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Engraved ochres from the Middle Stone Age levels at Blombos Cave, South Africa

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ABSTRACT

Powerful categories of evidence for symbolically mediated behaviour, variously described as 'modern' or 'cognitively modern' human behaviour, are geometric or iconographic representations. After 40,000 years ago such evidence is well documented in much of the Old World and is widely considered as typifying 'modern human culture,' but earlier evidence is rare. In Africa, this includes two deliberately engraved ochre pieces from c. 75,000 year old levels at Blombos Cave, Western Cape, South Africa and the greater than 55,000 year old incised ostrich egg shell from the Diepkloof shelter, located in the same province. Here we report on thirteen additional pieces of incised ochre recovered from c. 75,000–100,000 year old levels at Blombos Cave. These finds, taken together with other engraved objects reported from other southern African sites, suggest that symbolic intent and tradition were present in this region at an earlier date than previously thought.

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Introduction

Geometric and iconographic representations, elaborated burials, and personal ornaments are generally considered the archaeological expression of symbolically mediated behaviours. In Europe, some impressive manifestations date as early as 32 ka, for example at Chauvet Cave (Clottes, 2003). A number of objects bearing putative engravings have been reported from Lower and Middle Palaeolithic sites in Europe (Bednarik, 1995; Bahn, 1996; Lorblanchet, 1999). Some of these 'engravings' result from natural phenomena and carcass processing (d'Errico and Villa, 1997). However, a number can be interpreted as deliberate engravings (Langley et al., 2008), though none show complex structured designs. Evidence from the Near East and North Africa includes: an engraved cortex dated at c. 50 ka from the Mousterian site of Quneitra that could be associated with *Homo sapiens* or Neanderthals (Goren-Inbar, 1990; Marshack, 1996) and an engraved core from c. 90 ka levels at Qafzeh (Hovers et al., 1997). At the latter site, perforated and ochred marine shells associated with *Homo sapiens* (Bar-Yosef and Vandermeersch, 1993; Walter, 2003) come from the same levels, and a symbolically elaborated burial is reported at Qafzeh 11 (Vandermeersch, 1970). Perforated *Nassarius gibbosulus* shells, arguably used as beads, were recovered at Skhul from

c. 100 ka levels that include eleven *Homo sapiens* burials (Vanharen et al., 2006). Perforated shells of the same species showing use-wear consistent with suspension, and traces of red ochre were recovered from 82 ka levels at Grotte des Pigeons (Taforalt, Morocco; Bouzouggar et al., 2007).

Some archaeologists argue that 'symbolically mediated behaviour' (for definition see Wadley, 2001; Henshilwood and Marean, 2003, 2006; Henshilwood, 2007; Henshilwood and Dubreuil, 2009) emerged in Africa and link its origins with *Homo sapiens* (e.g., Knight et al., 1995; Watts, 1999, 2009; McBrearty and Brooks, 2000; Henshilwood et al., 2002, 2004; Henshilwood and Marean, 2003, 2006). According to this hypothesis, the appearance of modern cognitive behaviours in Eurasia, associated with *H. sapiens*, is the end result of an 'out of Africa' dispersal of an already symbolic species at c. 60 ka or earlier (e.g., Henshilwood and Marean, 2003, 2006; Forster, 2004; Mellars, 2006; Henshilwood, 2007). This migration model fits well with recent tracing of the patterns of mtDNA and Y chromosome DNA variation in people throughout the world (e.g., Forster, 2004; Forster and Matsumura, 2005). Other authors argue that Neanderthal behaviour may have independently developed along similar lines, possibly at a later stage (Zilhão, 2001; d'Errico, 2003; d'Errico et al., 2003). Explanatory hypotheses for the emergence of symbolic culture include biological change (Klein, 1995; McBrearty and Brooks, 2000; Klein and Edgar, 2002), demographic events triggered by climatic change (Barham, 2001; Henshilwood, 2008; d'Errico and Vanhaeren, 2009), and coalition strategies shaped by sexual selection in the

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context of later middle Pleistocene encephalization (Knight et al., 1995).

Material evidence supporting claims for symbolically mediated behaviour prior to 40 ka from African sites is, however, rare. In part this can be attributed to difficulties in interpreting early 'symbolic' objects. Marks or patterns on artefacts interpreted by some as symbolic (e.g., Knight et al., 1995; d'Errico et al., 2001; Henshilwood and Dubreuil, 2009) are argued by others to be natural or not intentional (e.g., Wadley, 2001; Klein and Edgar, 2002). Even when intent is accepted, some authors discount the significance of the claims on the grounds that they do not constitute systematic, continuous, and patterned symbolic behaviour (e.g., Chase and Dibble, 1987; Noble and Davidson, 1996: 210; Klein, 1999; Wadley, 2001; Klein and Edgar, 2002); the latter parameters are regarded, by some, as essential to any claim for behavioural modernity.

New evidence of symbolic behaviour from Middle Stone Age (MSA) sites is challenging the status quo. Chunks of ochre engraved with complex geometric patterns from c. 75 ka levels at Blombos (Henshilwood et al., 2002), engraved bone from Blombos and Klasies (d'Errico et al., 2001; Henshilwood et al., 2001b; d'Errico and Henshilwood, 2007), deliberate markings and engravings on MSA bone tools (Henshilwood et al., 2001b; d'Errico and Henshilwood, 2007), and engraved ostrich eggshell from Diepkloof dated at > 55 ka (Parkington et al., 2005; Rigaud et al., 2006) strongly imply symbolism. A recent robust claim for symbolically mediated behaviour at c. 75 ka is the recovery at Blombos Cave of forty nine deliberately perforated *Nassarius* shell beads, with clear evidence of use-wear and some bearing traces of ochre (Henshilwood et al., 2004; d'Errico et al., 2005). Personal ornaments are accepted as unqualified evidence of symbolic material culture (Wadley, 2001; Klein and Edgar, 2002; d'Errico et al., 2003, 2005; Henshilwood et al., 2004; Henshilwood and d'Errico, 2005; Kuhn and Stiner, 2007).

Apart from the two published engraved ochre pieces from Blombos Cave (Henshilwood et al., 2002), recent microscopic studies by the authors of other recovered ochre pieces from the same site show that some of these are possibly engraved. The objective of this paper is to: 1) describe these unpublished pieces; 2) provide a stratigraphic, cultural, and chronological context for the pieces; 3) present a technological analysis of the incisions or engravings; and 4) discuss the significance of these findings in relation to early claims for symbolically mediated behaviour.

The Blombos evidence

Background

Blombos Cave is situated on the southern Cape coast, 300 km east of Cape Town. The MSA levels at the site are divided into three phases: M1, M2 (upper and lower), and M3 (Henshilwood et al., 2001a; Fig. 1). The five uppermost layers below a sterile level named BBC Hiatus are assigned to the M1 phase. M1 phase lithics are typified by Still Bay type bifacial foliate points, the *fossile directeur* of the Still Bay Industry (Goodwin and van Riet Lowe, 1929), and end- and side- scrapers (Henshilwood et al., 2001a). Engraved ochre and bone (d'Errico et al., 2001; Henshilwood et al., 2002), formal bone tools (Henshilwood et al., 2001b), and forty nine *Nassarius* shell beads (Henshilwood et al., 2004; d'Errico et al., 2005) come from this phase. The upper M2 phase is typified by four levels of carbonised deposits, large hearths, and shellfish. Some bifacials, as well as formal bone tools possibly used as awls and projectile points, come from the upper M2 phase. High density shellfish deposits and ochre pieces dominate some levels in the M3 phase. The lithic assemblage from the M3 phase is under study, and preliminary findings suggest it does not conform to the typical MSA I or MSA II patterns observed at Klasies River (Soressi, 2005).

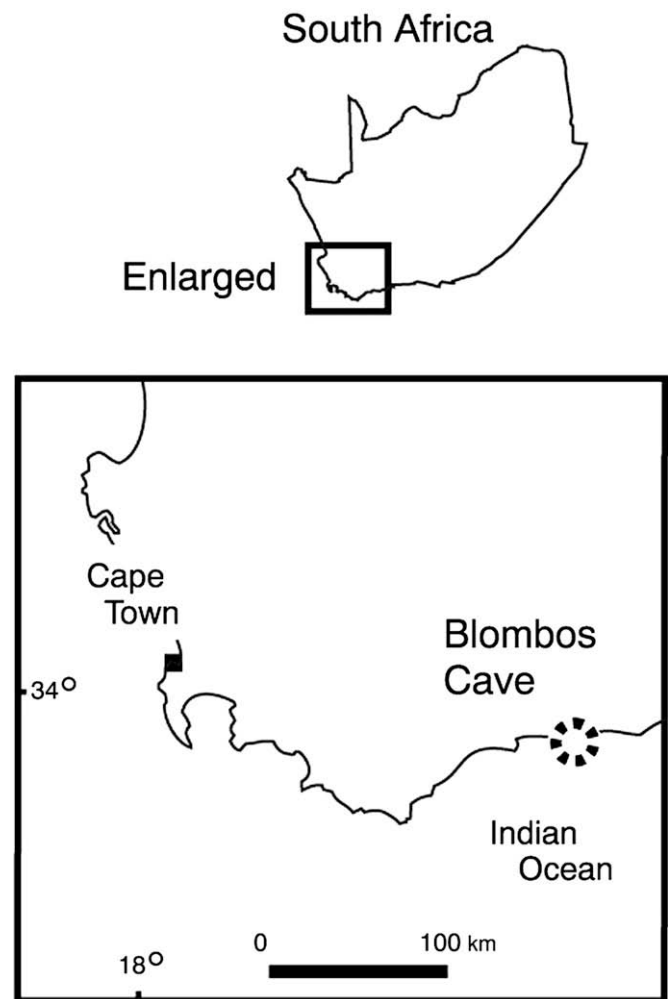


Figure 1. Geographic location of Blombos Cave.

The Still Bay levels have been dated using a number of methods (Jones, 2001; Jacobs et al., 2003a,b, 2006; Tribolo et al., 2006). The Hiatus level composed of undisturbed aeolian sand above the M1 phase is dated by optically stimulated luminescence (OSL) to 69 ± 5 ka and 70 ± 5 ka (Henshilwood et al., 2002; Jacobs et al., 2003a,b; Jacobs et al. 2006; Fig. 2) and provides a minimum age for the Still Bay deposits at the site. An OSL age of 72.7 ± 3.1 ka was obtained for the upper part of the Still Bay M1 phase (Jacobs et al., 2003a,b). Thermoluminescence (TL) dates for the M1 phase indicate that 74 ± 5 ka and 78 ± 6 ka are the likely ages for these Still Bay levels (Tribolo et al., 2006). OSL dates for the M2 phase fall between 84.6 ± 5.8 ka (lower levels) to 76.8 ± 3.1 ka (upper levels; Jacobs et al., 2006; Fig. 2). Similar ages were obtained using the electron spin resonance method (Jones, 2001). The lower c. 85 ka levels of the M2 phase (CG levels; Fig. 2) represent a period of ephemeral occupation and do not contain artefacts associated with the Still Bay. The upper M2 phase does contain these markers and the inference drawn is that the age of 76.8 ± 3.1 for the CF level (Jacobs et al., 2006; Fig. 2) should be regarded as the terminus post quem for the Still Bay levels at Blombos Cave. Using single aliquots, an OSL age of 98.9 ± 5.5 ka was obtained for the upper portion of level CI, representing the upper M3 phase. The levels below, CJ including CL and CO, are in the process of being dated by OSL and preliminary estimates suggest a c. 100 ka age (Jacobs, pers. comm.). The stratigraphic integrity of artefacts recovered from these levels has been demonstrated and there is minimal evidence for

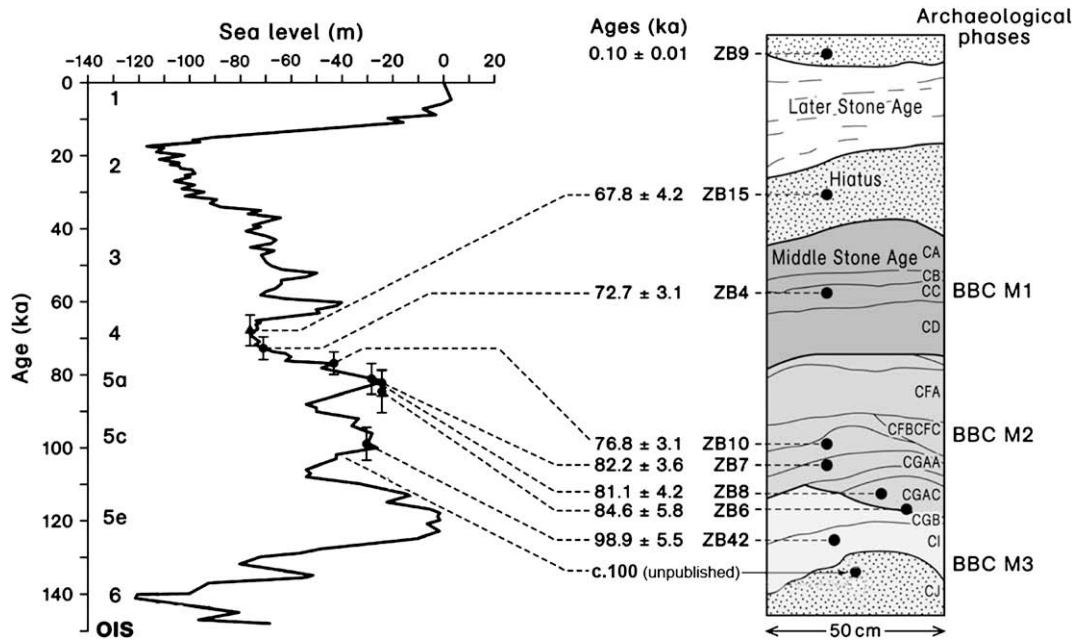


Figure 2. Stratigraphy and ages of Blombos Cave deposits (after Jacobs et al., 2006).

movement of artefacts between the MSA phases (Jacobs et al., 2003a,b; Henshilwood, 2005).

Ochre at MSA sites

Ochre is typically a product of chemical weathering which has been sufficiently enriched in iron oxide (generally haematite) or iron hydroxide (typically goethite) to produce (respectively) a reddish or yellowish mark when drawn over a surface. Archaeological occurrences overwhelmingly comprise red ochre. While early occurrences in Eurasia and Africa may be broadly coeval (between 300,000 and 400,000 years ago), Eurasian evidence is rare until within the last 60,000 years (Soressi and d'Errico, 2007). In tropical Africa, regular use probably goes back to c. 250 ka, and in southern Africa it is documented from at least c. 160 ka (Marean et al., 2007; Watts, in press). Thereafter, red ochre use is virtually ubiquitous to southern African cave/rock shelter sequences (Watts, 1999; see also Henshilwood et al., 2001a; Wadley, 2005b; Rigaud et al., 2006). Utilized pieces typically show striations from grinding or scraping to produce a powder, widely assumed to have been used as pigment (e.g., Volman, 1984; Clark, 1988; Knight et al., 1995; Watts, 1999, 2002; Henshilwood et al., 2001a). Rarer forms of modification include edge notched pieces (Stapleton and Hewitt, 1928; Evans, 1994; Watts, in press) and what appear to be deliberately engraved, juxtaposed lines (Knight et al., 1995; Watts, 1998; Mitchell, 2002; Watts, in press). However, the only engraved pieces to have been subject to detailed analysis are the two previously published examples from Blombos Cave (Henshilwood et al., 2002) and a piece from a younger (but undated) MSA context at Klein Kliphuis in the Western Cape, South Africa (Mackay and Welz, 2008).

Lacking direct evidence as to how ochre was used, and with diverse views as to when symbolic behaviour emerged, different interpretations have been placed on the MSA ochre record. An interpretation as pigment predominates, and regular pigment use is widely taken as evidence for colour symbolism (Deacon, 1995; Knight et al., 1995; Watts, 1999, 2002, 2009, in press; McBrearty and Brooks, 2000; Barham, 2001, 2002; Henshilwood et al., 2001a,

2002; d'Errico, 2003; Henshilwood and Marean, 2003, 2006; Hovers et al., 2003; Van Peer et al., 2004; Marean et al., 2007). Some archaeologists suggest that much of the MSA ochre record may result from utilitarian use, for example as skin protection from sun or insects, as a medicine, for tanning hides, or as a binding agent to facilitate hafting (Velo, 1984; Klein, 1999; Wadley, 2001, 2005a; Klein and Edgar, 2002; Wadley et al., 2004; Lombard, 2007). However, detailed analyses of MSA ochre assemblages produces consistent evidence for the preferential use of those providing the reddest hues and the most saturated nuances (Henshilwood et al., 2001a; Barham, 2002; Marean et al., 2007; Watts, 2009, in press; but see Van Peer et al., 2004) that contradicts an interpretation that is solely functional.

Blombos ochre

Within an approximately 50 km radius of Blombos Cave, the most likely sources of ochre are outcrops of Bokkeveld Group deposits (predominantly comprising shale and siltstone; Henshilwood et al., 2001a; Watts, 2009). About 35 km inland from the cave, protracted chemical weathering of such outcrops has resulted in extensive red and yellow ochre deposits (Visser, 1937; Brabers, 1976). Repeated Cenozoic marine transgressions (cf. Rogers, 1988) have resulted in coastal zone outcrops being less deeply weathered and less ochreous. Today, the nearest such outcrops are adjacent to the Goukou and Duiwenhoks rivers (respectively 19 km east and 21 km west of Blombos), but even a small drop in sea level (as occurred following the interglacial transgression of MIS 5e) would probably have exposed Bokkeveld shales within as little as 3–5 km WNW of the site (Watts, 2009; see also Rogers, 1988: 411), now buried under marine deposited and aeolian sands. Tiny marine testes and pholadid mollusc borings on numerous ochre pieces from the M3 phase testify to procurement from the coastal zone.

Following a short preliminary report (Henshilwood et al., 2001a), selected results of a reanalysis of ochre recovered from the 1998 and 1999 excavation seasons have been published elsewhere (Watts, 2009) and a full report is in preparation. The 1,534 pieces of ochre which were ≥ 10 mm in length had a net weight of 5,581 g.

Streaks (colour of the abraded powder) were recorded using the Natural Colour System (NCS); the grouping of NCS values has been outlined elsewhere (Watts, 2009, *in press*). The great majority (78.6% of pieces, 82% of mass) comes from the M3 phase, where the predominance of fine-grained sedimentary (FGS) forms (shale, siltstone, coarse siltstone) over sandstone and haematite is more pronounced than in subsequent phases, particularly in comparison to M1 (Table 1, see also Watts, 2009: their Fig. 4.2). Streak variability tracks the changes in raw material profile (Watts, 2009: their Fig. 4.3). The quantity of ochre from BBC is considerably greater than that recorded for most southern African MSA sites (Henshilwood et al., 2001a).

Modification was primarily directed at producing a powder, either by grinding pieces across an abrasive surface or by scraping them using a stone tool. It is possible that marine shell may also have been used for scraping ochre or for grinding. Some shells found in the M3 phase are partially coated in ochre and these are being studied for evidence of use-wear. A number of stone flakes and blades, currently under study from all three MSA phases, have ochre on at least one edge and may be the tools used for scraping the ochre. Grinding results in flat or slightly convex facets covered by multiple fusiform striations (d'Errico and Nowell, 2000; Backwell et al., 2008). Scraping produces parallel striations of different width and depth resulting from projections on the working surface of the implement. Repeated applications of the scraping tool, in the same area, results in wide grooved or concave areas with fringed ends corresponding to individual exit points. At a simple level of categorization, engravings or possible engravings can be treated as a sub-group of scraped pieces. Three hundred and seven pieces (20% of pieces, 61.6% by mass) showed definite modification. Grinding occurred on 62.5% of these pieces, scraping on 43.9%, and 2.9% only showed signs of flaking. That the sum is greater than 100 is because 9.4% provided traces of both scraping and grinding (Table 2). The utilized percentage in M1 (33.1%) is twice that of M3 (17%), thought to reflect more intensive use of smaller quantities of material coming from further afield (Watts, 2009). Scraping comprises much smaller proportions of utilized material in M1–M2 than in M3 (Table 2).

The principal factor influencing the likelihood of a piece being scraped rather than ground was hardness (adapting Mohs scale, cf. Watts, *in press*). For the total sample ($n = 1534$), 21.1% were softer than hardness three, a figure that is fairly constant across temporal phases. Among scraped (non-ground) pieces ($n = 106$) this percentage increases to 36.8%, compared to just 7.4% of ground (non-scraped) pieces ($n = 163$). The manner of powder production appears, therefore, to have been primarily determined by contingent considerations. Softer pieces are less likely to be particularly iron-oxide enriched (cf. Watts, *in press*). Consequently, compared to ground pieces, scraped pieces provide a higher proportion of intermediate or pastel—rather than saturated—nuances, a higher proportion of lighter nuances, and a higher proportion of yellowish hues.

Table 1
Percentage distribution of ochre raw material categories by frequency and mass across occupation phases at Blombos Cave.

Phase	M1		M2		M3		Total <i>n</i>	Total <i>g</i>
	% <i>n</i>	% mass	% <i>n</i>	% mass	% <i>n</i>	% mass		
FGS	59.4	57.7	82.4	63.8	90.7	86.1	1306	4533.0
Sandstone	17.7	14.8	10.8	30.3	4.6	6.8	109	489.4
Haematite	18.1	16.8	6.8	5.9	3.6	6.1	95	429.9
Other	4.7	10.8	0.0	0.0	1.0	0.9	24	128.7
Total %	100.0	100.0	100.0	100.0	100.0	100.0		
Total <i>n</i>	254		74		1206		1534	
Total <i>g</i>		821.4		182.22		4577.39		5581.0

Among the scraped pieces, some bore striations inconsistent with powder production that may represent instances of intentional engraving. Examples are:

1. Lines that produce an apparently arranged pattern such as a fan shaped or cross-hatched design
2. Thin incised lines on small, but apparently complete ochre pieces that would have produced insubstantial amounts of ochre powder
3. Sinuous lines, the production of which required a controlled hand motion, that are incompatible with effective powder production
4. A portion of an originally complex engraved pattern found on a fragmented ochre piece
5. Juxtaposed similar incisions with a regular cross section showing that constant pressure was applied during the incision process and that the lines were produced by the same lithic point in a single session.

We are aware that the above features do not guarantee the identification of intentionally made engravings. In this paper, we have therefore included a number of pieces that meet one or more of the above features, despite us being unsure whether the lines were incised to create a deliberate pattern. Potentially symbolic markings cannot be taken out of the context of other modifications, nor should they be restricted to only the most compelling examples. While the majority of the pieces to be described came from the analysed 1998/99 sample, two came from the 1997 excavation, one from the 1999 test-pit from in front of the drip line, and two were recovered in 2000 (Table 3).

Methods

The described material (Table 3) is curated at the Iziko-South African Museum, Cape Town. Each specimen was examined with a Leica S8 APO stereomicroscope in order to identify anthropogenic and natural traces and photographed using a Nikon Coolpix digital camera. Identification of grinding, scraping, and deliberate engraving is based on criteria obtained from experimental scraping of tuff, manganese, and ochre (d'Errico and Nowell, 2000; Soressi and d'Errico, 2007; d'Errico, 2008), from previous examinations of engraving on stone and bone surfaces (d'Errico, 1995, 1996), and by comparison with the published engraved pieces from Blombos Cave (Henshilwood et al., 2002). The localisation and extent of modified areas, the techniques used, and their chronology were systematically recorded for each piece. Digitised images were imported into Adobe Illustrator and the modified areas traced. Tracing was subsequently verified on the original using a microscope. The chronology of the engravings and scraping marks, the type of tool involved, the direction of the lines, and the identification of lines produced in a single session by the same tool were established on the basis of experimental criteria

Table 2
Frequencies and percentages of definitely utilized pieces, grouped by principal forms of modification, across occupation phases at BBC.

Phase	M1		M2		M3		Row total <i>n</i>	Row total %
	<i>N</i>	%	<i>n</i>	%	<i>n</i>	%		
Ground	61	72.6	13	72.2	89	43.4	163	53.1
Ground and scraped	8	9.5	3	16.7	18	8.8	29	9.4
Scraped	15	17.9	2	11.1	89	43.4	106	34.5
Flakes or flaked	0	0.0	0	0.0	9	4.4	9	2.9
<i>n</i> utilized	84	100.0	18	100.0	205	100.0	307	100.0
Total <i>n</i>	254		74		1206		1534	
% utilized		33.1		24.3		17.0		20.0

Table 3

List of engraved ochre pieces from the MSA levels at Blombos Cave.

Reference N	Acc. num. SAM-AA	Phase	Square	Layer	Date	Length	Width	Thickness
M1-1		M1	E5a	CA (BZ)	06.02.98	26	18	6
M1-2	1645	M1	F6a	CA (BZB0)	25.01.99	15	15	11
M1-3	1577	M1	G6a	CA (CAB)	29.01.99	16	10	4
M1-4		M1	E10d	CA (WA)	26.01.99	30	25	22
M1-5	8937	M1	E6a	CC	01.99	53.6	42.6	11.7
M1-6	8938	M1	H6a	CD	01.00	75.8	34.8	24.7
M2-1		M2	G5a	CFB/ CFC	27.01.00	51	36	10
M2-2		M2	E4	CG/CF (AB)	02.97	29	23	6
M3-1	1208	M3	F5c	CH/CI	03.02.99	24	2	2
M3-2 ^a	294	M3	E5b	CH/CI	10.02.98	27	11	11
M3-3 ^b	322	M3	E5b	CH/CI	01.98	26	20	9
M3-4	1824	M3	F5c	CH/CI	01.99	11	8	6
M3-5	1168	M3	F5c	CH/CI	01.99	17	7	5
M3-6	1101	M3	F5c	CH/CI	09.01.99	25	19	18
M3-7		M3	G6a	CH/CI (CIB)	03.02.00	38	24	9
M3-8		M3	E4	CH/CI (AP)	02.97	34	22	6
M3-9		M3	E4	CH/CI (AS)	02.97	78	42	15
M3-10	233	M3	E5a	CJ	10.02.98	28	25	6
M3-11	274	M3	F5b	CJ	11.02.98	35	16	8

^a Joins with M3-5 and M3-11.^b Joins with M3-8.

reported by d'Errico (1995) and Fritz (1999). In our tracings, incised lines are identified by black shadowed outlines filled with a dark grey pattern, ground area are filled with a light grey pattern, traces of scraping are identified by black shadowed outlines filled with a light grey pattern, and altered area are indicated by a discontinuous line. The photos and tracings were made by one author (FD).

Description of the ochre pieces

M1 phase

1. M1-1 (E5a, BZ), Fig. 3. A slightly friable, weathered flake of reddish-brown 'coarse siltstone', it has been deliberately flaked off a larger piece of ochre. Adjacent to the striking platform, three flakes had been removed prior to the piece being struck, perhaps to assist with producing an elongated flake. Prior to this removal the dorsal surface of the flake (i.e., surface shown in Fig. 3) had been ground to produce a convex facet. Two groups of incisions, one on the centre and one close to the edge, were subsequently marked on this facet (also prior to the flake being struck). In the centre of the piece, two joining lines form a 'Y' that was engraved first, and this is crossed by a few perpendicular parallel lines. On the right hand edge the lines are parallel and were originally longer until terminated by the flake fracture. Three incisions cross these lines made after the first set. Variations in the profiles of the lines within the two groups indicate that different tools may have been used for each group.

2. M1-2 (F6a, BZB), Fig. 4. This dark fragment is a porous material with a texture and density resembling pumice. It is a fragment of a larger piece with parallel lines made prior to breakage. On the top right margin there is residual evidence of two lines that cross perpendicularly and that were longer on the original piece. The profiles of the converging lines examined microscopically are very similar, suggesting a single lithic point was used to make the incisions. Prior to engraving, the surface was not prepared and the incised lines do not contact one another.

3. M1-3 (G6a, CAB), Fig. 5. This flake is composed of orange-brown haematized fine sandstone and was broken post-depositionally. Originally, the flake was part of a larger piece and now retains only a small area of the original engraved pattern. A portion of the dorsal surface was ground prior to engraving. Three straight oblique lines were incised on the top left hand portion of the flake followed by two sinuous lines that cross them. The profiles of the incisions show that the same point was used, probably in rapid succession. Finally, two lines, possibly three, now heavily eroded,

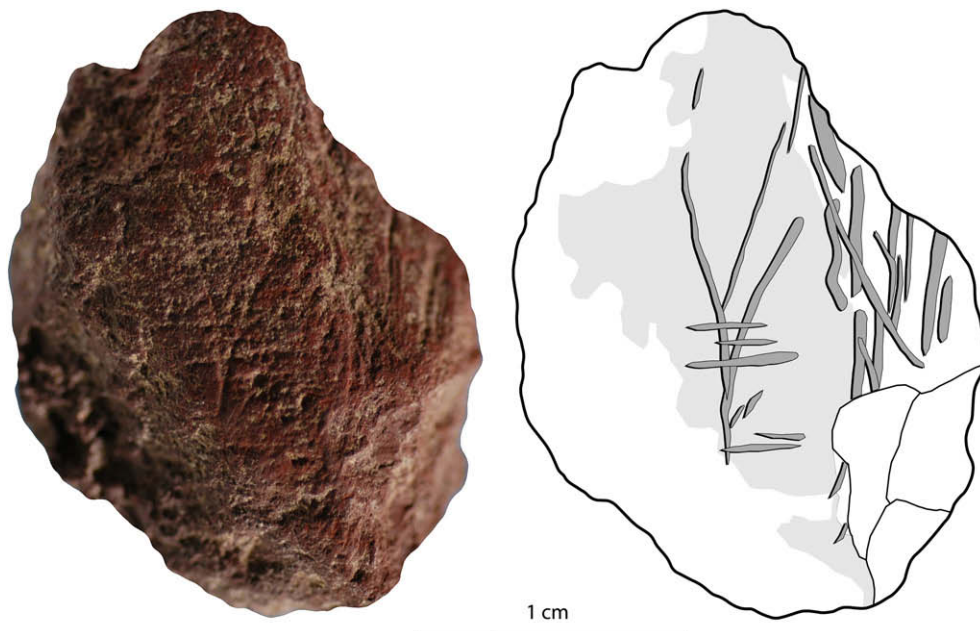
**Figure 3.** Photo and tracing of piece M1-1.



Figure 4. Photo and tracing of piece M1-2.

were made and one of them cuts the two sinuous lines. These last lines share the same alignment as the first three.

4. M1-4 (E10d, CA), Fig. 6. This piece is a well cemented, moderately haematized, dark red siltstone. Originally a larger piece, its volume was reduced by knapping. What initially appears as four parallel lines actually comprises three distinct sets of lines engraved on a predominantly natural surface. The first set is engraved near the upper part, adjacent to a previous break, and consists of four single stroke incisions made, based on the similarity of the profiles of each line, with the same tool. A second set consists of at least six lines, made with the same tool, that were engraved to elongate and add to the first set. The first three lines on the left of this new set were subsequently broadened by applying multiple strokes within the same grooves. Two oblique lines that cross the first set of lines were then made at the top of the piece. Subsequently, the piece was knapped to remove one large and several smaller flakes and in the process a part of the engraving was removed and finally some ridges produced by knapping were finely ground.

5. M1-5 (E6a, CC), Fig. 7. Composed of a metamorphosed siltstone and fine sandstone this piece is moderately cemented. It is pink-brown in colour with a lustrous appearance owing to an exceptionally high mica content. Previously partially described (see Henshilwood et al., 2002; Henshilwood and d'Errico, 2005), SAM-AA 8937 is a slab ground on both main faces and three edges. On one face a flake was removed that left evidence of concentric ripples, the face was then ground and the flake scar scraped. A group of sinuous lines was then engraved on the same face as the flake scar. The opposite face shows highly localised scraping: a) a repeatedly scraped narrow groove, broadening into a dendritic shape where the scraping tool was repeatedly removed, and b) two short, thin, sub-parallel striae. One edge of the piece was ground on a fine grained abrasive surface that left a homogenous surface texture. A cross-hatched pattern was engraved on this surface and is composed of two superimposed groups of parallel lines followed by a single line obliquely crossing the pattern.

6. M1-6 (H6a, CD), Figs. 8–10. This relatively large rectangular piece (166.6 g) is a moderately cemented siltstone that is reddish-

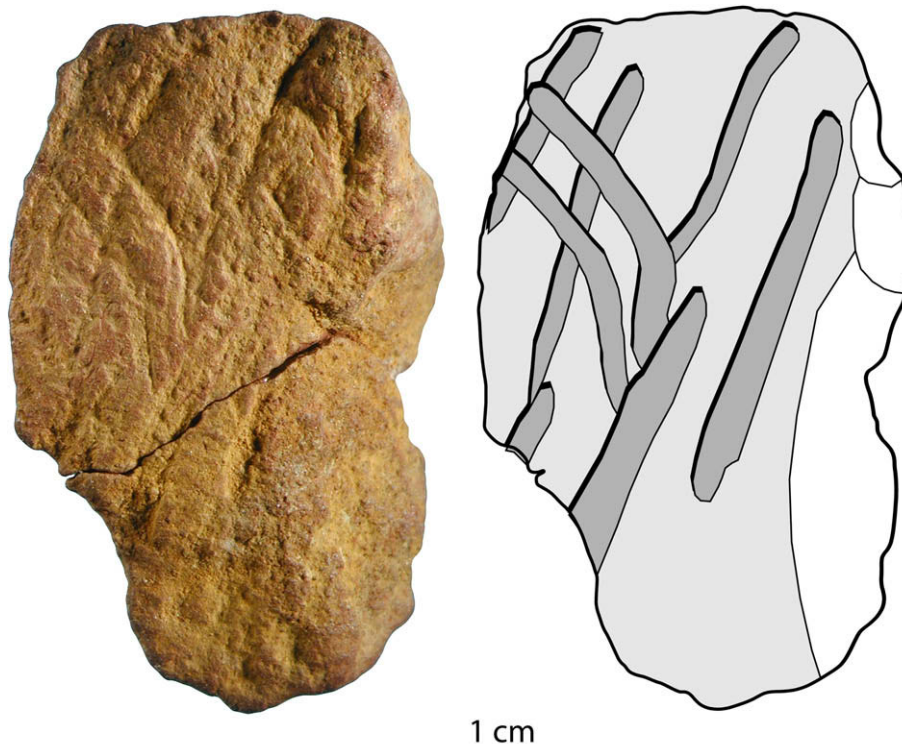


Figure 5. Photo and tracing of piece M1-3.

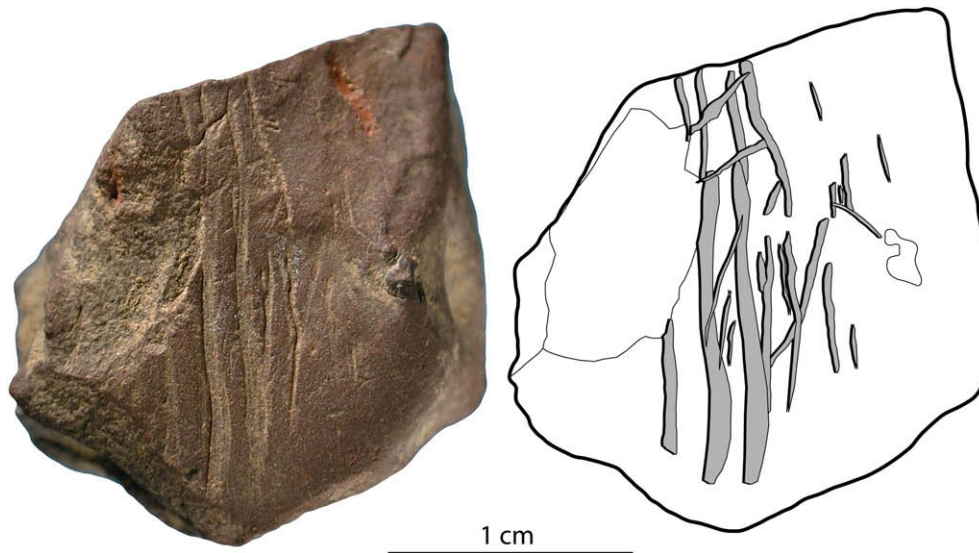


Figure 6. Photo and tracing of piece M1-4.

brown in colour. One end is modified by continuous retouch and on one long edge there is a large removal and a thin ground facet (Fig. 8). The opposite long edge was flattened by grinding and scraping before a cross-hatched pattern was incised (Henshilwood et al., 2002; Henshilwood and d'Errico, 2005). Both the top and bottom of the piece show evidence of grinding and scraping over an extensive area.

The engraved pattern consists of two sets of superimposed oblique lines crossed and framed by three horizontal lines (Fig. 9). Analysis of the lines indicates that the oblique lines were first cut in

sequence from top right to bottom left (Fig. 10) and that each line was cut with multiple strokes. Evidence for the initial point of an incision and its terminus was determined by examining the morphology of the line, as the striking point has a rounded shape and at the point of exit the line thins. The second set of incised lines was cut from top left to bottom right. Each line in this set is also made up of multiple strokes with the exception of the three on the right. These were made in a single stroke. Two single stroke lines, oriented as in the first set, were then engraved over these last three. Finally, the horizontal lines crossing and framing the sets of oblique

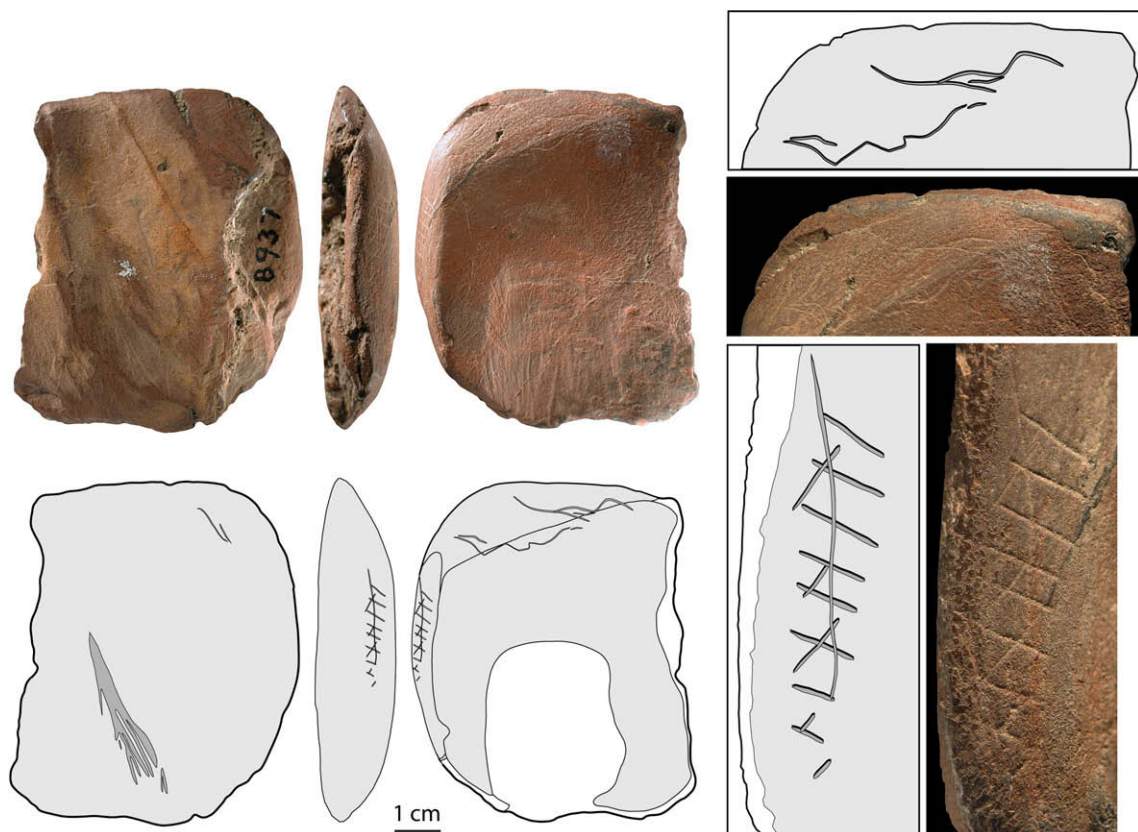


Figure 7. Photo and tracing of piece M1-5.



Figure 8. Photo of the various aspects of piece M1-6.

lines were incised moving the tool from the left to the right. This was done by joining and partially superimposing, in each case, three to four short incisions.

M2 phase

7. M2-1(G5a, CFB/CFC), Fig. 11. This is a tabular piece of light brown siltstone producing a light intermediate yellowish-brown streak. One edge was ground to produce a flat, elongated facet, and both main surfaces were scraped. The topography of the more intensively scraped face is dominated by a protuberance bearing remnant traces of scraping. This face is crossed vertically by deep convergent striae produced by the repeated application of a lithic point that scraped the surface from top to bottom. The striae converge at the base of the protuberance. An isolated striation runs slightly sub-parallel to the left of this set. These lines are crossed horizontally by a set of deep incisions produced either by a single or multiple application of a sharp lithic point. At the bottom left, a set of five thin, single stroke oblique lines partially cross the main vertical grooves. The oblique and horizontal sets were engraved before the vertical composite groove. On the reverse side there is also a multiple stroke, deep vertical groove, and several parallel

incidental lines. A group of three joined single stroke lines are incised at the bottom left.

8. M2-2 (E4, CG/CF), Fig. 12. This is a small flat slab composed of compact haematite red/brown in colour. Two distinct lines on one surface were made by the same tool. The line on the left was produced by two applications of the same tool. The line on the right represents a single stroke. The piece was originally bigger and these are just remnants of longer lines. Impact scars on the same flat surface were possibly made with a lithic tool. A minute line is incised on the reverse face.

M3 phase

9. M3-1(F5c, CH/CI), Fig. 13. M3-1 is a tiny shard that fractured off a much larger piece of moderately haematised shale. A remnant of the original engraved surface is retained on one edge. The surface on which the lines are incised is naturally flat and shows no evidence of preparation by grinding. The engravings consist of two parallel lines oriented with the long axis of the piece that are crossed obliquely, in the middle of the engraved area, by three lines.

Close to these three lines are a further three oblique lines that terminate at the point of contact with the main long line.

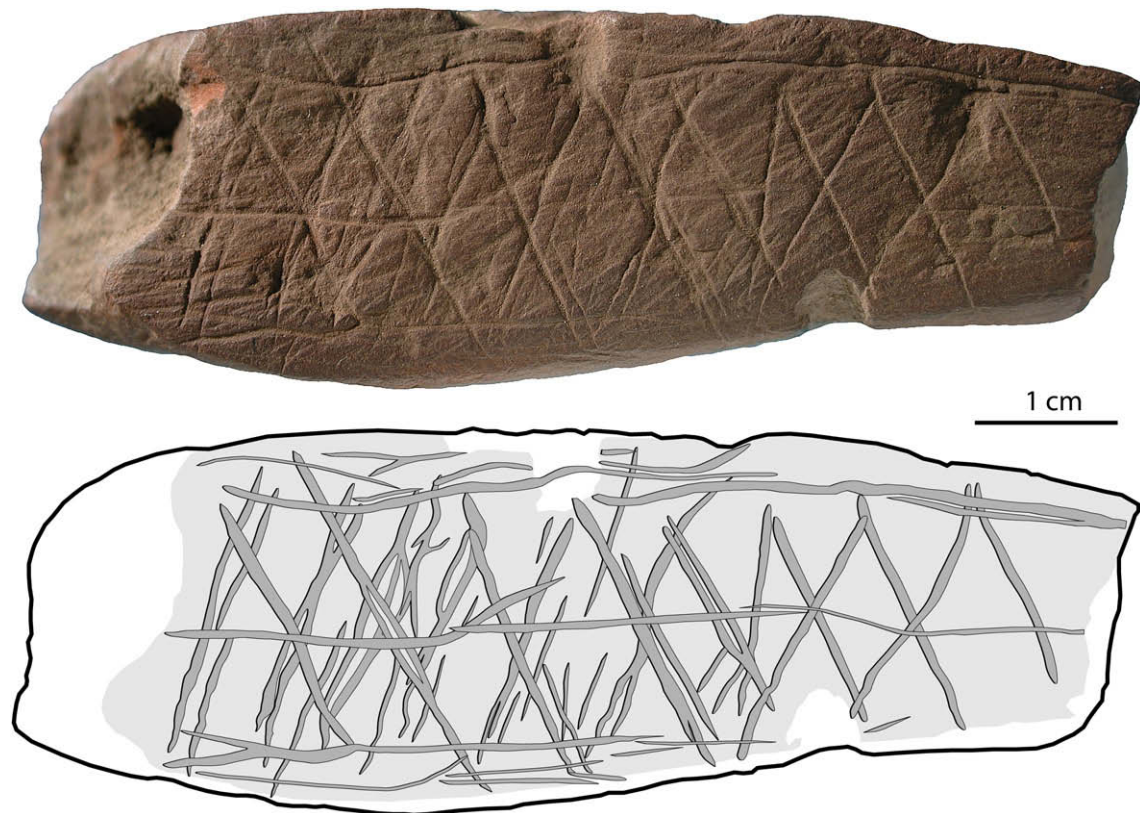


Figure 9. Photo and tracing of piece M1-6.

A superficial line crosses three of the oblique lines perpendicularly and the main long line. At the thicker end of the piece one line joins the two long lines. At the thinner end there are two oblique lines made with the same tool. The pattern was created by first engraving the long parallel lines, then the oblique lines, and finally, the superficial single line that crosses the latter perpendicularly. Each line was engraved using probably a lithic tool in a single stroke. The presence of at least two superimposed sets of parallel lines suggests these incisions are the remnants of a complex design. Some oblique lines cross the long vertical incisions, yet others terminate exactly on the vertical lines. If this pattern was repeated on the original piece, then it would have formed a scalariform design consisting of long vertical lines with oblique lines that variously crossed or joined them.

10. M3-2 (E5b, CH/CI), M3-5 (F5c, CH/CI), M3-11 (F5b, CJ; 3 conjoining pieces), Fig. 14. Three conjoining reddish brown pieces come from a larger slab of well cemented siltstone, the face of which was repeatedly scraped to produce ochre powder. This is clear from the depth of the scraped lines creating a deep groove on the right hand side of the piece. The scraping striae form three groups; the outer groups were produced first, followed by the middle group. Subsequent to the main episodes of scraping, four deep parallel single-stroke lines were engraved using the same stone tool.

11. M3-4 (F5c, CH/CI), Fig. 15. This is a small, abraded piece of moderately cemented siltstone with four engraved single stroke lines. The remnants of two parallel lines meet and end at right angles to a longer striation. Sub-parallel to this longer line is

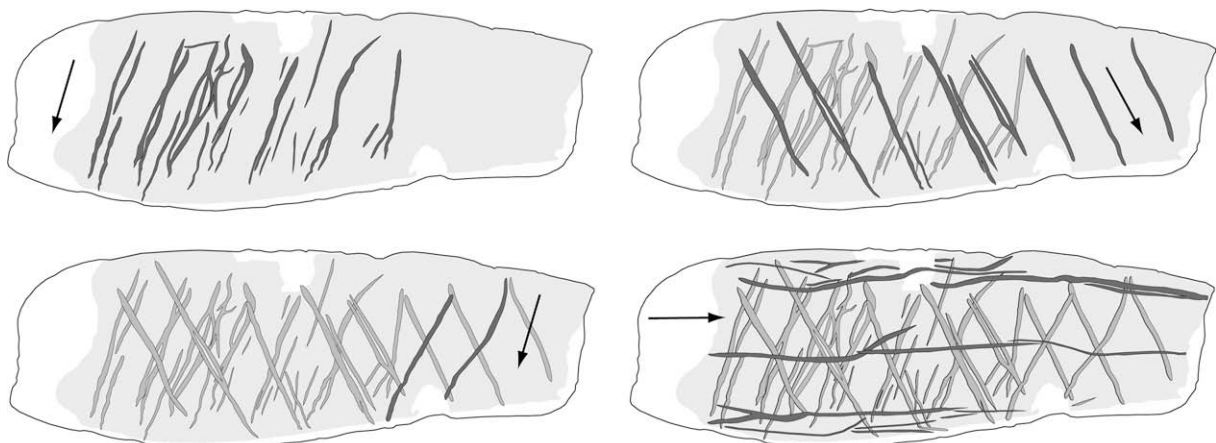


Figure 10. Order of the engravings on piece M1-6. Each new set is highlighted in dark grey. Arrows indicate the direction of the engraving tool.

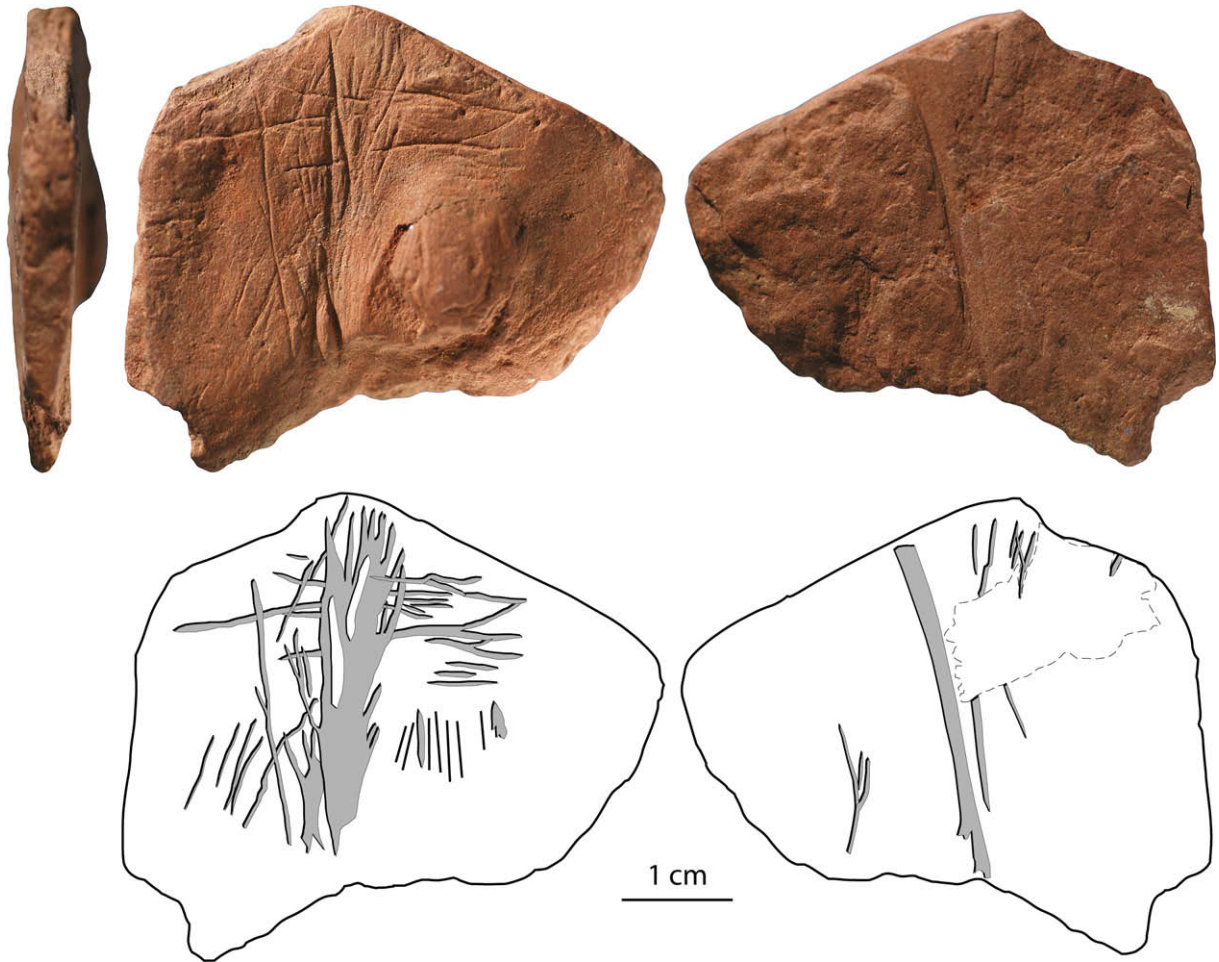


Figure 11. Photo and tracing of piece M2-1.

a fourth that may have converged with it. The incisions are faint, highly abraded, and were engraved on a ground surface.

12. M3-6 (F5c, CH/CI), Fig. 16. This is a light-grey heavily eroded fragment of soft, friable siltstone. One surface was first ground, then two sets of parallel incisions aligned at right-angles to each other were engraved. Both sets were probably made with the same tool. The engraving was originally part of a larger design, as indicated by lines on the very edge of the engraved surface and by some truncated lines where the piece fractured. Close to the pointed end of the piece, three incisions have slightly curved, tapering tails

showing that this was the terminal point of the incisions. These also suggest the engraved pattern did not extend beyond this point. To the right of the three central vertical lines a possible fourth incision could have been made or this line represents a natural superficial cut on the surface.

13. M3-7(G6a, CH/CI), Fig. 17. A lustrous, pinkish-red shale, this flat fragment has a facet on one edge that shows evidence of grinding followed by scraping. On one main surface there is a group of conjoining lines that are juxtaposed from left to right. This dendritic pattern is flanked by a single deep line on the right. The

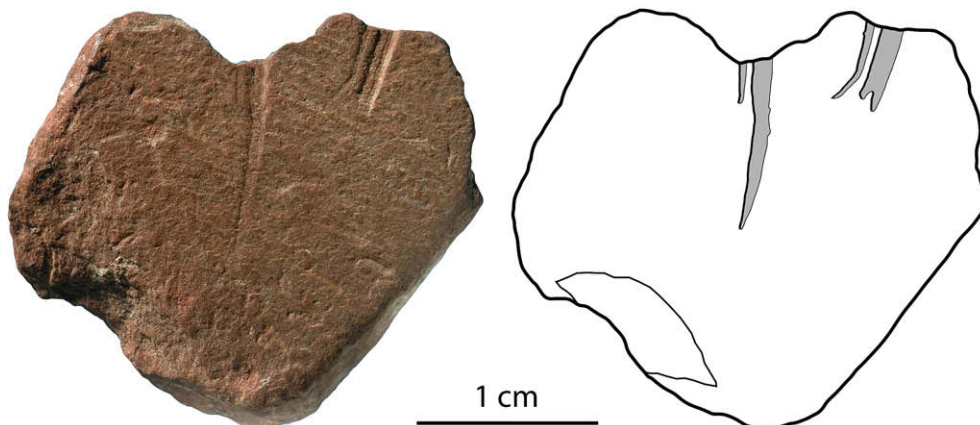


Figure 12. Photo and tracing of piece M2-2.



Figure 13. Left = photo and tracing of piece M3-1; right = close-up views of the engravings. Scale = 1 cm.

lines were all engraved by the same point, but with varying angles of application resulting in variation in the morphology of the lines ranging from single deep to multiple groove incisions.

14. M3-8 (E4, CH/CI), M3-3 (E5b, CH/CI; conjoined pieces), Fig. 18. These two conjoining fragments are a very soft, pastel coloured siltstone. The fragments came from different squares and differ appreciably in their state of preservation and subtly in colour. The better preserved fragment, from square E4, has a pinkish-grey surface colour; the more worn fragment, from E5b, is light-grey in surface colour and provided a slightly lighter, less chromatic yellow. The colour differences are certainly the result of slight differences in taphonomic context (e.g., moisture and/or proximity to hearths), factors which might also account for differences in preservation. This originally thick tabular object was repeatedly scraped in the middle presumably to extract powder (Fig. 18a), resulting in a pronounced concavity. Scraping—at least in the latter part of the working of the piece—took the form of groups of parallel or sub-parallel striae set at right angles to each other. The intensive scraping in the middle of the piece resulted in pronounced thinning, eventually causing it to break into two (Fig. 18b).

The many scraping episodes necessary to hollow the piece may have been produced, as in the last stage, by juxtaposing short sets of sub-parallel incisions perpendicular to one another. A possible reason for changing the orientation of the scraping between or within scraping episodes is that the concavity can be ‘carved’ little by little, ensuring that it takes the shape of a cupule. However, we note that this was not done on any of the five or six other examples of scraped cupules to have been recovered (all from younger horizons), suggesting that the alignment of striae in this instance was not dictated by the physical requirements of creating and maintaining a cupule. It is also probable that only one or two scraping episodes took place at each use, as the profiles left by the tools from

each episode are different. This has two contradictory implications. On the one hand, the artisan did not apparently gain a lot of powder during each scraping episode, which by analogy with our interpretation of some other pieces (e.g., M3-7, M3-10) might be taken as supportive of deliberate design. On the other hand, in spite of the impression of a crenellated pattern made by the lines, the use of different tools makes it problematic to interpret the last visible scraping episodes as resulting from the intent to produce a meaningful pattern. On the reverse face of the original object, the centre was scraped longitudinally and on one edge two short notches are evident.

15. M3-9 (E4, CH/CI), Fig. 19. A large rectangular slab of dark brownish-red siltstone, with one edge knapped to remove several contiguous thin flakes. The opposite edge was modified by scraping and then engraved near one end with a cross hatched pattern. This pattern was produced by first engraving short longitudinal lines, followed by oblique incisions above these. The balance of the ground area was then partly removed by intense longitudinal scraping creating a step alongside the inside edge of the pattern. On the right of the pattern (Fig. 19, central image) there is extensive smoothing, probably produced by rubbing the piece against soft material such as skin or hide. A flake from one short edge was removed by percussion that left a bulbar scar and radial fissures. At the point of percussion, a short line was engraved that seems to highlight the natural patterns of the radial fissures and produces a dendritic motif.

16. M3-10 (E5a, CJ), Fig. 20. This is a pinkish-grey rounded slab of siltstone. One surface displays a long pair of sub-parallel single stroke lines that start at the edge of the piece and continue almost across the whole face to diverge slightly at the end. Four shorter convergent single stroke lines are engraved on the left and follow the same direction. Two of these lines end at the base of a slight, but

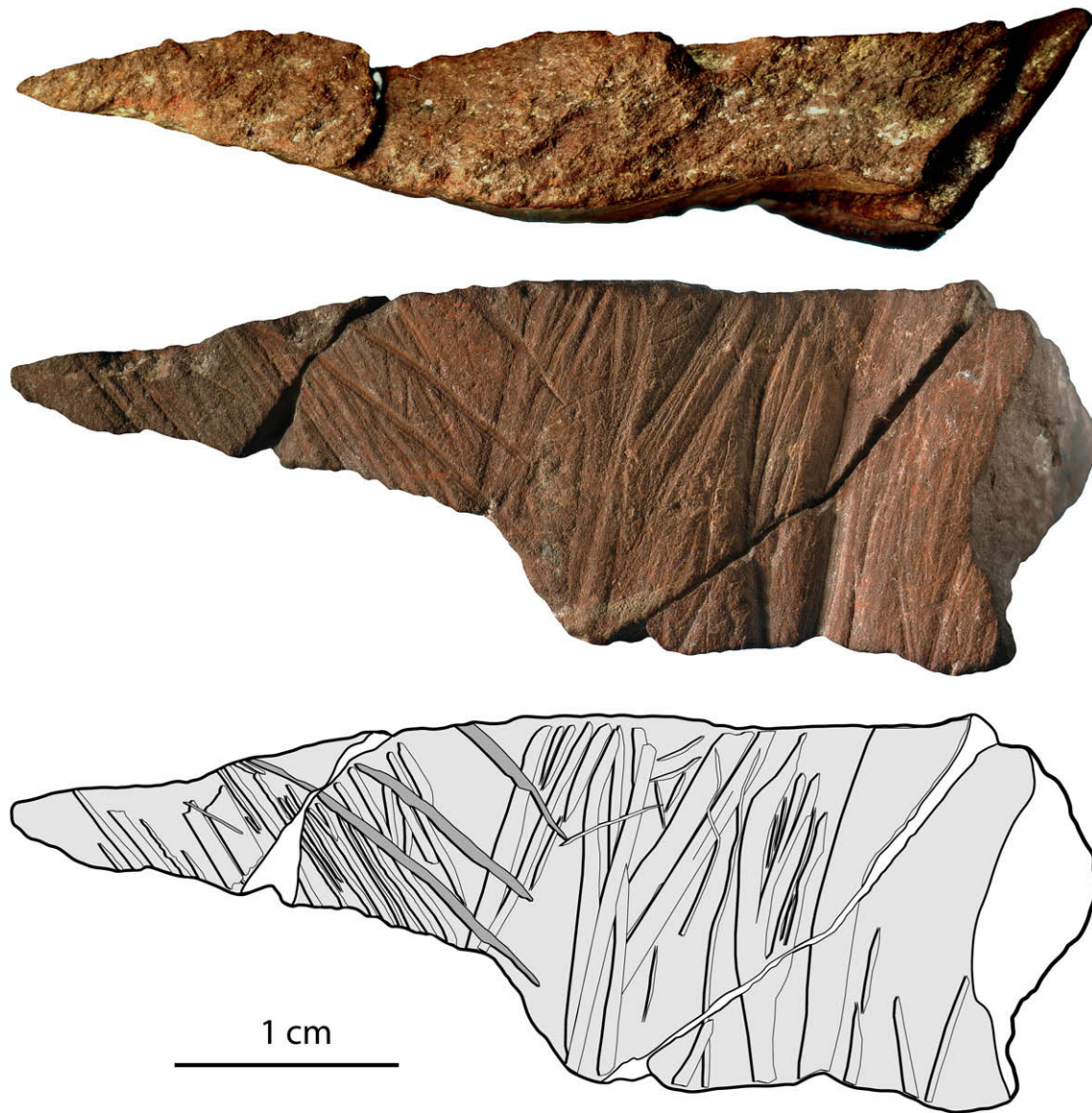


Figure 14. Photo and tracing of the joining pieces M3-2, M3-5, and M3-11.

steep rise in the surface. This impediment may have stopped the engraver from further continuing the lines. It seems the resultant fan shaped motif was intentionally produced. Much less conspicuous are a series of short, very faint incisions lying perpendicular to the longest convergent lines. On the right of the engraved pattern, the surface shows impact traces produced by a lithic point.

Discussion

With regard to the evidence presented above, we raise three questions: 1) are deliberate engravings present on any of the pieces, 2) were they made with symbolic intent and do they demonstrate the presence of symbolic systems, and 3) is there evidence that these engravings represent a tradition?

Elaborating the first question, we address the issue of whether the striations are epiphenomena of human activities with no representational purpose, for example trampling (Schiffer, 1983; Bednarik, 1995; McBrearty et al., 1998), cutting on a surface (Chase and Dibble, 1992; d'Errico et al., 2001), or scraping to test pigment properties or to obtain pigment (Watts, 1998, *in press*; Mackay and Welz, 2008). The analysed incisions are not typical of the types of

incidental marks made by humans (e.g., Brumm et al., 2006). Marks left by trampling typically occur on the most exposed areas and on the larger surfaces. In an abrasive environment, this type of damage will result in randomly oriented straight or slightly curved individual superficial striations (d'Errico et al., 1984; Shipman and Rose, 1988; d'Errico, 1993; Lyman, 1994; Fisher, 1995). The described pieces are mostly well preserved and show no evidence of taphonomic damage including striations indicative of natural abrasion.

The incisions also cannot be interpreted as the outcome of cutting motions. A flat surface used as a base on which to cut soft material will need to be of a size compatible with the task. This eliminates most of the described pieces. Lines left on cutting-boards are generally straight, sub-parallel, overlapping, and oriented along the long axis of the board, a feature not recorded here. Furthermore, our analysis of the incisions shows that they were made by the point of a tool, likely stone, and not by a cutting edge (d'Errico, 1995; Fritz, 1999; Alvarez et al., 2001; d'Errico et al., 2001). The tip of a stone tool is not effective for repeated cutting as it blunts rapidly, yet it is effective to precisely engrave lines, as is the case on these ochre pieces.

Testing ochre for powder quality or streak properties only requires one or two strokes while multiple lines are present on most

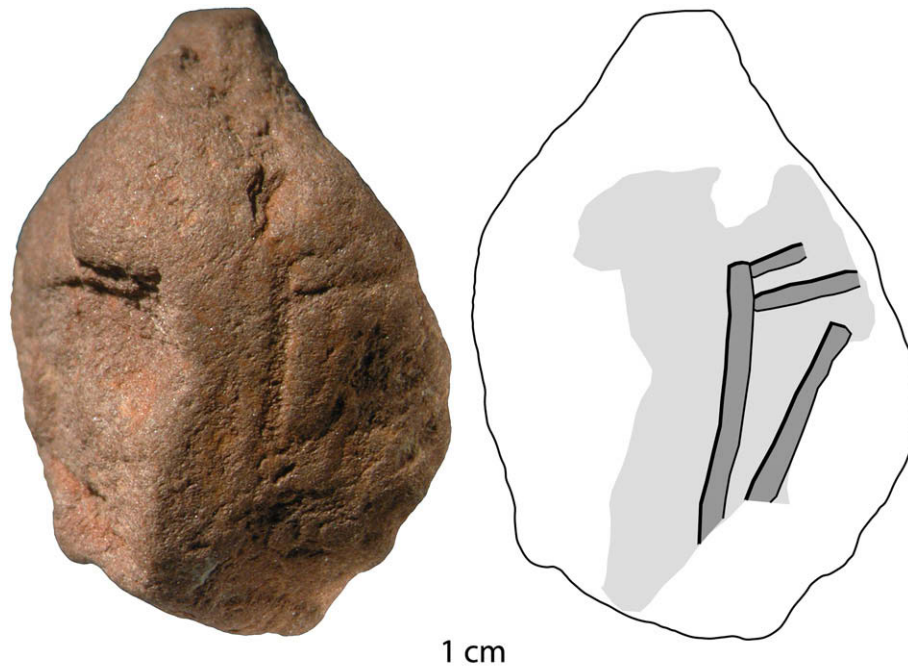


Figure 15. Photo and tracing of piece M3-4.

of the above examples. The only fragment with less than half-a-dozen striae (M3-4) has three of the four striae juxtaposed in such a manner that they precisely meet perpendicular to each other, hardly consistent with testing. In a number of cases the engravings occur on previously ground facets, implying that the quality of the ochre was already known. To obtain a useable quantity of scraped powder requires a repeated action with the scraping tool, resulting in single, wide, deep grooves with fringed ends created by a relatively unrestrained back and forth motion, or multiple sub-parallel deep grooves produced by repeated motions in one direction. On some of the pieces examined there is evidence of powder production by grinding or scraping, but additionally there are narrow, superficial incisions made by a lithic point that would only have produced a tiny quantity of powder (e.g., M1-1, M1-3, M1-5, M1-6, M3-2, M3-

6, M3-9, M3-3, and M3-8 conjoins); these incisions are clearly not the outcome of powder extraction processes. In some cases (M3-1, M3-10), these narrow incisions are the only modification visible on the surface of the ochre, which again contradicts the powder production interpretation.

Further evidence that these lines were carefully incised is evident on a number of pieces (M1-2, M1-5, M1-6, M3-1, M3-6, M3-10) where the regularity in the profile and outline of incisions indicates precise neuro-motor control (Figs. 4, 7, 9, 16, and 20). Good examples are M1-6 and M3-1. Confirmation of this point is evident on M1-6 where the engraver filled in a blank space by incising two lines to complete the symmetry of the pattern (Fig. 10), and on M3-1 where the start or end points of some lines were placed to exactly conjoin with existing lines (see also M3-4).

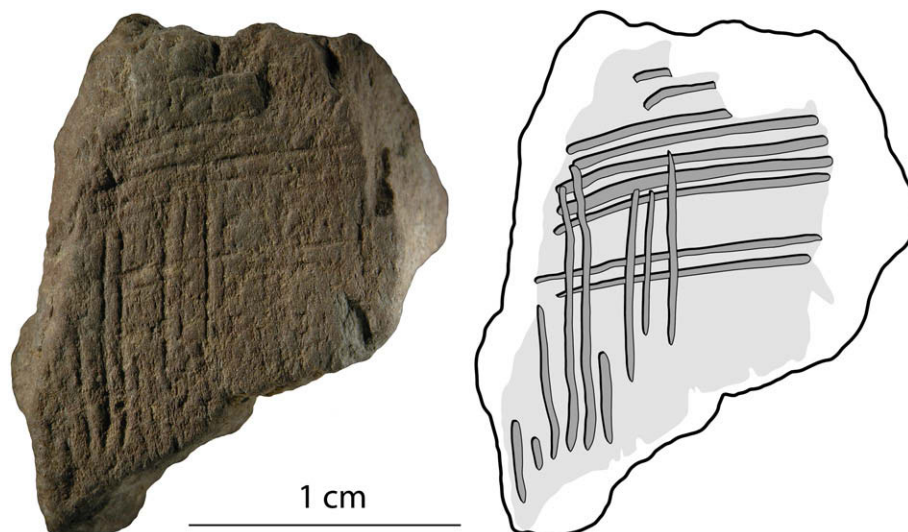


Figure 16. Photo and tracing of piece M3-6.

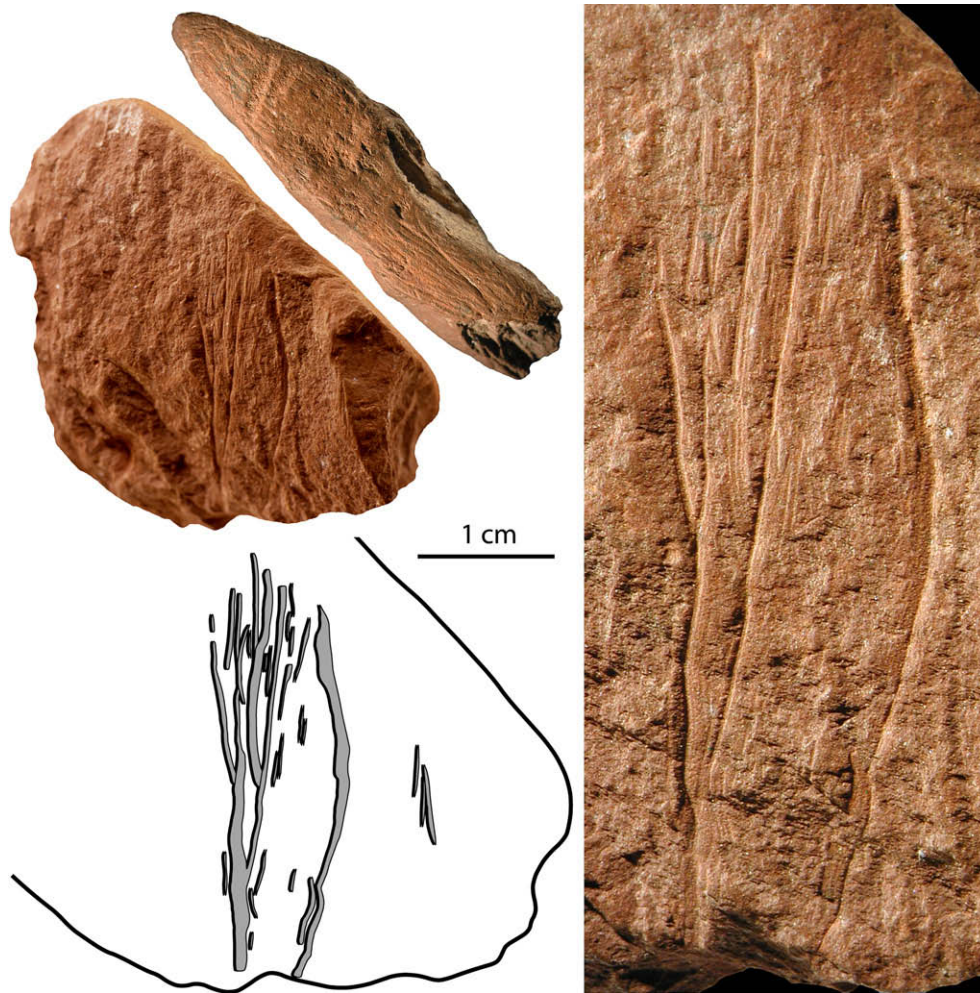


Figure 17. Left = photo and tracing of piece M3-7, right = close-up view of the engraved pattern.

There are some cases where we cannot confidently discriminate between marks resulting from powder production and those made with other intent. For example, on piece M1-1, while the crossed ‘Y’ feature appears intentional, the lack of discernable patterning among the residual lines to the right could fit an interpretation of powder production. The fragmentary nature of the piece makes it difficult to reach a firm conclusion. The striae on M1-2 are suggestive of an intent other than powder production because of their non-overlapping nature and the residual trace of perpendicular striae, but again the piece is too fragmentary for confident interpretation. The deep, composite, convergent groove on M2-1 matches the criteria of scraping to produce powder, but this is less evident for the single stroke lines that perpendicularly cross this feature, suggesting that at least a part of the work was done intentionally. The three conjoins of M3-2, M3-5, and M3-11 were intensively scraped to produce powder, but the four parallel striae on the left do not readily fit such an interpretation. On the M3-3 and M3-8 conjoined pieces, the scraping of the cupule is fully consistent with powder production. Moreover, it would allow the powder to be contained, possibly facilitating admixture with fat or water. On the other hand, during the final stages that the piece was modified, a plausible case for design has been made.

Deliberate markings might be made for various purposes. Examples that readily come to mind include doodling, notation, making a piece individually recognizable (ownership?), marking the completion of an episode of use, or the intent to represent some

personal shared, abstract, or figurative concept (d’Errico, 1995, 2002; d’Errico and Nowell, 2000; Mackay and Welz, 2008).

The engraved lines that form the unequivocal motifs (e.g., M1-5, M1-6, M3-1, M3-6) were carefully controlled by the makers during their execution, which assists now in gauging the intent of the artist. Analysis of the engraved patterns allows us to identify consistency in the engraving techniques, the direction in which the lines were incised, and their chronological order (M1-3, M1-5, M1-6, M3-1, M3-6, M3-10). However, not all pieces show unequivocal evidence that the engraved pattern was deliberate. Uncertainty in the interpretation of M2-1 has already been noted. The convergent lines on M3-7 and M3-10 do not form an obviously formal motif; on the other hand, the striae are too few for the production of powder, and their positioning—particularly in the case of M3-10—could only have arisen purposefully.

On the M3-9 piece, a single short line was engraved apparently to highlight the radial fissures that were created after a flake was struck from the edge of the piece. A dendritic pattern was created by combining this minute line with a natural feature at a scale unlikely to be noticed by anyone but the artisan. On the same piece, the two superimposed sets of lines making a criss-cross pattern also seem too tiny to be considered a deliberate engraving. However, microscopic analysis indicates that there was deliberate intention to produce two superimposed sets of parallel, differently oriented lines that are unlikely to be motions related to powder production. This suggests that despite its small size, the pattern on



Figure 18. Photo and tracing of the conjoined piece M3-3.

M3-9 was purposefully produced. A similar, much less ambiguous pattern is present on two other pieces (M1-5, M1-6). As with M3-9, these two pieces of ochre had a cross hatched pattern engraved on the edge after it was ground; on M1-5, the cross-hatching was almost as small. It also implies that some geometric engravings may not have been intended to be noticed by anyone but the maker.

In sum, although a degree of ambiguity is certainly implied in our interpretation of some pieces, the overall results confirm that unequivocal engraved patterns are present in the MSA levels at Blombos Cave. Conservatively, this conclusion concerns at least eight pieces coming from different layers (M1-2, M1-4, M1-5, M1-6, M3-1, M3-6, M3-7, M3-10, and possibly the conjoining pieces M3-3 and M3-8).

Clearly, most of the incisions on the Blombos ochres result from deliberate motions, but were they made with representational intent or absent-mindedly, as would be the case for a doodle (Appenzeller, 1998; Wynn, 2000; Balter, 2002)? Doodling is broadly defined as a design or representational image made while a person's attention is otherwise occupied, for example while talking on the telephone. Doodling can result in the production of a detailed abstract or representational image, but if the artist did not have a referent symbolic system that included image making and interpretation or the cognitive setting enabling him/her to create one, it is unlikely that an image or an abstract design would be produced. In other words, even if the abstract patterns on the ochre pieces are the result of doodling, these motifs must have been made

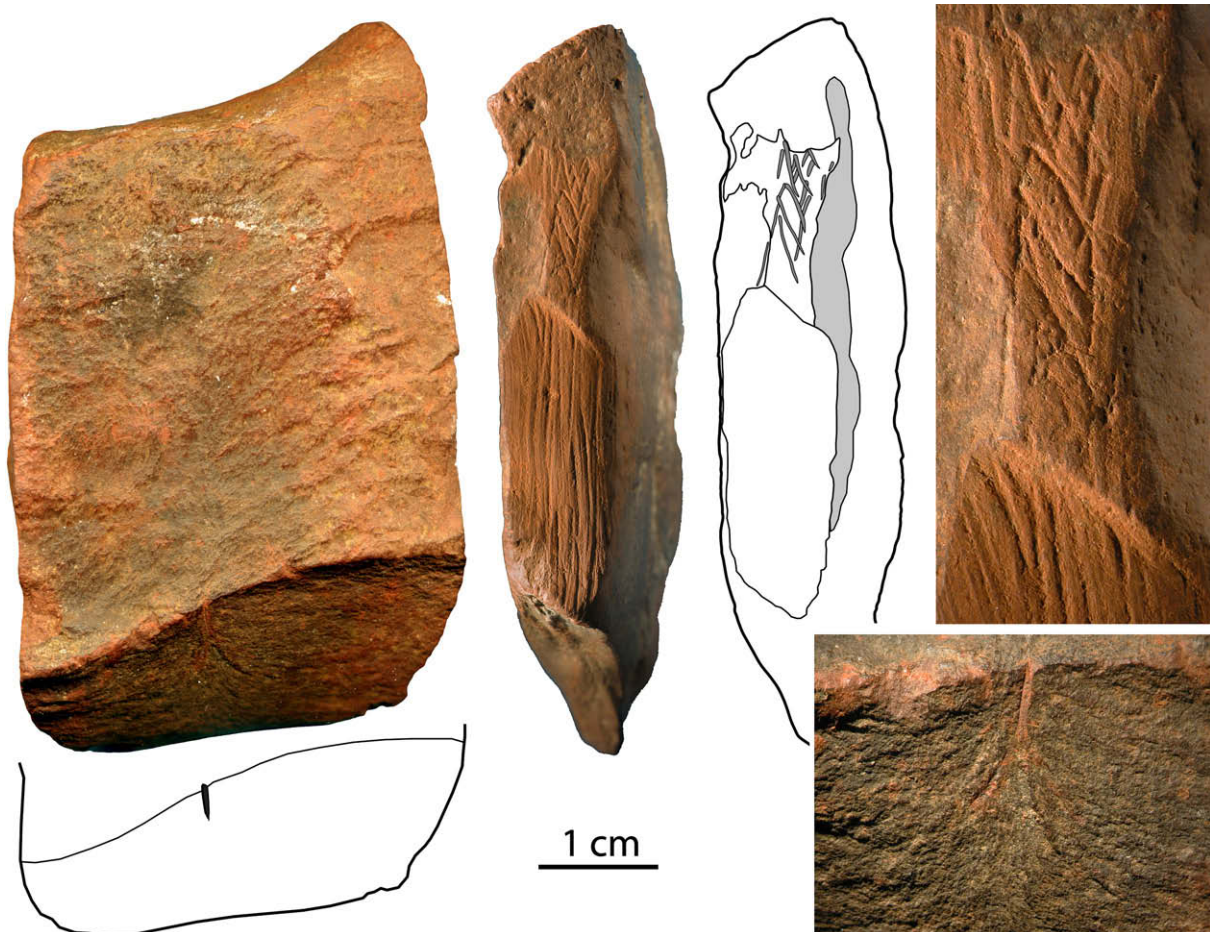


Figure 19. Left = photo and tracing of piece M3-9, right = close-up view of the incisions. Shaded portion indicates polished area.

within a behavioural system that included the production of symbols. Incising lines on ochre, particularly on the harder pieces (e.g., M1-1, M1-4), requires focused attention in order to apply the right pressure and keep the depth of the incision constant. Both hands were required to perform this action, one to hold or stabilise the piece (frequently of small size) and one to engrave. In addition, incisions on a number of pieces were made after initial grinding of the facet, producing an engraving within this limited area. These actions, in our opinion, are not consistent with doodling, but rather represent a focused and not abstracted attempt to produce a pattern.

These markings are also not notations. A “notation” can be defined as a marking system specifically conceived to record, store, and recover information outside the physical body (d’Errico, 1998, 2002). Such a system must allow for a clear distinction between the marks that carry specific information. This is not present in most of the Blombos engravings as the individual marks cannot be visually identified as discrete signs. Also, no evidence exists of sequential markings produced by different tools that may be interpreted as a notation based on an accumulation of information over time.

The second question we raise is whether these engraved patterns were perceived as symbols by the Blombos inhabitants. According to Peirce (1998), a symbol denotes a kind of sign that has no natural or resembling connection with its referent, only a conventional one. Symbols cannot exist in isolation, but generally form a part of systems in which they are interlinked. The first two engraved patterns on ochre identified at Blombos (M1-5, M1-6) represented a variation of a single abstract representation,

consisting of a criss-cross pattern intersected by horizontal lines. They could not be interpreted, *sensu stricto*, as evidence for a symbolic system mediated by abstract representations.

Recognition of distinct symbols that impart different meanings by and to members of a social group requires that the material representations show morphological variation that imparts to each an ‘identity.’ By identity we mean the collective aspect of the set of characteristics by which a symbolic item is recognizable or known. In the Christian faith for example, the depiction of the cross has varied over two millennia but the various representations are recognisable as the same religious symbol. The engraved signs from Blombos Cave certainly do not display the high degree of standardisation that we generally associate with structured symbolic systems. Four basic categories of patterns can nevertheless be distinguished: 1) cross hatched designs, 2) dendritic shapes, 3) parallel lines, and 4) right-angled juxtapositions. The first category is present on at least five pieces (M1-3, M1-5, M1-6, M3-6, M3-1), the second on four (M1-1, M2-1, M3-7, M3-10), the third on two (M1-2, M1-4), and the fourth on two or three pieces (M3-4, M3-6, and possibly the conjoins M3-3 and M3-8). The first category is found in the upper and lower MSA phases, the second in all three, the third is restricted to M1, while the fourth is restricted to M3. The level of redundancy of these possible symbols is admittedly low, and we observe that signs placed in a category (e.g., M1-1, M1-2, M1-4) present additional lines that may indicate another or an ambiguous membership. As previously noted, some of the engravings appear to be too small to have served any communicative purpose, suggesting that more than one role may be implied.

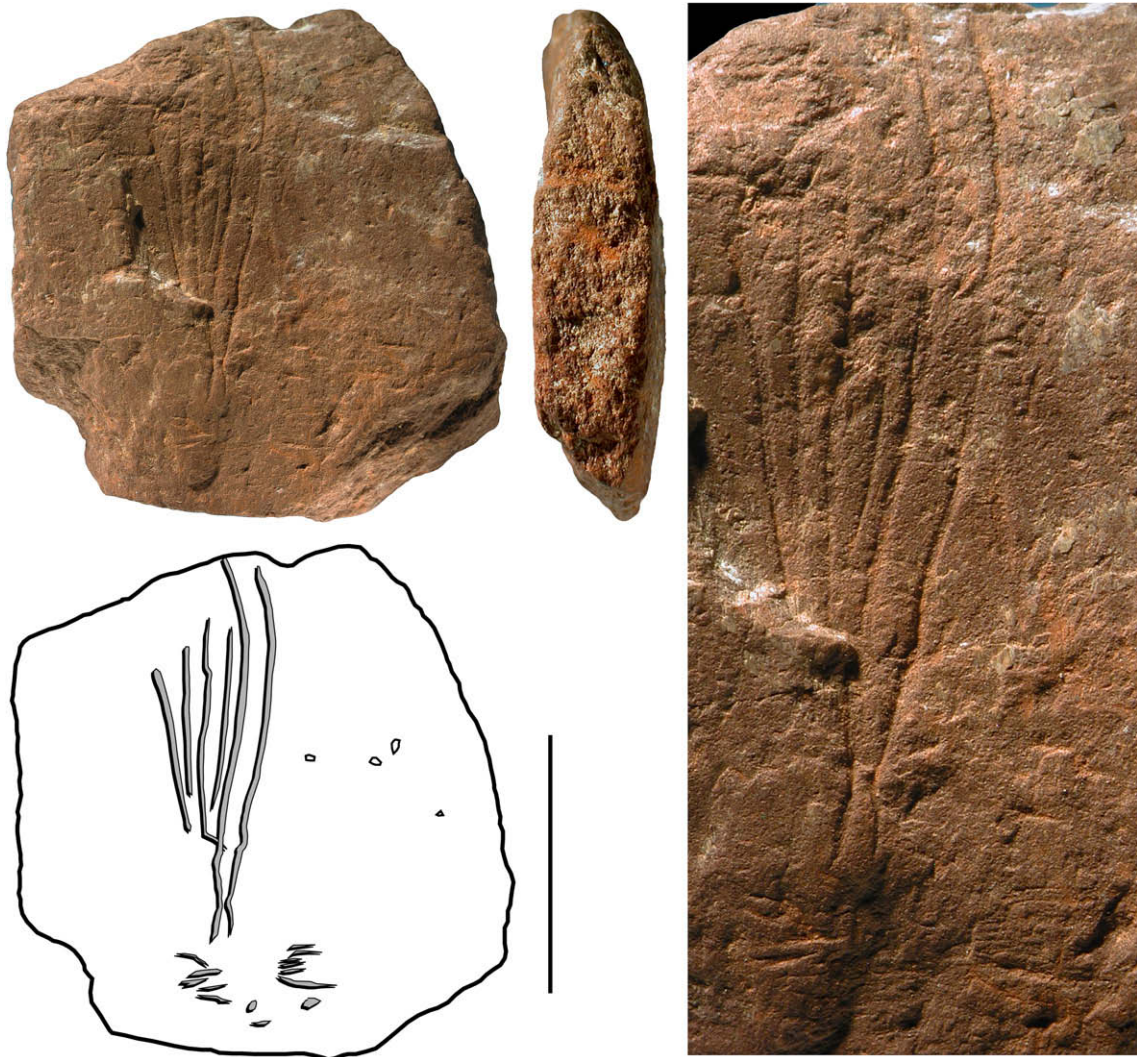


Figure 20. Left = photo and tracing of piece M3-10; right = close up view of the engraving. Scale = 1 cm.

It is also worth pointing out that with the darker specimens (e.g., M1-1, M1-2, M1-4, M1-6, M3-1, M3-2-M3-5, M3-7), when the incisions were freshly made, they would have stood out as vivid red against a dark background. Short of making the identification of symbolically mediated behaviour or 'fully developed symbolic communication' (Conard, 2005: 294) dependent on iconic representations (e.g., Mithen, 1999; Conard, 2005), a sufficient case can be made that some of the engraved pieces were perceived as symbolic.

If, as we show here, abstract depictions date to at least 100 ka, then an obvious question is why do figurative depictions arrive so late? One response is that figurative depictions are synonymous with the cognitive advances that resulted in 'fully developed symbolic communication and behavioural modernity' (Conard, 2005: 294, see also Mithen, 1999), and that abstract depictions predating figurative representation can be regarded as a symbolic expression that began when humans were not fully modern (Conard, 2005). There are several problems with this approach. First, while there may be good cognitive (hard-wired) reasons for expecting abstract representations to predate figurative ones (cf. Hodgson, 2006), this does not permit discrimination from a long-standing social anthropological theory predicting the same temporal precedence without assuming any difference in cognition (Durkheim, 1965: 148–149). Second, there are (and presumably

always have been) cultures that do not engage in figurative representation (e.g., Levinson, 2006: 19), and considerably more that make images on perishable materials that have not survived (e.g., Radcliffe-Brown, 1964; Marshall, 1976; Bell, 1983; Lewis, 2002). Third, what may appear an abstract sign from a cultural outsider's perspective frequently turns out to be iconic from a culturally informed perspective (e.g., the Christian cross).

The third question we ask is whether there is evidence that these ochre markings represent a tradition. Tradition in archaeology has been defined as continuity in material culture practices that last longer than a phase or the duration of a horizon (Willey and Phillips, 1955; Binford, 1965). Continuity can refer, among other things, to technology, artefact style, economic practice, and symbolic representations. Six of the engraved ochres described in this paper come from the c. 72 ka M1 phase (layers CA, CC, CD), one from the much smaller M2 sample of c. 77 ka (CFB/CFC), and eight pieces from the M3 phase (layers CH/CI, CIB, CJ) with an age of c. 100 ka (Figs. 2, 21). To ascertain whether the production of these engraved pieces followed a tradition we consider a number of features. These include morphology, surface preparation, engraving techniques, construction of incisions, engraving expertise, locations of engravings, types of patterns, evidence for additional modification, and how the piece may have been curated or disposed. We address each of these points below.

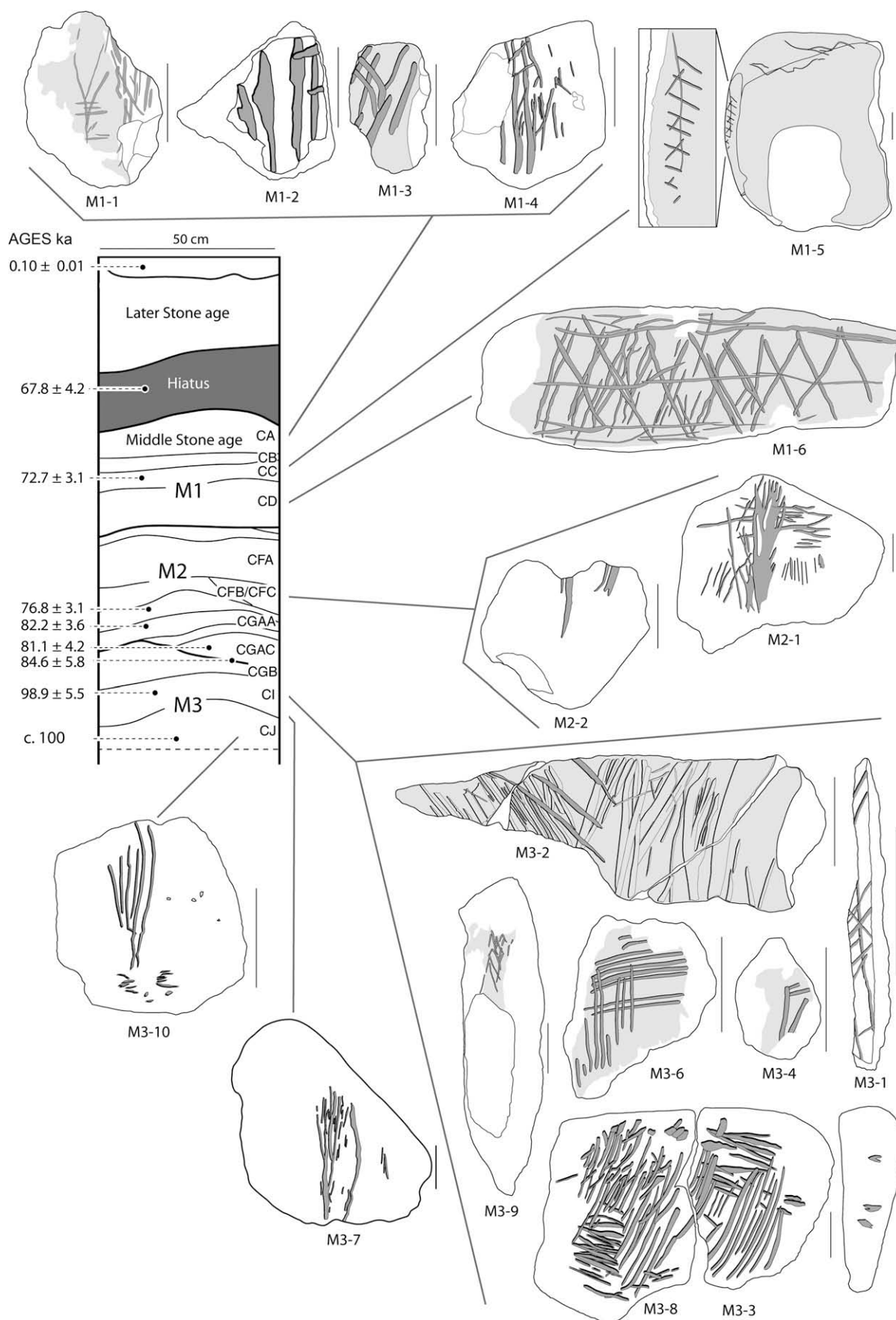


Figure 21. Tracings of engraved ochres from the Blombos MSA layers and their stratigraphic provenance.

Ochre is the only raw material on which engravings were made across all three phases at Blombos. Three bones are engraved with parallel or joining lines but only occur in the M1 phase (d'Errico et al., 2001; d'Errico and Henshilwood, 2007). The morphology of the original ochre pieces selected for engraving is largely unknown due to breakage (e.g., M1-1, M1-2, M1-3, M3-4, M3-1, M3-6), but some whole pieces indicate that both tabular (M1-5, M1-6, M3-10, M3-9) and chunky (M1-4, M3-6) pieces of differing size were selected. Grinding prior to engraving of the same facet is present on eight pieces recovered from the M1 and M3 phases (M1-1, M1-3, M1-4, M1-5, M1-6, M3-5, M3-4, M3-6). With the exception of M1-4 (where grinding striae have a more restricted distribution than the scraped striae), this might constitute evidence for prior preparation of the surface, or at least the selection of fortuitously pre-prepared surfaces. Engravings were also made on natural ochre surfaces in all phases.

Single stroke lines that comprise some of these engravings occur in all phases, but multiple stroke lines are limited to M1. There is a high level of engraving expertise in two phases (M1-5, M1-6, M3-1, M3-6, M3-10), and conversely some lines are less accurately executed in all phases (M1-3, M2-1, M3-7). Our analysis suggests that the ability for accurate engraving was in place from layer CJ. Almost all the designs are comprised of straight or slightly curved lines, but the motifs produced change slightly across the phases. Simple converging lines occur only in the M3 phase (M3-7, M3-10); converging lines crossed perpendicularly are found in the M1 and M2 phases (M1-1, M2-1); cross hatched patterns occur in the M1 and M3 phases (M1-5, M1-6, M1-3, M3-6, M3-9). A more elaborate variant of this last pattern creates a ladder-like motif and is restricted to the M3 phase (M3-1). Engraved parallel lines appear in the M1 and M3 phases (M1-2, M1-4, M3-2). Perpendicular arrangements may be restricted to M3 (M3-4, M3-6, and arguably M3-3 and M3-8).

The breakage of some pieces was probably the result of taphonomic processes and was not deliberate (M1-2, M3-1, M3-2, M3-4, M3-6). In some cases during the M1 phase, previously engraved surfaces were knapped to remove flakes indicating that at least in this phase, some engravings could become redundant. This perhaps occurred when its previous function became obsolete and/or if the ochre was required for further exploitation. In one case, the breakage was probably caused by thinning of the piece as a result of intense scraping (M3-3, M3-8).

In spite of the observed changes in the engraving techniques used and type of design represented between phases, all the other features considered here suggest a continuity in engraving practices over a period of at least 25 ka. The evidence is admittedly fragmentary and the sample size limited, but we suggest still strong enough to infer a tradition of geometric engraving. This tradition endured over the longest span yet recorded at any one site. In accounting for the impression of this being a site-specific phenomenon, it should be noted that only a few ochre collections excavated at Cape archaeological sites have been studied (suggested by the recent find of an MSA engraved ochre piece in the Klein Kliphuis site collection curated at Iziko-SA Museum since 1984 and not recognised until 2006—see Mackay and Welz, 2008).

The geographic extent of this tradition is difficult to establish, but dendritic/convergent line motifs have been recovered from MSA II and Howiesons Poort contexts at Klasies (Eastern Cape; Knight et al., 1995; Watts, 1998) and from a c. 100 ka context at Pinnacle Point (Western Cape; Watts, in press). Parallel line engravings are reported from an undated MSA context at Bushman Rock Shelter (Mpumalanga Province; Watts, 1998). Similar parallel lines engraved on bone fragments are found at Klasies (d'Errico and Henshilwood, 2007). An engraved small stone fragment recovered by Wolfgang Sydow in 1963 at a site containing only MSA

lithics near Palmenhorst in the Swakop Valley, Namibia (Wendt, 1975) has a cross hatched pattern similar to those engraved on M1-5 and M1-6. Though still rare, these examples demonstrate that the Blombos Cave engravings are not isolated cases and we expect further instances of MSA engravings will come to light.

The Blombos Cave engravings may fall, we suggest, within two fields of abstraction; first, that described as non-representational or non-objective as the designs do not derive from recognisable subjects and second, they are abstract patterns that 'reframe nature for expressive effect' (Ettinger, 2005: 211). The first type of abstraction is difficult to identify archaeologically. The second can be demonstrated if the subject of the motifs is identified (d'Errico, 1991). In the case of the Blombos engravings, none of these can be identified as clearly representing elements of the natural world. Considering that engravings and traces of utilisation for pigment production often occur on the same objects, it is reasonable to speculate that motifs/decorations may represent templates of designs produced on other media, for example human and animal skin, wood, and stone using the extracted ochre powder.

Conclusion

In this study we demonstrate, for the first time, the presence of a tradition in the production of geometric engraved representations in the MSA; second, that this tradition has roots that go back in time to at least 100 ka ago, and third, that the tradition includes the production of a number of different patterns. From the evidence, we cannot determine the context in which these engravings were used or why they were abandoned. We also cannot be sure whether the engraved ochres from Blombos were created as non-objective or expressive designs. The fact that they were created, that most of them are deliberate and were made with representational intent, strongly suggests they functioned as artefacts within a society where behaviour was mediated by symbols.

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