

SUPPLEMENTARY ONLINE MATERIAL 2

Production phases and point-production strategies previously published in Högberg and Lombard (2016), with some examples from Primrose Ridge highlighted

for

The points from Primrose Ridge:

A possible Still Bay workshop on the Gauteng Grassland of South Africa

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1. Description of production phases

SOM Table 1. Definition of production phases.

Phase	Definition
Phase 1	<i>Blank</i> : consisting of an unmodified or slightly worked flake, a blade or a nodule.
Phase 2	<i>Initial shaping</i> : consisting of a worked piece with a distinct shape, clearly showing the intentions of the knapper to produce a point. The worked piece has several negative removal scars on its surface.
Phase 3	<i>Preform shaped as a point</i> : consisting of a shaped piece with several invasive surface-covering negative flake-removal scars. The edges are regular. The preform is larger than finished points from the same contexts, but the proportions between length, thickness and width demonstrate that the preform can be reduced to a finished point, similar to those in the assemblage.
Phase 4	<i>Advanced shaping</i> : consisting of a clearly shaped form with well-balanced proportions. The tip and the base are defined. The edges are pronounced and stable. Commonly, several invasive surface-covering negative flake removals reach over the length axis of the point, i.e., the bilateral equilibrium plane, on one or two faces of the point. The piece appears to be a finished point, but lacks the final retouch or serration along the edges and on the tip.
Phase 5	<i>Finished point</i> .

Note, we exclude the reworked/recycled point phase included in previous descriptions (Villa et al. 2009; Högberg & Larsson 2011), because it is not a production phase, but part of a tool's lifecycle.

The following constraining factors have been taken into consideration:

- A phase 1 blank cannot easily be defined in an assemblage, thus even though we know, for example, that nodules were used as blanks, it is not straightforward to conclude that nodules were brought to the site as blanks.
- In some instances, not all phases of a point-production strategy can be recognised.
- Because of the extensive shaping and invasive retouch that often covers large portions of the surfaces of finished points, such pieces cannot always be confidently assigned to a specific production strategy. The interpretation/identification of a specific production strategy is thus restricted to point-production phases that display diagnostic characteristics of a chosen strategy

2. Definition of point-production strategies

(See SOM Figure 1 and SOM Tables 2 and 3, see also Figure 2 and 3 in main text)

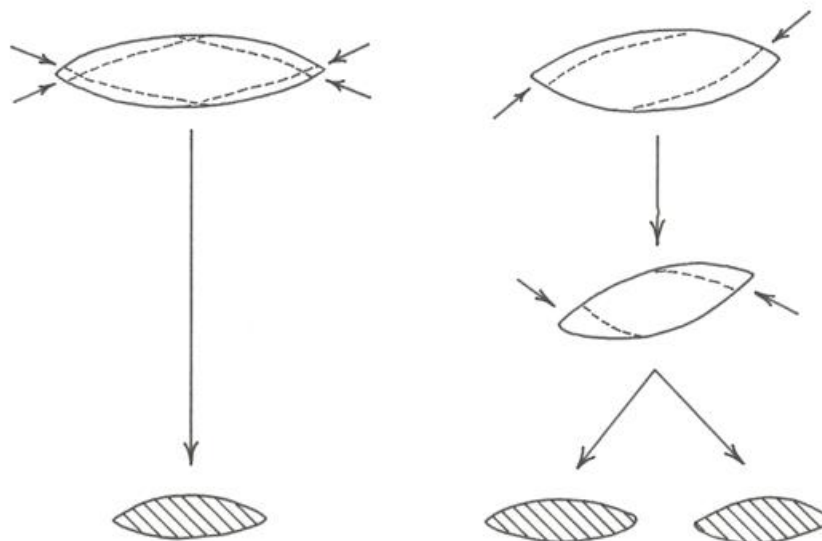
2.1. Bifacial nodule point-production strategy version 1 (bifacial nodule pps 1)

The knapping starts from a raw, naturally formed or slightly worked nodule or nodule-like flake. From phase 1 to phase 2 the piece is worked into a distinct shape, clearly showing the intentions of the knapper to produce a point. Several invasive flakes are detached, using away-from-edge knapping (internal, on-surface percussion). The rough-out is clearly bifacially knapped, with two convex faces on each side of a bifacial equilibrium plane. From phase 2 to phase 3 the rough-out is worked into a preform shaped as a point. This is achieved through invasive surface-covering flake removals, using away-from-edge as well as on-edge knapping (marginal percussion). Some of the flake removals reach over the length axis of the point, i.e., over the bilateral equilibrium plane. The edges are kept regular. The preform is large, compared to the finished points, but the proportions between length, thickness and width show the intention of the knapper to reduce the preform to a point. From phase 3 to phase 4 a point with a clear shape and with well-balanced proportions is formed by on-edge knapping. Several invasive surface-covering flakes are detached, reaching over the bilateral

equilibrium plane on both faces of the point. The point looks finished, but lacks the final retouch on the edges and the tip. From phase 4 the final retouch results in a phase 5 or finished point. The bifacial nodule pps 1 is recognised by equally well-shaped faces on each side of the bifacial equilibrium plane and its lenticular cross-section from phase 2 to phase 5. Frequently, the bifacial nodule pps 1 shows a centred ridge at the bilateral equilibrium plane on each face of a phase 4 and phase 5 point.

2.2. Bifacial nodule point-production strategy version 2 (bifacial nodule pps 2)

The bifacial nodule point-production strategy version 2 (bifacial nodule pps 2) initially follows the reduction sequence of the bifacial nodule pps 1. The main difference is in how the reduction is set up, going from phase 2 to phase 4 (SOM Figure 1). In the bifacial nodule pps 2, the symmetry of the bifacial rough-out is altered and the edge lines of the biface changed. To knap a phase 2 rough-out into an advanced-shaped phase 4 point according to the bifacial nodule pps 1, the knapper needs to reduce the piece with on-edge knapping from all four platforms. In this way, the thickness and width are reduced in a manner that controls the lenticular cross-section, the shape of the piece and the centred bifacial equilibrium plane line of the edges. In contrast, using the bifacial nodule pps 2, a phase 2 rough-out is knapped into an advanced-shaped phase 3 preform and phase 4 point with away-from-edge knapping. First, the knapper uses two platforms shaping parts of each face, then the two other platforms are used to shape the opposite parts of the faces. With the bifacial nodule pps 2, the line of the centred bifacial equilibrium plane is broken, changing the symmetry of the piece and two new edges are created. The lenticular cross-section will change into a rhombic biconvex cross-section, giving rough-outs, preforms and points a slightly twisted look. To stabilise the edges, they are slightly retouched, resulting in a phase 4 point. From phase 4 the final retouch and, if pertinent, serration, on the edges and the tip, sometimes using pressure flaking, results in a phase 5 or finished point.



SOM Figure 1. Schematic illustration of the difference in reduction from phases 2 to 4 between bifacial nodule pps 1, left in figure, and bifacial nodule pps 2, right in figure, illustrated with cross-sections.

The bifacial nodule pps 2 is recognised by its twisted look and rhombic biconvex cross-section in phases 3, 4 and 5. The placing of the bifacial equilibrium plane is not centred from phase 2 to phase 5. The bifacial nodule pps 2 shows an off-centred ridge, located towards one of the edges, at the bilateral equilibrium plane on each face of a phase 3, 4 and 5 point. Phase 1 and phase 2 from bifacial nodule pps 1 and bifacial nodule pps 2 cannot be distinguished from each other. If the lenticular cross-section is fully recreated in a phase 4 point, it is not possible to tell from that phase 4 point whether it has been knapped with the bifacial nodule pps 1 or bifacial nodule pps 2 (SOM Figure 1).

2.3 Bifacial blade point-production strategy (bifacial blade pps)

The bifacial blade point-production strategy (bifacial blade pps) does not follow the basic concept for typical bifacial shaping as described by, for example, Inizan et al. (1999). It begins with a blade blank. From phase 1 to phase 2 the rough-out is knapped using the ventral side of the blade as a platform. Invasive flakes are detached to shape the dorsal side. The majority of these terminate by the ridges on the original blade blank, resulting in a wedge-shaped or keeled cross-section. Occasionally, areas on the dorsal side are left un-flaked, and instead, sections of the lateral edges of the original blade become part of the rough-out outline. Since the ventral side is left unworked, it is not relevant to mention away-from-edge or on-edge knapping in these phases. The knapping performed on the rough-out in this phase is similar to knapping from a plain platform surface. The size of the rough-out is smaller than that used for bifacial nodule pps 1 and bifacial nodule pps 2. Going from phase 2 to phase 3, the rough-out is flipped, and the dorsal side is used as platform to detach invasive flakes running over the ventral side of the original blade. The result is a wedge-shaped, keeled or dislocated semi-circular cross-section. The bifacial equilibrium plane is not centred. The ridge at the bilateral equilibrium plane on each face of a phase 3 preform follow ridges on the original blade on one side and is indistinct, not centred or centred on the other side. The flipping procedure is repeated going from phase 3 to phase 4. Throughout the reduction process the outline size of the preform changes less compared to bifacial nodule pps 1 and bifacial nodule pps 2. From phase 4 the final retouch results in a phase 5 or finished point. The bifacial blade pps strategy creates a diamond-shaped cross-section on phase 4 and phase 5 points. Sometimes, the blade is knapped initially using the dorsal side as platform. The bifacial blade pps is recognised throughout the production phases by the selection of a blade as a blank. In addition, in phase 2 and phase 3 it is recognised by its wedge-shaped or keeled cross-section on rough-outs and preforms. Phase 4 and phase 5 points are recognized by their diamond-shaped cross-sections.

2.4 Bifacial flake point-production strategy (bifacial flake pps)

The bifacial flake point-production strategy (bifacial flake pps) is set up in a similar way to the bifacial blade pps. What differs is that the bifacial flake pps starts with a flake blank. The bifacial flake pps is recognised by its triangular cross-section in phase 2 and phase 3, and its dislocated semi-circular cross-section in phase 4. Another trait is that the platform of the original flake blank forms the base of the finished point. Hypothetically, if a point made with the bifacial flake pps is worked into a lenticular cross-section, and the platform of the original flake blank is removed, then this point-production strategy cannot be distinguished from a phase 4 or phase 5 point made with the bifacial nodule pps 1 or bifacial nodule pps 2. The flake blank used for the bifacial flake pps is wider than the blade blank used for the bifacial blade pps. It must be straight, and needs to have a long, coherent dorsal ridge running from the platform to the distal end.

2.5 The unifacial point-production strategy (unifacial pps)


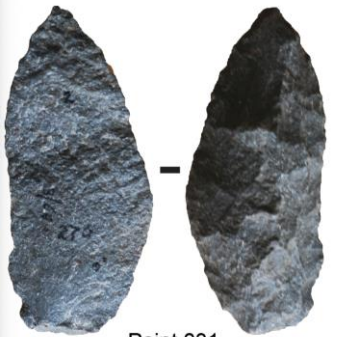


The unifacial point-production strategy (unifacial pps) starts with a flake or blade blank. From phase 1 to phase 2 the rough-out is knapped using the ventral side of the flake or blade as a platform. Invasive flakes are detached to shape the dorsal side. The majority of these terminate by the ridge(s) on the original flake or blade blank. In this phase of production, the unifacial pps is comparable to the bifacial blade pps and bifacial flake pps described above, but the approach differs in one important aspect. During the unifacial pps, the ventral side of the flake or blade blank is not worked throughout the whole production process. This means that from phase 2 to phase 4 the rough-out and preform is formed by invasive flaking, normally covering the whole dorsal side of the original blank. From phase 4 the final retouch and results in a phase 5 or finished point with flake scars present only on the dorsal side. The ventral side is left with its original blank surface. A few pieces are exceptions, with the flake or blade initially knapped from the dorsal side, and hence with detachment over the ventral side. This pps is recognised first and foremost by its unifacial knapping. Phase 2 rough-outs from the unifacial pps and bifacial blade pps, as well as bifacial flake pps cannot be distinguished from each other.

SOM Table 2. Attributes that we used for differentiating point-production strategies, described for a phase 2, 3 and 4 point.

Cross-section			
<i>Point-production strategy</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Phase 4</i>
Bifacial nodule pps 1	Lenticular, irregular	Lenticular	Lenticular
Bifacial nodule pps 2	Lenticular, irregular	Rhombic, biconvex	Rhombic, biconvex
Bifacial blade pps	Wedge-shaped or keeled	Wedge-shaped, keeled or dislocated semi-circular	Diamond shaped
Bifacial flake pps	Triangular	Triangular or dislocated semi-circular	Dislocated semi-circular
Unifacial pps	Triangular	Triangular or dislocated semi-circular	Semi-circular
Ridge at the bilateral equilibrium plane on each face of the point			
<i>Point-production strategy</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Phase 4</i>
Bifacial nodule pps 1	Not clearly defined	Not clearly defined	Centred
Bifacial nodule pps 2	Not clearly defined	Off-centred, located towards one of the edges	Off-centred, located towards one of the edges
Bifacial blade pps	Follow original ridge on blade on one side. No ridge on the other side	Follow original ridge on blade on one side. Indistinct, not centred or centred on the other	Follow original ridge on blade on one side. Indistinct, not centred or centred on the other side
Bifacial flake pps	Follow original ridge on flake on one side. No ridge on the other	Follow original ridge on flake on one side. Indistinct or not centred on the other	Follow original ridge on flake on one side. Indistinct or not centred on the other side
Unifacial pps	Follow original ridge on flake or blade on one side. No ridge on the other side	Follow original ridge on flake or blade on one side. No ridge on the other side	Follow original ridge on flake or blade on one side. No ridge on the other side
Placement of the bifacial equilibrium plane			
<i>Point-production strategy</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Phase 4</i>
Bifacial nodule pps 1	Centred	Centred	Centred
Bifacial nodule pps 2	Not centred	Not centred	Not centred
Bifacial blade pps	-	Not centred	Centred
Bifacial flake pps	-	Not centred	Not centred
Unifacial pps	-	-	-
Worked on both sides			
<i>Point-production strategy</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Phase 4</i>
Bifacial nodule pps 1	Yes	Yes	Yes
Bifacial nodule pps 2	Yes	Yes	Yes
Bifacial blade pps	No	Yes	Yes
Bifacial flake pps	No	Yes	Yes
Unifacial pps	No	No	No
Other characteristics			
<i>Point-production strategy</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Phase 4</i>
Bifacial nodule pps 1			
Bifacial nodule pps 2		Away-from-edge knapping using two platforms	
Bifacial blade pps		Pressure flaking sometimes used for thinning point	
Bifacial flake pps	Platform from original flake visible on point butt	Platform from original flake visible on point butt	Platform from original flake visible on point butt
Unifacial pps	Platform from original flake or blade visible on point butt	Platform from original flake or blade visible on point butt	Platform from original flake or blade visible on point butt

3. Examples of Primrose Ridge points defined according to production phases and point-production strategies

SOM Table 3. Exemplification of how four points, illustrated in Figure 4 in the main text, were defined according to production phases and point-production strategies in line with our approach. Note, point illustrations in this figure are not to scale. For correct scale, see Figure 4 in main text.

 <p>Point 001</p>	<p>Quartzite, phase 4, bifacial flake pps (BFPPS). Dislocated semi-circular cross-section. The ridge at the bilateral equilibrium plane follows original on the flake on one side (to the right in figure) and is indistinct on the other side. The placement of the bilateral equilibrium plane is not centred. The platform of the original flake blank is slightly visible at base of the point (to the right in the figure). Final retouch (phase 5) not completed.</p>
 <p>Point 031</p>	<p>Quartzite, phase 2 and bifacial blade pps (BBPPS). Ventral side unworked. Original platform on the blade blank clearly visible on the ventral side at the base of the point, together with bulb of percussion and impact scars (to the left in figure). Invasive flaking on dorsal side, with a majority of these terminated by the ridge on the original blade blank. Wedge-shaped cross-section. Working on both side (phase 3) not started.</p>
 <p>Point 033</p>	<p>Quartzite, phase 5 and unifacial point-production strategy (UPPS). Ventral side of the blade blank not worked (to the left in figure). Dorsal side formed by invasive flaking, following original ridge on the blank and covering the whole dorsal side of the original blank. Semi-circular cross-section. Final retouch completed.</p>
 <p>Point 047</p>	<p>Quartz, phase 3 and bifacial nodule point-production strategy version 1 (BNPPS1). A preform shaped as a point by invasive surface-covering flake removals using both away-from-edge as well as on-edge knapping. Some of the flakes reach over the not clearly defined ridge at the bilateral equilibrium plane. Edges are regular. Lenticular cross-section. Ridge at the bilateral equilibrium plane on each face of the point (phase 4) not centred.</p>

References

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