Journal of Archaeological Science xxx (2018) 1–30

Contents lists available at ScienceDirect

Journal of Archaeological Science

journal homepage: http://www.elsevier.com/locate/jas

A techno-functional perspective on quartz micro-notches in Sibudu's Howiesons Poort indicates the use of barbs in hunting technology

P. de la Peña [a, b, *], N. Taipale [c], L. Wadley [a], V. Rots [c, d, e]

[a] Evolutionary Studies Institute, University of the Witwatersrand, PO Wits 2050, Johannesburg, South Africa
[b] School of Geography, Archaeology and Environmental Sciences, University of the Witwatersrand, Johannesburg, South Africa
[c] TraceoLab / Prehistory, University of Liège, Place du 20-Août 7 (bât A4), 4000 Liège, Belgium
[d] Chercheur Qualifié du FNRS, Belgium
[e] Institute for Early Prehistory and Quaternary Ecology, University of Tübingen, Germany

ARTICLE INFO

Article history:
Received 28 May 2017
Received in revised form
28 February 2018
Accepted 2 March 2018
Available online xxx

Keywords:
Quartz
Notch
Barb
Projectile
Sibudu
Howiesons poort
Use-wear

ABSTRACT

In this paper we present the results of a use-wear study of quartz micro-notches identified during a technological analysis of lithics from the Howiesons Poort layers of Sibudu Cave. Building on the technological analysis and preliminary functional screening of the archaeological material, a series of experiments was designed to evaluate different hypotheses for notch formation (blank production, intentional notching, hafting, projectile use, and trampling). The experimental reference collection was compared with archaeological micro-notches and a large sample of other archaeological quartz pieces (including bladelets, bipolar blanks, flakes and retouched pieces). This allowed us to evaluate the causes of micro-notch formation in the studied assemblage. Results indicate two novelties in the Howiesons Poort hunting technology at Sibudu: the use of quartz barbs and non-retouched quartz blanks. It seems that in addition to backed pieces (segments, obliquely backed points, etc.), unretouched pieces were mounted as elements in hunting weapons during the Howiesons Poort techno-tradition. Seven probable and 29 tentative barbs were identified. We thus present one of the strongest and oldest bodies of evidence for the use of *barbs* as projectile elements.

1. Introduction

During the technological study of the quartz assemblage of the Howiesons Poort layer Grey Sand (GS) of Sibudu Cave, a new morphotype, the so-called micro-notch, was identified (de la Peña and Wadley, 2014a). These notches measure less than 3 mm in length, and mostly occur on automorphic (crystal) quartz. While some of the notches clearly resemble retouch, other pieces show more irregular macroscopic features, which make them a technologically ambiguous group.

Even though different types of notches have been frequently reported in Howiesons Poort assemblages, their production and/or links to tool use have not been yet examined through systematic experimentation. To shed light on the technological and functional properties of the micro-notched quartz pieces, we developed an extensive experimental and analytical programme focused on the micro-notches first identified in Sibudu's GS layer (de la Peña and Wadley, 2014a) (Fig. 1A–F). On the basis of preliminary functional analysis, we considered different hypotheses for the formation of these micro-notches, taking into account both accidental formation and intentional production. The objective was to discover how the micro-notches were formed, and to evaluate their functional significance. To reach this goal, we analysed a series of quartz micro-notches and other types of blanks with macro-traces from the GS layers (de la Peña and Wadley, 2014a,b), Grey Rocky (GR) (de la Peña, 2015a), Dark Reddish Grey (DRG) and Pinkish Grey Sand (PGS) using microscopes with both oblique and incident light sources.

We offer a variety of microscopic criteria that can help to identify functional and postdepositional causes of micro-notch formation in automorphic (crystal) and xenomorphic (vein) quartz in assemblages of all ages. We also identify two novelties in Sibudu's HP: the use of quartz barbs and the use of unretouched blanks as components of compound weapons. These findings serve as further evidence of the importance of quartz in Sibudu's HP and

* Corresponding author. Evolutionary Studies Institute, University of the Witwatersrand, PO Wits 2050, Johannesburg, South Africa.
E-mail address: paloma.delapenya@gmail.com (P. de la Peña).

https://doi.org/10.1016/j.jas.2018.03.001
0305-4403/

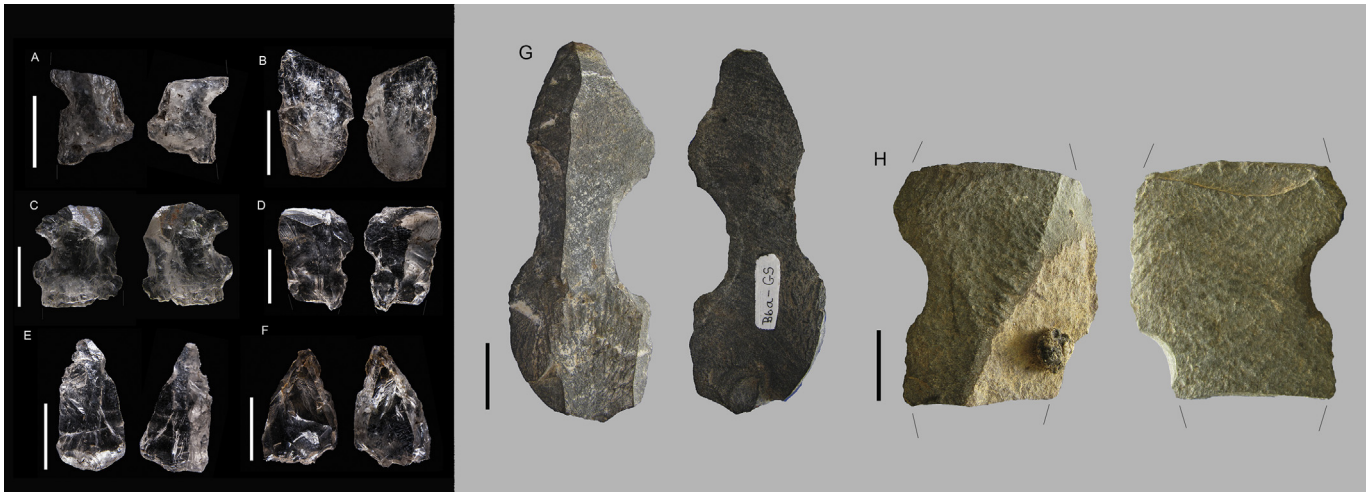

Fig. 1. Different types of notches from Sibudu Cave: A-F micro-notches in quartz. G Strangulated blade in hornfels. H. Notch in dolerite.

highlight the variability within this techno-tradition.

2. Background

2.1. Howiesons Poort

The Howiesons Poort (HP) of southern Africa is a well-known techno-tradition in the Middle Stone Age (MSA). Since its first inception, the HP has been considered unusual because of its so-called 'innovative technologies' reminiscent of the Later Stone Age/Upper Palaeolithic. Furthermore, it was thought to include symbolic implements that seemed out-of-place in MSA techno-traditions. Material culture associated with the HP includes backed stone tools, engraved ochre, bone technology and ostrich eggshell engravings (Singer and Wymer, 1982; Thackeray, 1992; Vogelsang, 1998; d'Errico and Henshilwood, 2007; Wadley, 2008; Backwell et al., 2008; Mackay and Welz, 2008; Texier et al., 2010; d'Errico et al., 2012; Henshilwood et al., 2014). Soon after its first discovery, the HP was relegated to an intermediate phase between the Later Stone Age and MSA, but its autonomous position within the MSA was later established through excavations in Klasies River, Peers Cave, Rose Cottage, Umhlatuzana, Border Cave and Apollo 11 (Wendt, 1976; Beaumont, 1978; Singer and Wymer, 1982; Wadley and Harper, 1989; Kaplan, 1990). For some researchers, the HP still represents an unusual or ephemeral technological development (Villa et al., 2012), whereas for others it is a proxy for complex cognition in the MSA because of the sophistication implied by the multiple action sequences required for processing material culture (Wadley, 2013). The attitudes of some other researchers to the HP are coloured by historiography, in particular a biased view of prehistory, in which European Upper Palaeolithic material culture is held as the standard for advanced culture and technology (Deacon, 1989; Wurz, 1999; McBrearty and Brooks, 2000; Shea, 2009; de la Peña, 2015b).

Even though the HP has received a great deal of attention, its definition still mainly relies on lithic typology. Initially the presence of backed blades was considered the main criterion for placing assemblages in this techno-tradition (Thackeray, 1992). During the last two decades, however, there have been notable efforts to redefine the HP from a technological point of view, using the assemblages from Klasies River (Wurz, 2000; Villa et al., 2010), Diepkloof (Porraz et al., 2013), Rose Cottage (Harper, 1997; Soriano et al., 2007), Pinnacle Point (Wilkins et al., 2017), Klein Kliphuis (Mackay, 2011) and Sibudu (Soriano et al., 2015; de la Peña, 2015a). Some PhD dissertations (for example Minichillo, 2005; Mackay, 2009), as well as southern African syntheses (see for example Mackay et al., 2014) also explore the relationships between MSA typology, environmental conditions and settlement patterns.

Some recent studies have also been dedicated to investigating the functions of backed pieces. They have been considered as versatile tools regardless of the raw material they are made on because they can be rotated and hafted in different ways to serve as elements of composite tools for tasks such as cutting (Wadley and Binneman, 1995; Wadley et al., 2009; Igreja and Porraz, 2013) or piercing when used as weapon tips (McBrearty and Brooks, 2000; Wadley and Mohapi, 2008; Lombard and Pargeter, 2008; Villa et al., 2010; Villa and Soriano, 2010; Lombard, 2011). It has been further suggested that the small quartz segments from Sibudu could have been hafted transversely and that hunting with bow and arrow may have been in use (Pargeter, 2007; Wadley and Mohapi, 2008; Lombard and Phillipson, 2010; Lombard, 2011; Pargeter et al., 2016). The suggestion that hunting with bow and arrow was practised in the HP at Sibudu is supported by the discovery of bone points that could have been arrowheads (Backwell et al., 2008, in press).

2.2. Sibudu and its Howiesons Poort industry

Sibudu Cave is located about 40 km north of Durban, KwaZulu-Natal, and 15 km inland of the Indian Ocean, on a cliff overlooking the uThongathi River. The shelter has a long occupation sequence that is dated by single grain optically stimulated luminescence (OSL) to between 77 ka and 38 ka ago (Jacobs et al., 2008a,b). The HP Industry comes from six square metres (squares B4, B5, B6, C4, C5 and C6) of Wadley's excavations into the deep sounding. The layers associated with the HP followed natural stratigraphy and are (from base to top): loose, pinkish-grey sand, called Pinkish Grey Sand (PGS3, PGS2 and PGS), silty, grey sand called Grey Sand (GS3, GS2 and GS), an ashy layer called Dark Reddish Grey (DRG) and grey sand with rock spalls called Grey Rocky (GR2 and GR) (Fig. 2). The subdivisions within each stratum (for example, GR2 and GR) are mostly based on the z readings of combustion features, but where such features are absent and strata are thicker than 5 cm, the subdivisions are spits. OSL ages for the HP are as follows: 64.7 ± 2.3 (PGS), 63.8 ± 2.8 (GS2) and 61.7 ± 2.0 ka (GR2) (Jacobs et al., 2008a).

As part of an attempt to define the HP, we elsewhere conducted

Please cite this article in press as: de la Peña, P., et al., A techno-functional perspective on quartz micro-notches in Sibudu's Howiesons Poort indicates the use of barbs in hunting technology, Journal of Archaeological Science (2018), https://doi.org/10.1016/j.jas.2018.03.001