone tools, including awls and bone points, that appear in the M1 and M2 phases of Blombos and in the HP technocomplex at Klasies River Mouth and at Sibudu, accompanied by symbolic novelties like shell beads, engraved ochre and incised ostrich eggshells (Henshilwood et al., 2001a,b, 2002, 2004; D'Errico et al., 2005; Parkington et al., 2005; D'Errico and Henshilwood, 2007; Backwell et al., 2008) are clear examples of a tendency to develop new functional ideas, techniques or devices.

To what extent these MSA assemblage changes and precocious innovations were influenced by parallel changes in climate, prey availability, plant food cover, hunting tactics or social practices is, at present, difficult to say. We do not really understand why some newly invented tools, like the bone points which occur in small numbers at a few sites (D'Errico and Henshilwood, 2007; Backwell et al., 2008) were not widely adopted while lithic novelties like the high frequencies of backed tools in the HP assemblages and the associated manufacture of small blades by the marginal percussion

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technique were adopted on a large scale and became, for some millennia, part of the established knowledge for the production of desired tools (Soriano et al., 2007).

Analyses of lithic technologies are needed because they can provide insights into MSA variability and document the degree of continuity and discontinuity in diachronic sequences of stone tools. We present here a technological analysis of the Still Bay points from Blombos Cave, focusing on their manufacture and intended use. Detailed analysis of the Still Bay core and debitage technology is planned. The M1 phase has yielded very large quantities of lithic materials, in the order of 15,000–18,000 pieces, in part byproducts of bifacial point manufacture; debitage analysis will be integrated with an understanding of the point production sequence.

2. The sample

Our sample consists of 352 points and point fragments from 1993 to 2004 excavation. We have excluded from analysis 30 items:

- 10 bifaces which do not have the typical Still Bay morphology (i.e. they are not pointed or have a very thick, broad base, see below);
- 7 unifacial points;
- 13 broken specimens originally identified as unfinished point fragments; these are in fact irregular debris or broken flakes which do not fit into the manufacturing phases of Still Bay points (see Section 5).

Twenty-two other specimens had been set aside for residue analysis by Marlize Lombard. Of these only 19 have the typical Still Bay morphology (one is a convergent scraper and the two others are thick bifaces). Analytical data for these 19 pieces are incomplete because the specimens may not be handled out of their storage bags and could not be fully observed. If we include the 19 specimens for residue analysis, the total number of specimens in our database is 371. However, with the exception of raw material counts and counts of square and layer provenience, all other diagrams are based on the sample of 352 pieces.

Two other sites in the Cape region have provided Still Bay assemblages in stratified context: Diepkloof and Hollow Rock Shelter (Rigaud et al., 2006; Porraz et al., in press; Evans, 1994; Minichillo, 2005). Both assemblages are under current investigations by other researchers; technological analysis of the small Still Bay assemblage from Sibudu (Kwa-Zulu Natal; Wadley, 2007) is in progress by one of us (PV) in collaboration with S. Soriano. The Blombos series is at present the richest sample of bifacial points and their manufacture debris available from a well-stratified and well-dated context.

The typical Still Bay morphology is characterized by a pointed or elliptical base with curved sides or a narrow straight end (Fig. 1a, c) and a V-shaped point with straight or curved sides (Fig. 1b, f). The point of maximum width is located at some distance from the base, between one-fifth and one-half of the total length. The maximum thickness is also in the proximal half of the piece but generally at some distance from the base. They differ from the bifacial teardrop-shape points with rounded bases and the triangular "hollow-based" bifacial points of the post-Howiesons Poort layers of Sibudu, layers MOD to Co dated about 50 to 37 ka (Wadley, 2005; Villa and Lenoir, 2006). The post-Howiesons Poort bifacial points are less elongated than the Still Bay points and the hollow-based points have a much wider and concave base.

Three hundred and fifty points were recovered in the M1 phase; 21 come from the top levels of the M2 phase (Fig. 2a). The points come from 66.5 quadrates (50 × 50 cm units) including 8 outside the drip line (Fig. 2b). We have not followed the subdivision of the M1 phase into 1a and 1b used by Henshilwood et al. (2001a) for this analysis but we believe that a future study of the variation among bifacial points from different layers at the site would be informative.

Based on OSL dates (Jacobs et al., 2006) the temporal range of Still Bay points at Blombos covers the interval between 77 ka (layer CFB/CFC of the M2 phase is dated to 76.8 ± 3.1) and ca. 70 ka (date for the sterile dune overlying the M1 deposits). Burnt lithics of the M1 phase have yielded a mean age of 74 ± 5 ka, in good agreement with the OSL dates (Tribolo et al., 2006).

Preliminary analysis of lithics from layer CC, a main M1 subunit, from 1998 to 2000 excavations, suggests that a large proportion of debitage is the byproduct of bifacial point manufacture; retouched pieces other than points may have been introduced into the site ready made or as blanks since there are too few cores (1.2%, that is 6 cores on a total of 500 flakes > 2 cm) from which their blanks could have been obtained, and too few cortical flakes (Soressi, 2005). Table 1 shows that finished points are 38.6% of all formal tools and informally retouched flakes.

3. Raw material

Silcrete, a soil duricrust consisting of clasts of variable size cemented into a hard mass by silica, is the raw material of choice for points. The fabric of silcrete is variable since it contains a detrital component and secondary silica. From a stoneknapper's viewpoint silcrete can be described as occurring in different varieties ranging from a fine-grained rock with microcrystalline matrix and almost no visible grains to a medium and coarse-grained variety. Table 2 shows that quartzite, quartz and, in one case, a cryptocrystalline siliceous stone were also used.

Fine-grained silcrete is slightly predominant (53.0%) over the coarse-grained variety (47.0%). The colors range from red, reddish grey and yellowish red (55.4%, i.e. 144 of 260) to grey, yellow and brown (44.2%, i.e. 115 of 260). Fine-grained green silcrete is rare; one point and some flakes in layers CA and CB are made of this variety.

It has been recently suggested that silcrete in its raw form is difficult to knap and that heat treatment was used on the southern Cape silcrete to improve its flaking qualities; the Still Bay bifaces would otherwise be difficult to knap (Brown et al., 2008). Heat treatment changes the mechanical properties of stone materials and experiments have demonstrated a well-defined reduction in fracture toughness in silcrete. Accompanying visual changes would be to change the color from yellow/brown to red, although color changes may not occur if iron oxides are not present, and a greasy luster visible on the part retouched after thermal treatment in contrast to the non-lustrous appearance of the non-heated surface (Domanski and Webb, 1992; Domanski et al., 1994; Domanski and Webb, 2007; Inizan and Tixier, 2001). Variable quantities of iron commonly occur in South Africa silcretes (Roberts, 2003) so color changes might be expected. Since a large proportion of the Blombos finished points made on silcrete is either light grey or yellow, without any reddish hue, it is possible that heat treatment was not applied or was not systematically applied. Color changes, however, are an uncertain indicator; luster is a better recognition criterion and a systematic search on points and associated debitage is planned. However, according to Australian geologists (Doelman et al., 2001; Webb and Domanski, 2008) the fabric and mechanical properties of silcrete have a strong effect on artifact manufacture; microcrystalline silcrete and some fine-grained silcrete are suitable for blade production and fine retouch. Still Bay points have been replicated in fine silcrete using a soft stone hammer, without heat treatment (Porraz et al., in press; Texier et al., 2008).

The sources of silcrete are not well known. About 10.2% of the pieces (38 of 371) have residual cortex. This cortex appears in three varieties: fresh (i.e. unrolled and unaltered), rolled (from water-