



The points from Primrose Ridge: A possible Still Bay workshop on the Gauteng Grassland of South Africa

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ABSTRACT

With this contribution we re-introduce a Middle Stone Age point assemblage from the Gauteng Grassland. Whilst the open-air site can no longer be excavated or dated, an updated interpretation of the Primrose Ridge points has the potential to shed new light on the Middle Stone Age occupation of the Witwatersrand. We apply a fine-grained approach, developed for compiling intra- and inter-assemblage comparative data, to assess how the Primrose Ridge points compare to some other Middle Stone Age point assemblages. We demonstrate that most of the points from Primrose Ridge conform to what can be expected from Still Bay point assemblages in terms of invasive bifacial retouch, lenticular cross sections and semi-circular or pointed butts as originally defined. *In situ* anvil boulders surrounded by fresh quartz chips recorded in the 1940s, and knapping mistakes provide reasons to think of Primrose Ridge as a workshop or production site for Still Bay-like quartz points. If our interpretation is correct, Primrose Ridge could have been used during the Still Bay phase – in terms of relative chronology – representing the first tentative record of this technocomplex on the Grassland Biome of interior South Africa.

Keywords: point production, Pietersburg Industry, *Levallois*, bifacial retouch

1. Reintroducing the Primrose Ridge assemblage

Harcus (1945) reported on *A Middle Stone Age Industry from Primrose Ridge District, Germiston, Transvaal*, which he excavated during 1943-1944, and selected specimens that he thought were worthy of display from the thousands found during the dig. On 14 December 2023, Matt Lotter (then of the Palaeo-Research Institute, University of Johannesburg), visited the Bill Stewart Municipal Nature Reserve in the Gauteng Province adjacent to Plot 170, where the Primrose Ridge deposit was excavated, finding that the site was destroyed by urban development (Fig. 1). Harcus' report and curated assemblage are the only records of the people who once used the site located on an outcrop in the Grassland Biome of South Africa. We suggest that the assemblage is worth revisiting and rethinking with our current understanding of the Middle Stone Age sequence in southern Africa (Lombard et al. 2022).

Harcus' attention was drawn to the archaeology of Primrose Ridge when he found yellowish brown quartzite Stone Age artefacts in the flat plain (the floodplain of the Jukskei River) north of and below the ridge (Harcus 1943). A cleaver and two handaxes all exceeding ~15 cm in length seemed to represent the Acheulean (see Lotter et al. 2022). Smaller (<8 cm in length), completely retouched pointed artefacts amongst the tools (Harcus 1943), however, alluded to the Middle Stone Age. Subsequently, house-foundation trenches erroneously dug on Plot 170 (Primrose Hill Township) inadvertently exposed a ~45 cm deep, stratified anthropogenic deposit on underlying red and yellow shale located on the sunny north-facing, wind-protected slope of Primrose Ridge, just below a six-foot high rocky outcrop (Harcus 1945). From the foundation trench Harcus collected a white quartz ovoid bifacial point that he interpreted as being pressure-flaked and in excellent condition except for its missing tip, and chips suggesting a factory site. He went on to excavate the site of ~15x5.5 m in ~12 cm spits to bedrock – selecting artefacts from the sieving station as the digging progressed.

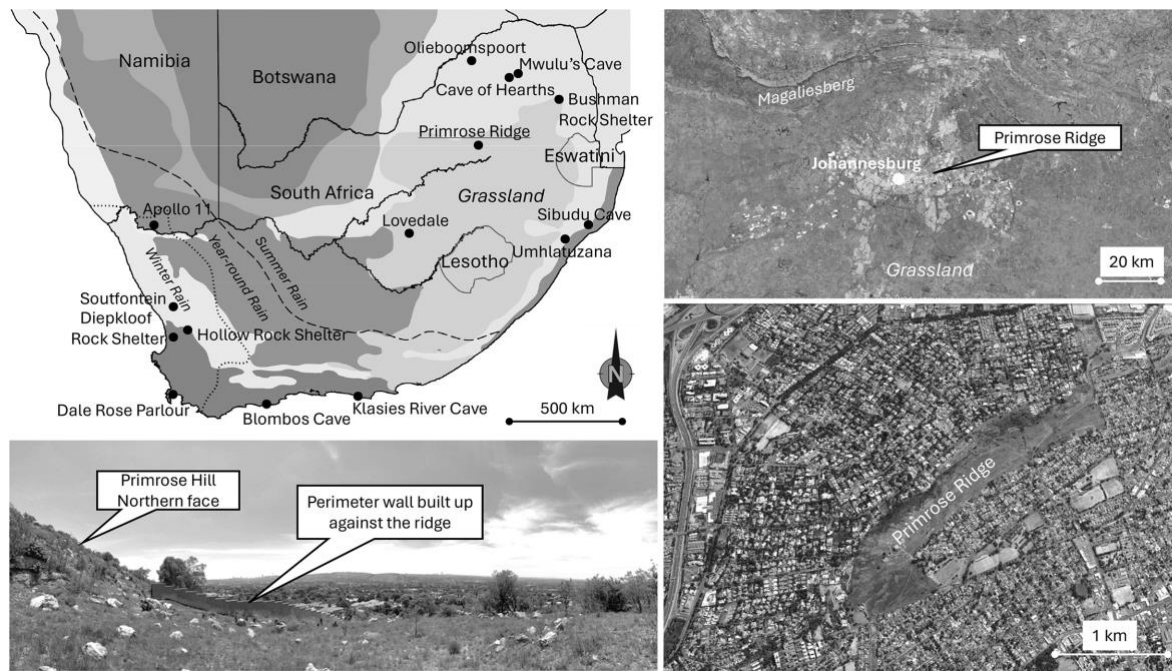


Figure 1. Top left: map of South Africa demarcating the Grassland Biome in the medium grey area (darker and lighter areas indicate other biomes as described in Rutherford et al. 2006), with the location of Primrose Ridge and other sites mentioned in our text. Bottom left: the northern face of Primrose Hill today (Photo ©Matt Lotter). Top right: satellite image of the Witwatersrand area and the city of Johannesburg surrounding Primrose Ridge with the Magaliesberg forming the northern boundary of the Grassland Biome. Bottom right: the Primrose Ridge located within the Bill Stewart Municipal Nature Reserve.

Harcus' (1945) interpretation of Primrose Ridge being a factory site was confirmed when the excavation revealed boulders with scars that seem to have served as *in situ* anvils surrounded by fresh chips (i.e., flakes and debitage). He described the excavated assemblage as being predominated by carinated points shaped like up-turned boats (which he dubbed *Navis* points – *navis* being Latin for ship), averaging ~90 mm in length, 28 mm wide and 25 mm thick. Another type was represented by delicately pressure trimmed, bifacial pointed ovoid “blades or spearheads” (Harcus 1945: 460). These measured about 95x44x13 mm, and sometimes were produced on dark quartzites. He observed no dark quartzite chips in the sieve, suggesting that these artefacts were not knapped on site, and reported only six so-called typical Pietersburg points, and two “equilateral triangular points with transversely concave flake undersides, carefully trimmed on the upper or convex face” (Harcus 1945: 460). He concluded that the Primrose Ridge assemblage does not represent the Pietersburg Industry, but that it represents a new type-centre, with novel ideals and a more extensive use of materials such as chert, climaxing in the use of white vein quartz – the “Primrose Ridge Culture” (Harcus 1945: 462).

Mason (1957) included the Primrose Ridge assemblage in his statistical analysis of the Transvaal Middle Stone Age, based on the six-bed Middle Stone Age sequence at the Cave of Hearths. He (Mason 1959: 120) reported 1570 “primary class specimens with statistical significance”, including what he termed quadrilateral and rectangular flakes, backed end-struck flakes, hemi-lemniscates (bifacial points), opposed arcs (double pointed tools), ellipticals, ogives (probably unifacial points), and *outils écaillés*. In general, he found the Primrose Ridge assemblage to be smaller compared to what he thought of as the Pietersburg Standard Series range, with a less extensive use of the *Levallois* technique, a more extensive use of plain platforms, a tendency to remove the platform altogether and more frequent bifacial production strategies (Mason 1957). Like Harcus, Mason therefore excluded the Primrose Ridge assemblage from the Pietersburg, instead lumping it with that of the neighbouring Linksfield Ridge into a Transvaal variant of the later Sangoan. The Sangoan is used commonly, but vaguely, further north in sub-Saharan Africa for industries that are later than the final Acheulean and that contain rather massive picks in addition to other large tool types. According to Taylor (2022), an age of ~300-250 ka may be an underestimation, but the paucity of well-stratified Sangoan assemblages prohibits the understanding of its technological characteristics and variability.

In southern Africa, Davies (1952) initially thought that the so-called Tugela Industry of KwaZulu-Natal (see Cramb 1937) had an affinity with the Sangoan of central Africa. He later self-corrected – concluding that the term was misapplied to industries that were too widely separated in age and distribution and too poorly defined to allow for its use in South Africa (Davies 1976). However, he described how at several sites the Tugela Industry or Natal Sangoan was overlain stratigraphically by Middle Stone Age layers, some of which contained Still Bay points, that have now been described from stratified contexts at Sibudu Cave (Wadley 2007) and Umhlatuzana Rock Shelter (Högberg & Lombard 2016a, b), generally dating to >70 ka (Jacobs et al. 2008; Lombard et al. 2010). The Primrose Ridge assemblage lacks the large picks and other large tools associated with the Sangoan but does have a relatively large non-*Levallois* retouched point assemblage.

Clark (1959) likened what Harcus (1945) described as tea cosy fabricators and high-backed boat-shaped tools worked on the dorsal side only, to the proto-Still Bay or Lupemban Industry of the Upper Zambezi Savannah and Grassland regions. The type-fossil of the Lupemban is the elongated bifacial lanceolate point that may exceed 30 cm in length (Taylor 2022); core-axes, points of different shapes and dimensions, blades, and other small tools are all also attributed to the Lupemban (Taylor 2021). Similar to the Sangoan, the Lupemban remains poorly dated, and where dates exist, they are disputed (Herries 2011) and range from >200 ka (Barham 2012), to as young as MIS 3 (57-29 ka) at some sites (Basell 2013). Thus, the Lupemban remains poorly defined and understood (Taylor 2021), and the Primrose Ridge assemblage lacks its elongated bifacial lanceolate type-fossil and core axes.

The Pietersburg, defined as containing bifacial points shaped like “wide almonds” with “perfectly round” butts measuring between ~50 and 64 mm and thought to represent a “step towards” making Still Bay points (Goodwin and van Riet Lowe 1929: 110, 119), too remains poorly defined although generally dated from stratified Middle Stone Age contexts (see de la Peña et al. 2019 for full historical discussion of the Pietersburg). Mason speculatively placed the Pietersburg of the Transvaal earlier than the Mossel Bay and Still Bay (at the time thought to be only present in the Cape) in his Middle Stone Age sequence, concluding that: “most important is the need for additional dynamic, evolutionary evidence that can come only from the excavation of more long-sequence sites such as the Cave of Hearths” (Mason 1957: 136). Such long-sequence Middle Stone Age sites have been excavated, and some contexts dated. For example, age estimates for so-called Pietersburg assemblages included in Mason’s (1959) analysis are that of Olieboomspoor now dated to ~150±14 ka (Val et al. 2021) and Mwulu’s Cave dated to ~90 ka (Feathers et al. 2020). At Olieboomspoor Val et al. (2021) found that it does not represent a clear chrono-cultural unit, and for Mwulu’s Cave, Feathers et al. (2020: 15) do not assume that Pietersburg is a proper label for its stone tools, seeing it as more of a “catch-all category” rather than a useful archaeological entity.

Whilst their point descriptions remain unreported, at Border Cave in KwaZulu-Natal, the Pietersburg phase has been dated to MIS 5 (130-80 ka) (Grün & Beaumont 2001; Grün et al. 2003), and Porraz et al. (2018) dated it at Bushman Rock Shelter, Mpumalanga, to 73±6 ka and 75±6 ka on quartz and to 91±10 ka and 97±10 ka on feldspar. The numerical age estimates suggest a probable duration of ~132-73 ka with a median age of ~91 ka. Age estimates for the Mossel Bay at Blombos Cave, Hollow Rock Shelter, and Klasies River in the Western Cape have a median value of 88.2 ka with the most probable duration of the technocomplex currently seen as 98.4-77.4 ka (Lombard et al. 2022). Based on 117 dating data points, from sites such as Klasies River, Blombos Cave, Sibudu Cave, Umhlatuzana Rock Shelter, Diepkloof Rock Shelter and Apollo 11, the probable duration of the Still Bay technocomplex lies at 88.8-67.4 ka with a median age of 75.2 ka (Lombard et al. 2022). These dating outcomes would place the Pietersburg generally earlier than the Still Bay technocomplex, should it become clearly defined as a southern African technocomplex.

For the invasively retouched *Navis* points from Primrose Ridge, Harcus (1945: 461) reported pointed, semi-circular as well as straight butts, expressing the sentiment that: “it will be interesting to know if there are any specimens of this type, the *Navis*, in other collections”. He further acknowledges that he has not done justice to the smaller (~50x19x10 mm), very fine and delicate bifacial points in white quartz with rounded butts, “bespeaking highly skilled technique in this difficult material” (Harcus 1945:

461-462). Working on the Grassland interior, it perhaps did not cross his mind to look at Goodwin and van Riet Lowe's (1929) definition of the Still Bay type fossil as a thin (≤ 10 mm), invasively retouched, bifacial, foliate or lanceolate point with semi-circular or wide-angled pointed butt, and lenticular cross-section.

Our work on the complete Still Bay point assemblages from Hollow Rock Shelter, Umhlatuzana Rock Shelter, Apollo 11 and Sibudu Cave, as well as some points from Blombos Cave, revealed at least five point-production strategies with four phases each, resulting in a range of cross-sections (e.g., lenticular, rhombic, wedge-shaped, semi-circular and triangular), and pointed, semi-circular as well as straight butts (Högberg & Lombard 2016a; Lombard & Högberg 2018), configurations of which may vary through time and across space throughout the Still Bay phase (Lombard et al. 2019). Although at the KwaZulu-Natal sites of Sibudu and Umhlatuzana bifacial point production occurs intermittently throughout their sequences (e.g., Kaplan 1990; Wadley 2012; de la Peña et al. 2013; Mohapi 2013), points from non-Still Bay contexts mostly lack the typical semi-circular or pointed butts and slender shape, so that Still Bay point assemblages remain relatively distinct. At first glance, Marcus' descriptions and illustrations are reminiscent of Still Bay point assemblages (see plates Y and Z in Marcus 1945: 463-464). This observation provided the impetus for the study we present below where we apply our approach for comparative analysis of retouched point-production strategies and morphometric attributes to assess to which extent the Primrose Ridge point assemblage is similar or different from other Still Bay point assemblages or point assemblages pre- or post-dating the Still Bay phase, and whether it could represent a point-manufacturing workshop on the Gauteng Grassland.

2. Sample and approach

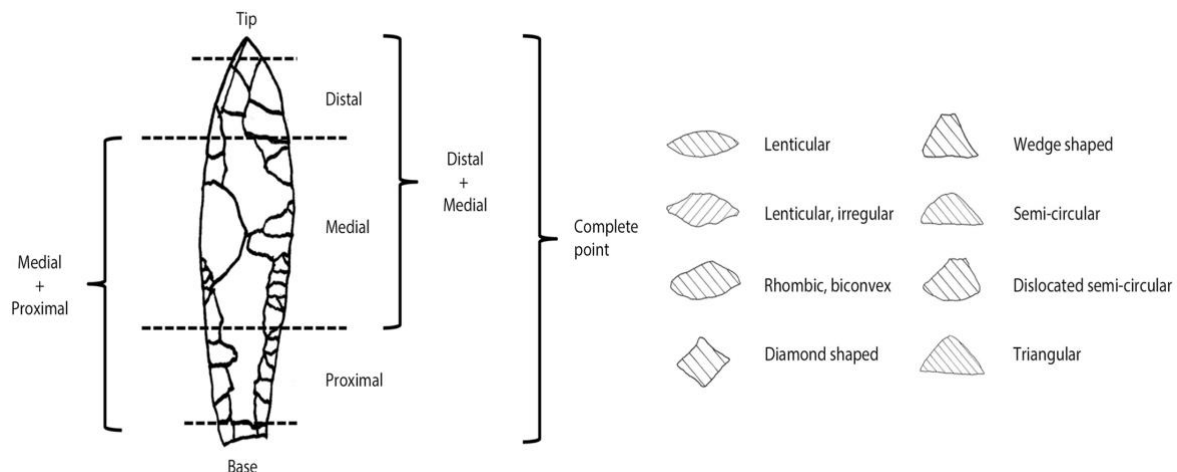
The Primrose Ridge assemblage is curated by the Archaeology Division of the University of the Witwatersrand without field notes, and artefacts are in boxes without any stratigraphic context. We were thus unable to reconstruct a possible artefact sequence from Marcus' layered excavation. Our purpose with this study is to assess whether the Primrose Ridge assemblage contains a point assemblage consistent with what can be expected for the Still Bay technocomplex, and if so, how it compares to other Still Bay point assemblages. To achieve this, we follow the approach outlined in Högberg and Lombard (2016a), and Lombard and Högberg (2018) wherein qualitative data for each point are presented in supporting online material (SOM) 1, with analyses conducted in a replicable quantitative manner conducive of directly comparing large samples – not possible with more traditional and subjectively descriptive *chaîne opératoire* approaches. We found 112 points and point fragments from Primrose Ridge in different phases of production, that could be analysed in the same manner we used for Still Bay point production, which we therefore refer to below as Still Bay-like. We found six more points (5% of the point assemblage) that could not be analysed in the same way, because they were made with a *Levallois* knapping strategy. We provide their description following the method published for *Levallois* point production described in Högberg and Lombard (2022)¹.

We gave each point a unique study number, and recorded its basic morphometric attributes (maximum length, width and thickness). Alongside details such as raw material and dimensions, we documented qualitatively fragment type/completeness, base shape, cross-section, the alignment of the dorsal ridge at bilateral equilibrium, the position of the bilateral equilibrium plane, whether the point was worked on one or both sides, indication of pressure flaking, and the type of blank used for producing the point (Table 1; Fig. 2; SOM 1). Based on these criteria, we interpret the production phase and point-production strategy for each Still Bay-like piece according to Högberg and Lombard (2016a; Fig. 3; and see Table 1 in SOM 2 for previously published phase definitions). Note that, because both whole and fragmented points are included in our study, the total number of points for the analysis of each attribute varies.

¹ We did not find all the 'prime' artefacts depicted by Marcus (1943: plate B, 1945: plates Y & Z), some of which may have been used for displays or other purposes throughout the years and not reintegrated into the assemblage.

Table 1. Attributes, definitions and labels used for the Still Bay-like assemblage from Primrose Ridge. When not specified, definitions are from Högberg and Lombard (2016a).

Number	Each tool has been given a unique number for our analysis
Raw material	Quartz; Quartzite; Hornfels; Chert; Dolerite/Andesite; Siltstone
Dimension (Högberg & Larsson 2011: table 2)	Length: the longest line of the artefact, measured in mm along the length axis Width: the widest part of the artefact, measured in mm at a right angle to the length axis Thickness: the thickest part of the artefact measured in mm
Fragment type/completeness (Villa et al. 2009: table 4; Fig. 2)	Tip (T); Distal part (D); Medial part (M); Proximal part (P); Base (B); Distal+Medial part (D+M); Proximal+Medial part (P+M); Complete point (C); Almost complete point, missing the tip only (AC); Almost complete point, missing the base only (ACB)
Base shape (Villa et al. 2009: figure 1)	Pointed (PT); Straight (ST); Semi-circular (SC), is distinguished from straight by a continuous line with no 'corners'
Cross-section (Fig. 2)	Lenticular (L); Lenticular, irregular (LI); Rhombic, biconvex (RB); Diamond-shaped (DS); Wedge-shaped (WS); Semi-circular (SC); Dislocated semi-circular (DSC); Triangular (T)
Ridge at the bilateral equilibrium , on each face on the point	Not clearly defined (1); Centred (2); Off-centred, located towards one of the edges (3); Following original ridge on one side, no ridge on the other side (4); Following original ridge on one side, indistinct, not centred or centred on the other side (5)
Position of the bifacial equilibrium plane	Centred (C); Not centred (NC)
Worked on both sides	Yes (Y); No (N)
Indication of use of pressure flaking	Yes (Y); No (N)
Blank type	Nodule (N); Blade (B); Flake (F)
Production phase (Fig. 3 and SOM 2)	A blank, unmodified or slightly worked flake, blade or a nodule (1); Represents the initial shaping of a piece, showing the intentions of the knapper to produce a point (2); Is the point preform with several invasive surface-covering negative flake-removal scars and regular edges, but still larger than finished points from the same contexts (3); Represents advanced shaping with well-balanced point proportions, defined tip, base and edges, but lacking final retouch (4); A finished point (5)
Point-production strategy (pps) (Fig. 3).	Bifacial nodule pps 1 (BNPPS 1); Bifacial nodule pps 2 (BNPPS 2); Bifacial blade pps (BBPPS); Bifacial flake pps (BFPPS); Unifacial pps (UPPS)

**Figure 2.** Illustration, fragment type/completeness and cross sections for Still Bay-like points (re-worked from Högberg & Lombard 2022: S3 figure 2).

To assess similarities or differences with known Still Bay assemblages, we compare the results of the Primrose Ridge point assemblage with those of other sites for which we have appropriate comparative data. At Sibudu we found that the points of the pre-Still Bay phase dated to $\geq 77.3 \pm 2.7$ ka were relatively distinct from the Still Bay phases dated to ~ 73 -65 ka (Lombard et al. 2019), we therefore present these two phases separately in our comparative trait analysis, because they may reveal temporal trends in point-production strategies and morphologies. We also compare the Primrose Ridge points with those excavated at Hollow Rock Shelter dated to ~ 85 -68 ka (Högberg & Lombard 2022), Umhlatuzana dated to $\geq 71 \pm 5$ ka (Lombard et al. 2010), and Apollo 11 dated to 71 ± 3 ka (Vogelsang et al. 2010). We do not have point-production or cross-section and base-shape data for the following point assemblages: Blombos Cave Still Bay dated to ~ 78 -68 ka (Jacobs et al. 2020), Diepkloof Rock Shelter Still Bay ~ 88 -65 ka (Jacobs & Roberts 2017), Bushman Rock Shelter Pietersburg dated to ~ 97 -73 ka (Porráz et al. 2018), Olieboomspoor Pietersburg dated to ~ 164 -134 ka (Val et al. 2021), as well as White Painting Shelter and #Gi Pan in Botswana dated, respectively, to ≥ 66 ka (Robbins et al. 2000) and ~ 77 ka

(Brooks et al. 1990), but we do have morphometric data which we include in our analysis. We also include the undated Still Bay assemblages from Clanwilliam Dam, Dale Rose Parlour and Soutfontein, as well as the Pietersburg points from Cave of Hearths in our morphometric analysis. Our purpose for including all these Middle Stone Age point assemblages is to assess as best as possible where the Primrose Ridge point assemblage may fit in the sequence.

	Bifacial nodule point-production strategy version 1	Bifacial nodule point-production strategy version 2	Bifacial blade point-production strategy	Bifacial flake point-production strategy	Unifacial point-production strategy
Rock type used	Quartzite Quartz Silcrete Hornfels	Quartzite Silcrete	Quartzite Hornfels	Quartzite Silcrete Hornfels	Quartz Silcrete Hornfels
Phase 1					
Phase 2					
Phase 3					
Phase 4					

Figure 3. Illustration of identified point-production phases and point-production strategy (pps) for the Still Bay-like points from Primrose Ridge (see SOM 2 for detailed discussion of the production phases as previously published in Högborg & Lombard 2016a)². Phase 5, i.e. a finished point, is not illustrated in the figure.

3. Results

Description of the Primrose Ridge point assemblage

We identified six raw materials used for Still Bay-like point production at Primrose Ridge with most points made on quartz ($n=54$, 48%), followed by quartzite ($n=48$, 43%), five (4%) on hornfels, three (3%) on chert and one each (1%) on dolerite and siltstone (Table 2; Fig. 4). Most of the quartz points were made with the bifacial flake point-production strategy ($n=28$, 52%), followed by the unifacial point-production strategy ($n=14$, 26%), the bifacial nodule point-production 1 strategy ($n=11$, 20%), and one (2%) quartz point was made using the bifacial blade point-production strategy. For making the quartzite points, the Primrose Ridge knappers preferred the unifacial point-production strategy ($n=21$; 44%), followed by the bifacial flake point-production strategy ($n=14$, 29%), and the bifacial nodule 1 and bifacial blade point-production strategies were each used for making six (13%) points, whereas

² Wedge/triangular/semi-circular/dislocated semi-circular=keeled or double keeled=carinated points shaped like 'up-turned boats'.

only one (2%) was made with the bifacial nodule point-production strategy 2. The numbers of points made on the other raw materials are too small for interpreting preferred point-production strategies, but their data are presented in Table 2. Cumulatively, it would seem that most of the Primrose Ridge points were made with the bifacial flake (n=44, 39%), and unifacial (n=38, 34%) point-production strategies. The bifacial nodule 1 (n=19, 17%), bifacial blade (n=8, 7%), and bifacial nodule 2 (n=3, 3%) point-production strategies are all less represented.

Table 2. Summary of Primrose Ridge point material use, point-production strategies, morphometric data, and cross section and base shape. Number of points analysed=112 (see SOM 1 for qualitative details of each point). Percentage values are rounded off so that the totals may differ up to 1% from those of subdivisions.

Summary of materials used for point production																
Material	Quartz		Quartzite		Hornfels		Chert		Dolerite		Siltstone					
	n	%	n	%	n	%	n	%	n	%	n	%				
Total=112	54	48	48	43	5	4	3	3	1	1	1	1				
Production strategy	Bifacial nodule pps 1		Bifacial nodule pps 2		Bifacial blade pps		Bifacial flake pps		Unifacial pps		Indeterminate pps					
	n	%	n	%	n	%	n	%	n	%	n	%				
Quartz	11	20	0	0	1	2	28	52	14	26	0	0				
Quartzite	6	13	1	2	6	13	14	29	21	44	0	0				
Hornfels	0	0	2	40	1	20	1	20	1	20	0	0				
Chert	2	67	0	0	0	0	1	33	0	0	0	0				
Dolerite	0	0	0	0	0	0	0	0	1	100	0	0				
Siltstone	0	0	0	0	0	0	0	0	1	100	0	0				
Total=112	19	17	3	3	8	7	44	39	38	34	0	0				
Summary of morphometric data (note: all length data include only complete and almost complete pieces; other data include complete pieces and those for which maximum width and thickness could be measured)																
Morphology	Length			Width			Thickness			Ratios						
	Average	SD	CV	Average	SD	CV	Average	SD	CV	L:W	L:T	W:T				
Quartz	58	11.4	19.6	31.1	5.8	18.6	14.9	4.2	28.2	1.9	3.9	2.1				
Quartzite	72	15	20.8	35.3	6.6	18.7	14.7	3.9	26.5	2	4.8	3.6				
Other	69.2	7.7	11.1	32.2	5.6	17.4	13.6	4.7	34.6	2.1	5	2.4				
Total	65	14	21.5	33	6	18.2	15	4	27	2	4.3	2.2				
Cross sections and base shapes in relation to material use (note: 30 (27%) of base shapes not known)																
Shapes	Cross sections, total=112										Base shapes, total=82					
	Lenticular/Lent. Irr.		Rhomboid		Wedge-shaped		Semi-circ./Disloc. s-c		Triangular		Pointed		Semi-circular		Straight	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Quartz	25	46	2	4	0	0	22	41	3	6	15	28	16	30	13	24
Quartzite	8	17	2	4	2	4	26	54	10	21	8	17	1	2	21	44
Hornfels	2	40	0	0	0	0	3	60	0	0	1	20	2	40	0	0
Chert	2	67	0	0	0	0	1	33	0	0	1	33	2	67	0	0
Dolerite	0	0	0	0	0	0	1	100	0	0	1	100	0	0	0	0
Siltstone	0	0	0	0	0	0	1	100	0	0	0	0	0	0	1	100
Total	37	33	4	4	2	2	54	48	13	12	26	23	21	19	35	31

Most of the Still Bay-like quartz points from Primrose Ridge have lenticular cross sections (n=25, 46%), followed by points with semi-circular cross sections (n=22, 41%) (Table 2). Three quartz points (6%) have triangular, and two (4%) have rhomboid cross sections. The base shapes are relatively equally distributed across the quartz points with 16 (30%) having semi-circular, 15 (28%) having pointed and 13 (24%) having straight bases. By contrast, the predominant cross section amongst the quartzite points is semi-circular (n=26, 54%), followed by triangular (n=10, 21%), lenticular (n=8, 17%), with two points each (4%) having either rhomboid or wedge-shaped cross sections. Also different from their quartz counterparts, the quartzite points from Primrose Ridge mostly have straight bases (n=21, 44%), eight (17%) have pointed bases, and only a single quartzite point has a semi-circular base (Table 2). Again, the number of points for the other materials is too small for comparative purposes, but as a whole, most of the points (n=54, 48%) have semi-circular cross sections, followed by lenticular (n=37, 33%) and triangular (n=13, 12%) ones, with only a few having rhomboid or wedge-shaped cross

sections. The predominant base shape is straight ($n=35$, 31%), followed by pointed ($n=26$, 23%), and semi-circular ($n=21$, 19%) (Table 2). Morphometrically, there are no significant differences between the quartz and quartzite points from Primrose Ridge ($p=0.4525$; SOM 3), so that for the inter-site comparisons we do not separate between the two main raw material groups from the site.



Figure 4. Still Bay-like points from Primrose Ridge showing various raw materials, phases of production and point-production strategies: Point 001: quartzite, phase 4 and BFPPS; point 003: quartzite, phase 5 and BBPPS; point 016: quartzite, phase 4 and UPPS; point 019: quartzite, phase 3 and BNPPS1; point 031: quartzite, phase 2 and BBPPS; point 033: quartzite, phase 5 and UPPS; point 047: quartz, phase 3 and BNPPS1; point 053: hornfels, phase 3 and BNPPS2; point 056: hornfels, phase 3 and BFPPS; point 065: quartz, phase 3 and BFPPS; point 072: quartz, phase 3 and BFPPS; point 075: quartz, phase 3 and BFPPS; point 092: quartz, phase 5 and UPPS. See Table 3 in SOM 2 for more detailed examples of points defined according to production phases and strategies.

Six additional points were produced with a *Levallois* knapping strategy (SOM 1). These points were all made on quartzite, and three of them have plain butts formed by having the original flake-blank platform removed with a tranchet blow, resulting in a flat un-modified surface (Fig. 5). Two have faceted butts, and one was retouched so that the platform is no longer distinguishable. All six points were worked on their dorsal sides only, and four have extensive dorsal surface-covering flaking resulting in the same shape as a classic *Levallois* point. The remaining two points were retouched on both their left and right lateral sides of their tips covering the whole point (SOM 1).

The points from Primrose Ridge compared to Still Bay and other relevant assemblages

First, we present an inter-assemblage comparison of criteria originally used to define the Still Bay technocomplex, i.e., bifacial retouch, semi-circular or pointed butts, and lenticular cross-sections (e.g.,

Goodwin & van Riet Lowe 1929). In terms of invasive bifacial retouch, the frequency of the Primrose Ridge Still Bay-like points (82%) is most similar to that of other Still Bay assemblages with relatively high proportions of points with such retouch, e.g., the Hollow Rock (82.1%) and Umhlatuzana Still Bay assemblages (87.7%) (Fig. 6). Proportions of points with lenticular cross sections are relatively high for the Still Bay point assemblages of Sibudu (55.6%) and Umhlatuzana (48%), but the Still Bay-like points from Primrose Ridge with 33% are most similar to those from the Hollow Rock Still Bay (35.8%) and the Sibudu pre-Still Bay (28.6%) assemblages (Fig. 6). The Umhlatuzana Still Bay point assemblage has the highest frequency (61%) of points with semi-circular and pointed butts, followed by the Primrose Ridge Still Bay-like points (42%) and the Sibudu Still Bay assemblage (23.5%) (Fig. 6). Similar to the Still Bay knappers from Hollow Rock and Umhlatuzana, those at Primrose Ridge used the full suite of point-production strategies thus far recorded for Still Bay assemblages, and raw material use for point knapping varies between the sites (Fig. 6).

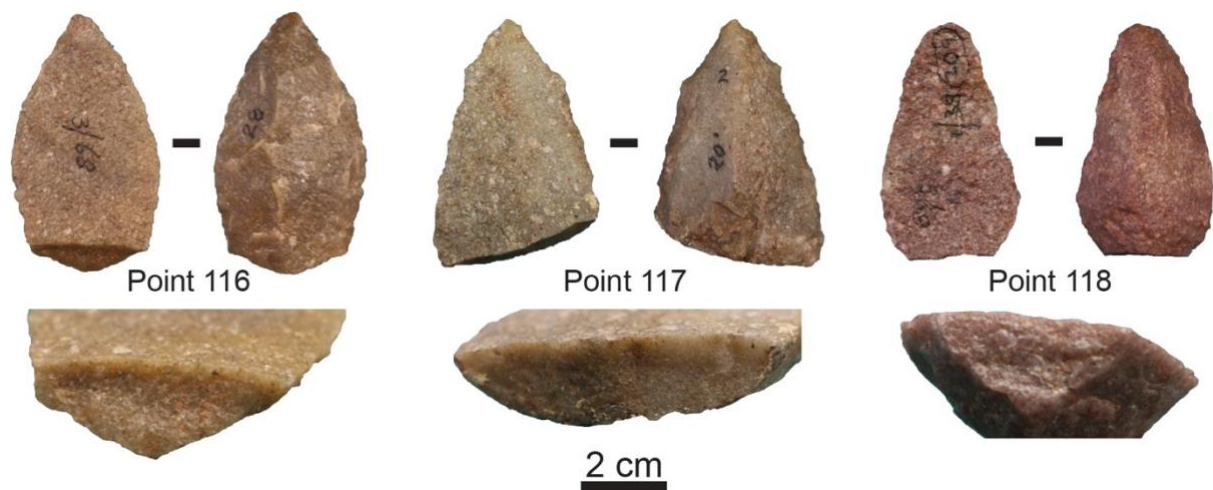


Figure 5. Levallois points from Primrose Ridge, point number 116, 117 and 118. Close up of each point’s butt, formed by a tranchet blow (not to scale).

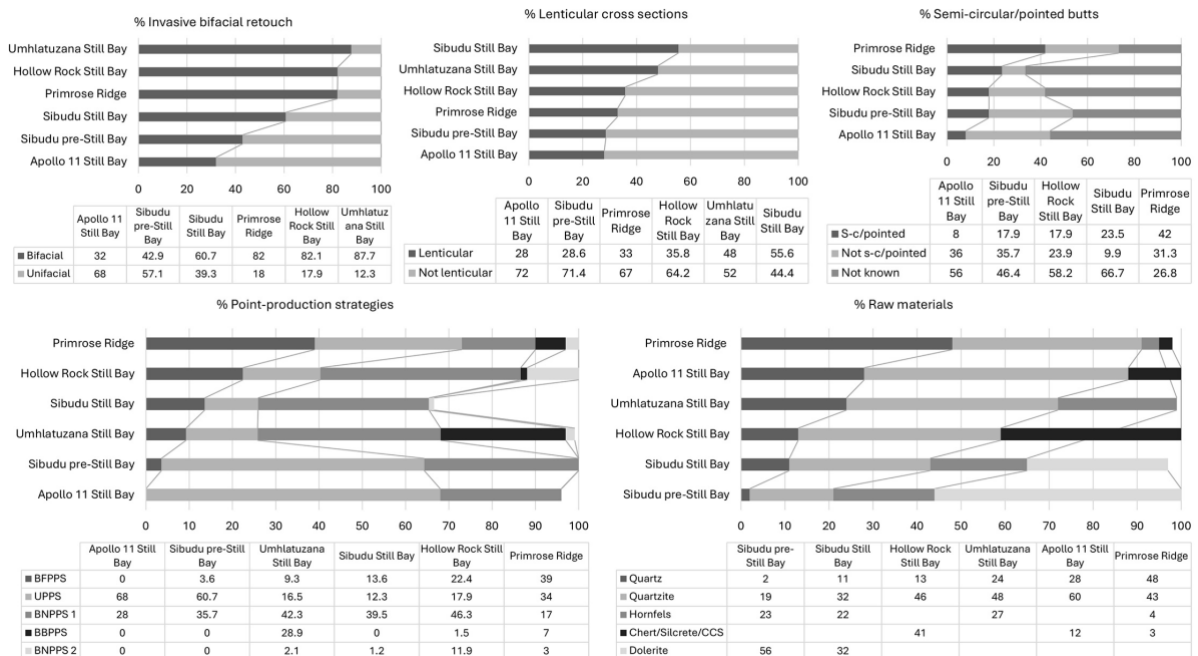


Figure 6. Some technical traits of Primrose Ridge Still Bay-like points compared to dated Still Bay/pre-Still Bay assemblages.

Box and whisker plots demonstrate that in terms of shape ratios, the Primrose Ridge Still Bay-like assemblage clusters most closely with some other Still Bay assemblages, whilst the six Levallois points

cluster with post-Howiesons Poort points in terms of their length:width (L:W) ratios, the points from ≠Gi Pan and White Paintings in Botswana in terms of length:thickness (L:T), and some Still Bay assemblages in terms of width:thickness (W:T) (Fig. 7). Statistically (Mann-Whitney U-tests; SOM 3), there are no significant ($p < 0.05$) differences between: a) The L:W ratios of the Primrose Ridge Still Bay-like points and those from the Apollo 11 ($p = 0.3502$) and Soutfontein ($p = 0.1158$) Still Bay assemblages; b) the L:T ratios of the Primrose Ridge Still Bay-like points and those from the Soutfontein ($p = 0.9473$), Clanwilliam Dam ($p = 0.6881$), and Diepkloof ($p = 0.5918$) Still Bay assemblages; and c) the W:T ratios of the Primrose Ridge Still Bay-like points and those from the Umhlatuzana ($p = 0.36$) and Soutfontein ($p = 0.3348$) Still Bay assemblages (Fig. 7). All other shape-ratio comparisons, apart from the Primrose Ridge *Levallois* points, show significant or highly significant ($p < 0.001$) differences (SOM 3).

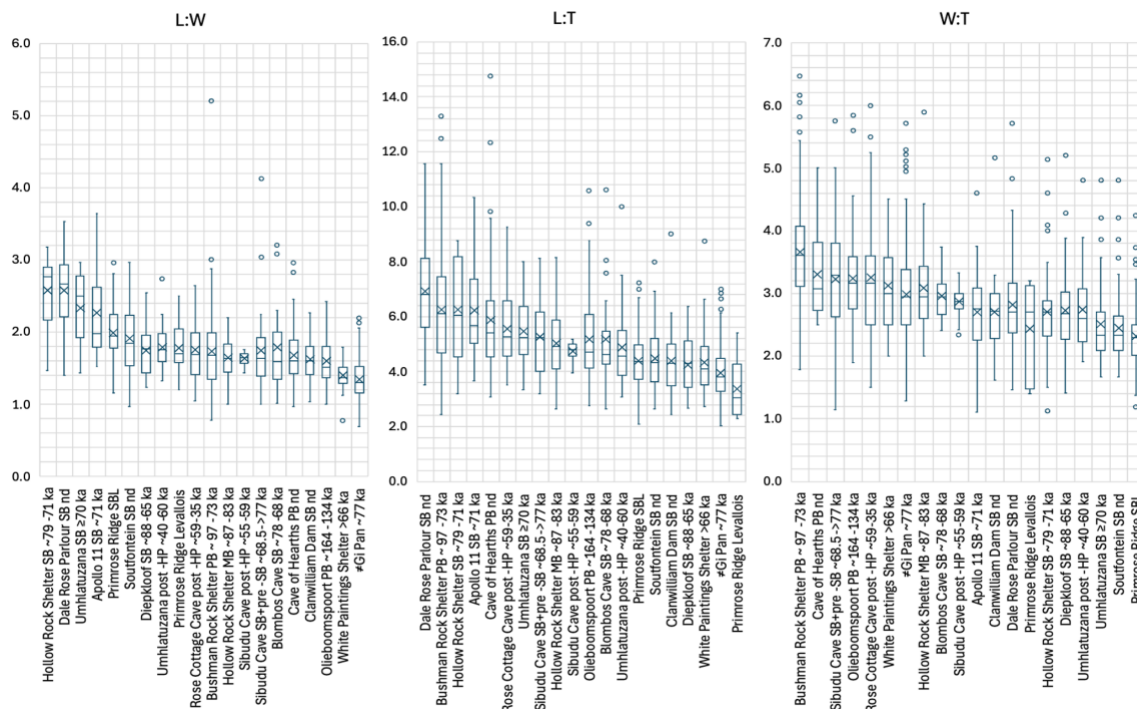


Figure 7. Comparative analysis of shape ratios arranged according to descending median values (horizontal lines within the bars).

4. Concluding discussion

Less than two decades ago, it was still thought that the Still Bay technocomplex was restricted to the Cape coastal regions of South Africa, and the so-called Pietersburg to the Savanna-Grassland Biomes north of the Vaal River. Both Marcus (1945) and Mason (1957) separated the Primrose Ridge point assemblage from what they perceived to be the Pietersburg Industry. Marcus, however thought that six pieces – probably those we identified as made with the *Levallois* technique – may represent the Pietersburg. The Pietersburg on the Gauteng Grassland, as well as at Cave of Hearths further northwest on the Savanna is *Levallois* based, but the six Primrose Ridge *Levallois* points do not group morphometrically with those from the purported Cave of Hearths and Olieboomspoor Pietersburg point assemblages. Instead, they group either with the younger post-Howiesons Poort assemblages dating to < 60 ka (also *Levallois* based, e.g., Dusseldorp 2014; Timbrell et al. 2022), or with the non-Still Bay assemblages from Botswana with age estimates contemporaneous with the Still Bay. At Hollow Rock Shelter, we found a Mossel Bay *Levallois* point-making tradition that may have started there at ~ 87 ka, and after ~ 83 ka the knappers started to also make Still Bay points even though some *Levallois*-type points remained in use throughout the site's Still Bay sequence until ~ 71 ka (Högberg & Lombard 2022). Thus, the six *Levallois* points from Primrose Ridge may be seen as: a) contemporaneous with the Still Bay-like points from the site; b) part of an earlier Mossel Bay-like technocomplex; or c) a younger intrusion into the Still Bay-like assemblage. Because they are so few and because the site itself cannot be re-excavated or dated, we may never know which is the more likely.

We demonstrated, however, that the Still Bay-like points from Primrose Ridge conform to what can be expected from Still Bay point assemblages in terms of invasive bifacial retouch, lenticular cross sections and semi-circular or pointed butts as originally defined by Goodwin and van Riet Lowe (1929), and subsequently recorded for points from dated Still Bay contexts (e.g., Wadley 2007; Porraz et al. 2008; Villa et al. 2009; Lombard et al. 2010; Högberg & Larsson 2011; Lombard & Högberg 2018). To our knowledge no other technocomplexes in southern Africa display this trait combination, even when they contain bifacially retouched points such as the final Middle Stone Age hollow-based points from Sibudu and Umhlatuzana in KwaZulu-Natal (Wadley 2005; Mohapi 2013). Pressure flaking has been confirmed for Still Bay assemblages from Blombos and Umhlatuzana (Mourre et al. 2010; Högberg & Lombard 2016b), but contrary to Marcus' (1945) interpretation of quartz pressure flaking at Primrose Ridge, we only found evidence of this knapping technique on two hornfels points (Fig. 8). Thus far, pressure flaking has not been consistently reported for any southern African Middle Stone Age technocomplexes other than the Still Bay. However, the bifacial and unifacial points from Sibebe in eSwatini dated to ~43 ka (Bader et al. 2022), require closer scrutiny with comparative work.

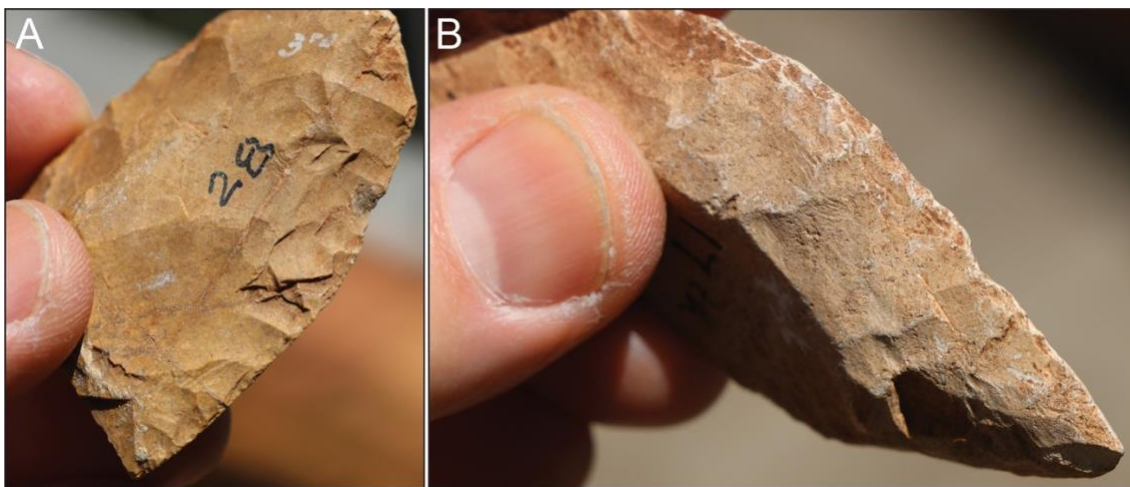


Figure 8. Close-up of the edges of Still Bay-like points number 053 (left) and number 054 (right), showing evidence of pressure flaking at Primrose Ridge. Both points are made from hornfels.

In terms of their shape ratios, the Primrose Ridge Still Bay-like points are almost indistinguishable from the undated points reported from Soutfontein, and show similarities with those from the Still Bay contexts of Apollo 11 (~71 ka), Diepkloof (~88-65 ka), Umhlatuzana (≥ 70 ka) and Clanwilliam Dam (undated). The Soutfontein points were recorded from an open-air site in the winter rainfall zone of the Western Cape (Mackay et al. 2010). Similar to the Primrose Ridge Still Bay-like points, they were mostly (66%) produced on local white vein quartz, show invasive bifacial retouch with a few unifacial points, and both semi-circular and pointed butts (Mackay et al. 2010, 2018). Hallinan and Parkington (2017) place the Soutfontein and Clanwilliam Dam assemblages within the Still Bay of the Olifants River Valley landscape, and Dewar and Stewart (2017: 17) see the Soutfontein assemblage as containing “tool forms diagnostic of the Still Bay”. The Soutfontein quartz pieces show breakage patterns consistent with knapping errors, suggesting that the points were produced onsite (Mackay et al. 2010). Because of the collection and curation history of the Primrose Ridge assemblage, we were unable to conduct a technological flake analysis (e.g., Högberg & Lombard 2016b), yet we found similar knapping errors on some of the quartz pieces from Primrose Ridge. Together with Marcus' (1945) observation about *in situ* anvil boulders surrounded by fresh quartz chips, it is reasonable to suggest that Primrose Ridge too served as a workshop or knapping site for quartz points (for discussion about earlier workshop sites on the Gauteng Grassland-Savanna ecotone see Lotter et al. 2024).

Mackay et al.'s (2022) reconstruction of Still Bay mobility patterns shows that Still Bay point knappers selected their raw materials in response to geological resources within river catchments. Along these catchments, open-air Still Bay point knapping sites show low raw material diversity, with local rocks dominating the assemblages. Primrose Ridge is located <2 km south of the Jukskei River on one of several ridges with quartz veins and pebble conglomerates in the Witwatersrand Basin (Tucker et al.

2016). Just north of the Jukskei River, a white quartzite ridge (Linksfield Ridge) with Orange Grove Quartzite, represents the lowermost stratigraphic layer of the basin. The ‘dark’ quartzite artefacts, that H Marcus (1945) saw as having been knapped elsewhere, may come from the iron rich quartzites of the West Rand Group ~40 km west of Primrose Ridge (Tucker et al. 2016). This would be consistent with Mackay et al.’s (2022) suggestion that Still Bay points were transported regularly over distances of 30-60 km, and the possibility that patterns in raw material selection and artefact transport were part of socially mediated choices and territory boundaries (also see Hallinan 2019).

Understood as a technocomplex – not a culture-historical unit (see discussion in Lombard et al. 2022) – Still Bay assemblages will share a place in the Stone Age sequence of southern Africa (i.e., above/younger than Mossel Bay-like *Levallois* horizons) and artefact classes (i.e., relatively slender, invasively retouched bifacial and unifacial points with rounded or pointed butts). Not all properties will, however, be identical through time (phases) or across space (local/regional knapping traditions). Each Still Bay assemblage is thus expected to include variations of the same family of artefacts as a response to socio-economic and/or environmental factors (e.g., Clarke 1968). A technocomplex, such as the Still Bay, can therefore be widespread, with subtle shifts in regional tool frequencies or design, whilst retaining broad similarities (e.g., Deacon 1980). Sackett (1982, 1986) discuss artefact shape as linked to shared traditions, but we see the fact that the Primrose Ridge Still Bay-like points so closely resemble the shape of those from far-away (>1000 km) Soutfontein as a result of raw material use within a spatiotemporally variable Still Bay technocomplex as mentioned above (also see Mackay et al. 2014; Högberg & Lombard 2016a).

Seen in this context, the technical traits (i.e., invasive bifacial retouch, lenticular cross sections and semi-circular or pointed butts) remained the shared stylistic tradition, but Still Bay shape ratios varied based on the quality and size restrictions of the different raw materials and perhaps on regional or intra-site shifts in point-making and maintenance traditions and phases (also see Archer et al. 2016, 2018; Lombard et al. 2019; Way & Hiscock 2021). We have previously demonstrated how ideas and/or artefacts can spread throughout the South African landscape within less than 15 years through social networks with travelling radii of up to 100 km operating along the coastline and river systems (Högberg & Lombard 2020) – with travelling radii of up to 60 km it will take ~25 years to spread across the landscape, i.e., within a single human generation. We now also know that, different from most other regions in the world, the southern African hunter-gatherer population show genetic continuity and similarity from the Cape to KwaZulu-Natal throughout the Holocene (Gretzinger et al. 2024). This implies social networks and the exchange of genes across the landscape for at least the last 12 000 years, perhaps reaching back into the Pleistocene – especially when considering the widespread appearance of technocomplexes such as the Howiesons Poort and Still Bay (Wadley 2015; Wurz 2021).

Primrose Ridge is forever lost as an archaeological site – only the H Marcus (1945) report and the artefacts he collected remain. Two developments over the last decade, however, made it possible to revisit the assemblage and present its artefacts in a new light. First, we now have a much better understanding of the distribution and dating of Stone Age technocomplexes across southern Africa (summarised in Lombard et al. 2012, 2022) – including the Still Bay that was previously discarded by Sampson (1974) and Volman (1984) – allowing for interpreting undated open-air sites in the broader chronological framework. Secondly, we developed and implemented the approach used here, specifically designed for comparative techno-morphometric analysis of non-*Levallois* bifacial and unifacial points from various sites and contexts. Different from exclusively morphometric studies (e.g., Archer et al. 2016, 2018; Way & Hiscock 2021), or traditionally descriptive *chaîne opératoire* approaches (e.g., Villa et al. 2009; Porraz et al. 2018; de la Peña et al. 2019) our approach is also able to describe and quantify variation and similarities in point-production strategies and the resulting technical traits.

When H Marcus (1945) reported on the three butt varieties of the Primrose Ridge *Navis* points, he wondered whether there were any other point assemblages with similar traits, and he understood that he did not do justice to the smaller, finely made white quartz bifacial points with rounded butts. Here we demonstrated that, yes, there are assemblages with similar traits and some of them, such as the points from Soutfontein, Apollo 11, and Umhlatuzana also have relatively small points made on quartz with

rounded butts – all of which have been identified as Still Bay point assemblages. We therefore conclude that the best-fit interpretation of the Primrose Ridge point assemblage is that it is consistent with what can be expected for Still Bay point assemblages, and that they do not signal the “novel ideals” of a “Primrose Ridge Culture” proposed by H Marcus (1945: 462). If our interpretation is correct, Primrose Ridge could have been used as a knapping site for quartz Still Bay points, perhaps sometime between ~89 ka and 67 ka, representing a provisional record of the Still Bay technocomplex on the Grassland interior of South Africa. The only other possible Grassland Still Bay site could be Lovedale in the Free State dated to ~70 ka (Wroth et al. 2022), but its point assemblage awaits formal description. Today, Gauteng is the most densely populated and built-up province of South Africa, but our hope is that this paper will stimulate new open-air Grassland research in areas still available for surveys, and that it may lead to research that could provide more robust evidence of a Grassland Still Bay.

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Supporting online material

[Lombard et al. Supporting Online Material File 1](#)

[Lombard et al. Supporting Online Material File 2](#)

[Lombard et al. Supporting Online Material File 3](#)

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