Why is there ongoing debate about the significance of the African middle stone age record?

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Although there are many interpretations of the African Middle Stone Age (MSA), this essay will review the relevant evidence relating to the significance of ochre use during this period. Contention regarding the MSA focusses on whether people of this period were capable of modern human cognition, especially important as the MSA period predates anatomically modern humans. In an effort to understand when behavioural modernity occurred, archaeologists examining the archaeological MSA record, such as the abundance of ochre artefacts, have resulted in differing conclusions. Ongoing debate emphasises ochre use, signifying functional behaviour and beginnings of advanced thought, or ritual behaviour and fully human cognition. Proponents for both sides concur that ochre use could have been both functional and ritualistic. Whether people of the MSA decorated objects or themselves with special colours, created tanned hides, or composite weapons, they can no longer be seen as archaic due to new evidence of growing human cognition throughout the period.

The MSA in Africa, dated ~250-40kya, is a period of change in the archaeological record, the significance of which is debated by archaeologists (Hansen 2011, p. 1; Henshilwood et al. 2002, p. 1278; Jacobs & Roberts 2009). Archaeological evidence, in the form of ochre, shell beads, and composite tools, could be seen as evidence of “human” behaviour. These innovations paralleled a marked *Homo sapiens* population increase and significant environmental changes around 80-60kya (Jacobs & Roberts 2009; McBrearty 2007, p. 140). The first appearance of modern humans, *Homo sapiens sensu stricto*, was c. 100kya. The appearance of *Homo helmei* (260kya), a species with modern human morphological traits, coincides with the beginning of the MSA (Barham & Mitchell 2008, p. 214; Hansen 2011, p. 73). *Homo heidelbergensis/rhodesiensis* was also active during the beginning of the MSA until at least 177kya (Barham & Mitchell 2008, p. 217; McBrearty & Brooks 2000, p. 480). Debate between academics regarding the significance of the Middle Stone Age

focusses on the origin of behavioural modernity. Archaeologists wish to pinpoint the transitional period between pre-modern and modern behaviour, and which species achieved this, to better understand uniquely human traits such as advanced cognition in the form of symbolic thought.

While ochre dated to the Middle Pleistocene has been found, significant quantities of ochre artefacts have been dated to the MSA (Table 1). Ochre is a pigment containing iron oxide or iron hydroxide, producing a red or yellow colour (Henshilwood, D'Errico & Watts 2009, p. 29; Watts 2002, p. 1). Evidence includes "ochreous powder, 'crayons', ochre stained lithics, beads and grindstones, nodules that are smoothed, polished or cut, and unmodified nodules" (Hansen 2011, p. 2). Following careful analyses, academics interpreted findings quite differently (Hansen 2011, pp. 3-4).

Debate surrounding MSA innovations includes two major arguments; artefact creation as functional adaptions, or representations of symbolic behaviour. Symbolic thought through conceptualisation and artwork is a key indicator of cognitively advanced modern behaviour (Barham & Mitchell 2008, pp. 255-256; Jacobs & Roberts 2009). The behavioural modernity debate is intensifying around ochre, as it is well-represented and has the potential to demonstrate early behaviours at sites post- and predating 100kya (Hansen 2011, pp. viii, 2; Lombard 2006, p. 57; Watts 2010, p. 392). This essay will examine some ongoing arguments surrounding potential ritual and utilitarian use of ochre, and will cover the most influential arguments on both sides.

Site/Cave	Country	Mass	Unit	Date	Period	Reported ochre minerals
Wonderwerk Cave (WWK)	South Africa	Red ochre pieces	Major Unit 7 Major Units 3-4	c. 790kya >350-276±29kya	Middle Pleistocene	Haematite and specularite
Twin Rivers	Zambia	<70kg	A Block F Block	c 400-266kya c 200-140kya	Middle Pleistocene MSA	Specularite, Haematite, Limonite, Ferruginous sandstone, Manganese dioxide
Duinefontein 2	South Africa	-	Horizon 3	>290-270kya	Middle Pleistocene	Haematite
GnJh-15, Kapthurin Formation	Kenya	*c.* 5kg/>70 items	K3 Sediments	>285 kya	Middle Pleistocene	Haematite
Border Cave	South Africa (KwaZulu-Natal)	111 ochre pieces (8.1 % modified), or 0.33kg (27.7 % modified)	6BS 5WA 5BS	>227kya 227±11-174±9kya 166±6 - 147±6kya	MSA MSA MSA	Haematite and specularite
Kalambo Falls	Zambia	Small pieces of soft ochre, some with rubbing facets and striations	Acheulean Lower Acheulean Upper Sangoan	182±16kya 182±10kya 76±10kya	MSA MSA MSA	Haematite, specularite, limonite, dolerite, kaolin, ferruginous schists
Mumbwa	Zambia	-	Unit III-XIII	>172±22kya - *c.*23kya	MSA	Haematite, specularite, ferruginous sandstone, yellow sandstone, limonite
Pinnacle Point Cave 13B	South Africa	1032 potential pieces of ochre (380 pieces/ 1,08kg classified as “pigment”)	LC-MSA Lower	164kya	MSA	Iron oxide, fine sandstone, coarse siltstone, siltstone, shale
Blombos Cave (BBC)	South Africa	c. 9000 pieces	Layers CL-CP	>143-70kya	MSA	Haematite, sandstone, shales, siltstone, coarse siltstone
Mumba	Tanzania	-	Stratum VIB	132kya	MSA	Haematite
Rose Cottage Cave	South Africa	1,57kg/>89 pieces	Sequential units: 242-81 inches	c. 130-60kya	MSA	Haematite

Site/Cave	Country	Mass	Unit	Date	Period	Reported ochre minerals
Mwulu's Cave	South Africa	13 pieces of ochre (53.8% modified), or 0.48kg (77.2% modified)	-	c. 126-100kya	MSA	Haematite and Specularite
Hollow Rock Shelter	South Africa	1123 pieces of ochre (8.4% modified), or 1.34kg (45.5% modified)	-	c. 126-100kya	MSA	Haematite and Specularite
Klasies River Mouth	South Africa	217 pieces of ochre, or 3.81kg	-	c. 126-60kya	MSA	Haematite
Apollo 11	Namibia	105 pieces of ochre (29.5% modified), or 0.89kg (46.8% modified)	-	c. 126-60kya	MSA	-
Pomongwe Cave	Zimbabwe (Matopo Hills)	Lumps and ground pencils of ochre	Area 1, lyrs 22-27	c. 125kya	MSA	Mostly red haematite
Bambata Cave	Zimbabwe	Balls and fragments of yellow ochre. Pencils, fragments and balls of red and brown ochre	Middle and Upper zones	c. 125kya	MSA	Haematite
Olieboompoort	South Africa	304 pieces of ochre (13.2% modified), or 11.95 kg (18.2% modified)	-	c. 120-100kya	MSA	Haematite and Specularite
Umhlatuzana	South Africa (KwaZulu-Natal)	1721 pieces of ochre (8.5% modified), or 3.44 kg (14.5% modified). Ochre residue on lithics	-	c. >90kya	MSA	Haematite, Shale and Specularite
Sibudu Cave	South Africa	c. 5500 pieces, almost 700 of these are worked	Squares B5 & B6, layers SIB 1 – SIB 14	c. 77-50kya	MSA	Haematite, goethite, dolerite, quarts
Porc Epic Cave	South Africa (Northern Cape)	214 small pebbles and lumps. 34 (15.9%) pieces modified	Levels 1-8	<77kya	MSA	Haematite and specularite
Boomplaas Cave	South Africa	133 pieces of ochre (18.8% modified), or 1.34 kg (16.9% modified)	-	c. 70-40kya	MSA	-
Ysterfontein 1	South Africa	29 ochre lumps	Upper and Lower Unit	c. 60-40kya	MSA	Red and possible black pigment
Klein Kliphuis (KKH)	South Africa	919 pieces, one engraved ochre piece	D2	>55kya	MSA	Haematite

Table 1: Archaeological evidence for ochre found within Africa, dated to the MSA (Hansen 2011, pp. 21-22, 33-35; Watts 2009, pp. 75-78).

Figure 1: Two toolkits used for the production and storage of ochre, Blombos Cave (Henshilwood et al. 2011, p. 219).

Next to stone tools, ochre is one of the most common artefacts found at MSA sites. Whilst engraved ochre has been discovered dating to 77kya, undecorated ochre has been dated to throughout the MSA even into the Middle Pleistocene (Table 1). Ochre-processing grindstones (c. 200kya) were discovered at GnJh-15 and Twin Rivers, possibly used by *H. heidelbergensis*, and toolkits (c. 100kya) at Blombos Cave, used by *H. sapiens* (Henshilwood et al. 2011, pp. 219-220; McBrearty & Brooks 2000, p. 531; Power 2004, p. 80; Figure 1). Ochre 'crayons' have also been found, and analysed as the most efficient way to extract ochre powder (Lombard 2006, p. 58; Figure 2). Although the processing technique is understood, the powder's use is uncertain (Henshilwood et al. 2011, p. 222). The considerable lengths to which hominids went to find and process ochre indicate the extreme importance of ochre throughout the MSA (Barham 2005, p. 4), with origins of its importance stemming from the Middle Pleistocene. As such, Watts argues that ochre use in ritual contexts was "an established part of early modern human behaviour" (2002, p. 1).

Figure 2: Example of an ochre “crayon” (Hansen 2011, p. 15).

Proponents for ochre use being linked to symbolism include Larry Barham, Christopher Henshilwood, Francesco D’Errico, Chris Knight, Camilla Power, and Ian Watts. Arguments can be grouped into two major categories – decoration and colour selection. Barham briefly covers both topics in relation to work at Twin Rivers. Henshilwood, D’Errico, Knight, Power and Watts cover different aspects of both topics in depth. If ochre use is proven to be artistic by any of these arguments, then the hominids who used ochre for these activities can be classed as cognitively modern.

Engraved decorations, abstract in design, can be identified in the record from 77kya, during the most innovative period of the MSA (Henshilwood, D’Errico & Watts 2009, p. 28; Power 2004, p. 82). Henshilwood, D’Errico and Watts analysed ochre pieces from Blombos Cave, including the direction and timing of the engraved lines on piece M1-6, caused by deliberate human action rather than taphonomic processes (McBrearty & Brooks 2000, p. 524) – the engraver “filled in a blank space by incising two lines to complete the symmetry of the pattern” (Henshilwood, D’Errico & Watts 2009, p. 39; Figures 3-4). This is not enough evidence to prove that *H. sapiens* at Blombos did more than doodle, especially as other pieces of ochre, while modified,

are unlikely to be decorative. However, with similar geometric design repeated across MSA sites on ostrich eggshell and bone, a notational pattern emerges from the MSA's most innovative period (Henshilwood, D'Errico & Watts 2009, p. 28; McBrearty & Brooks 2000, p. 531; Watts 2002, p. 8; Figure 5). Cultural identity through pattern replication is implied, but confirmed by ochre-stained shell beads used for personal adornment at Blombos and Sibudu (Hansen 2011, p. 30; Henshilwood, D'Errico & Watts 2009, p. 28; Figure 6). Artistic expression in decorating organic items, including the human body, with ochre paint is theorised (Barham 2005, p. 4; Henshilwood, D'Errico & Watts 2009, p. 45; Watts 2002, p. 1). Such artistic expression is indicative of ritual or religious activity of a symbolic nature, equating with modern human cognition (Hansen 2011, p. 4; Power 2004, p. 76). Whether ochre was an artistic choice, or not, can be determined by the type of ochre selected.

Figure 3: Cross-hatched ochre piece from Blombos Cave (M1-6), South Africa (Hansen 2011, p. i).

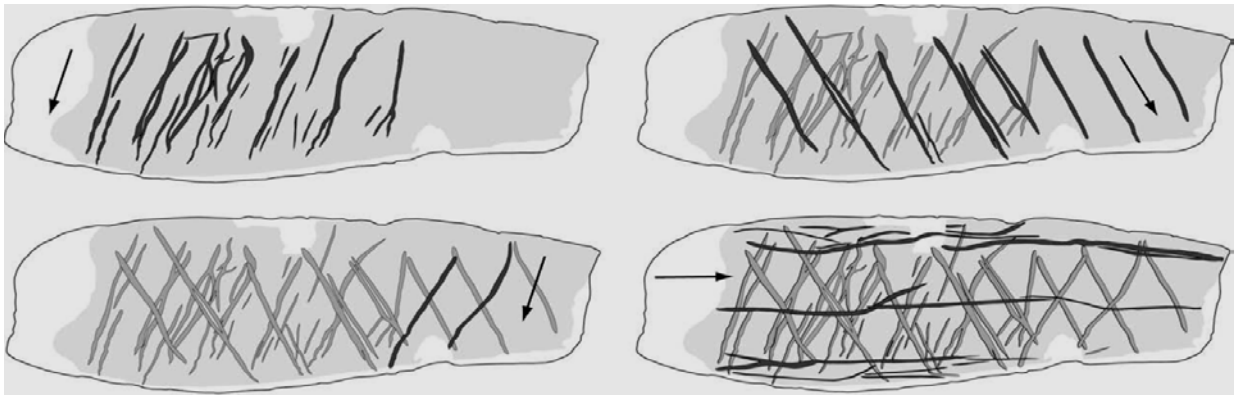

Figure 4: Order of the engravings on piece M1-6. Each new set is highlighted in dark grey. Arrows indicate the direction of the engraving tool (Henshilwood, D'Errico & Watts 2009, p. 35).

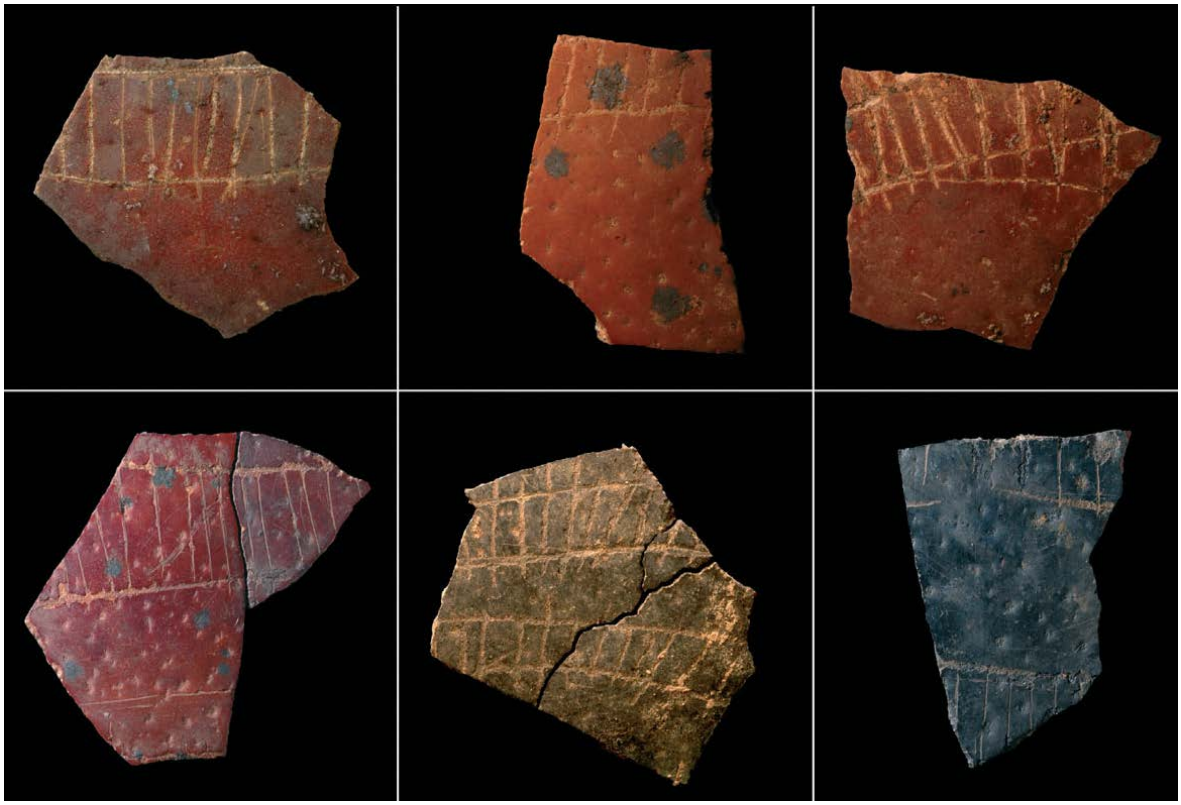

Figure 5: Decorated ostrich eggshell from Diepkloof, c. 60kya (Texier 2010).

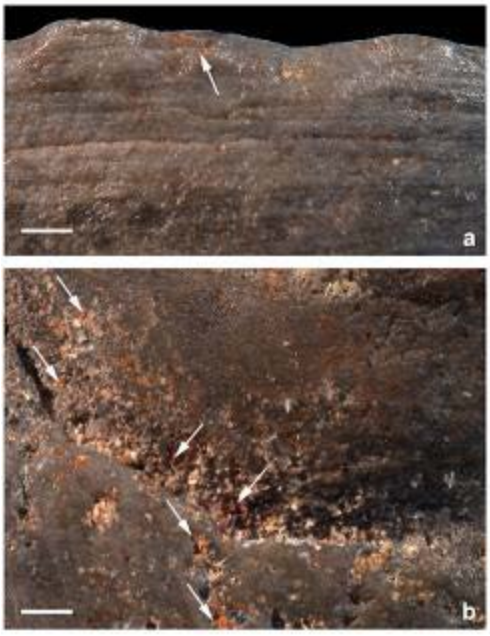

Figure 6: Close-up view of an ochre stained shell, showing the location of red ochre on the surface and the spire of the shell (Hansen 2011, p. 71)

Archaeological evidence reveals deliberate colour selection as ochre colour and hue were important during the MSA. Watts (2002, pp. 2-3; 2009, p. 69) notes the first colour to be named, red, is a common colour focal point for all human cultures, which shows its importance. After analysing ochre pieces from southern African MSA sites,

he concluded that over 80% of ochre pigments were red, with over half being strong red (Power 2004, p. 81-82; Table 2; Figure 2). Great effort was required to obtain the reddest, most saturated pigments over yellows, browns, purples and blacks (Barham 2005, p. 4; Hansen 2011, p. 89; Henshilwood, D'Errico & Watts 2009, p. 29; Watts 2010, pp. 409-410). This was reflected in the modified pieces at Still Bay and Blombos (Watts 2002, p. 9). Knight (2010, p. 299) and Watts (2010, p. 409) note that the brilliance and redness of ochre pigments at Blombos is reminiscent of African hunter-gatherer body-painting. These reds are connected to blood, as seen in its use by these hunter-gatherer women for fertility-related menarcheal observances (Knight 2009, p. 298-300; Power 2004, pp. 82-83; Watts 2009, p. 72). It is reasonable to assume that red had a symbolic meaning during the MSA, inferring a modern cognitive conceptualisation of red pigment with an idea (blood/fertility). While this may extend to vocal symbols and language (Barham & Mitchell 2008, p. 255; McBrearty 2007, pp. 142-146; Watts 2009; Watts 2010, p. 409), such investigation is beyond the scope of this essay. The symbolic choice of bright red pigment throughout the MSA is clear in the archaeological record. However, ochre may well have been put to other uses.

Colours	% of entire sample	% of utilised pieces
Whites	0.4	0.4
Yellows	0.6	0.8
Orange & yellowish-browns	3.2	4.5
Light browns	5.0	3.1
Reds	87.5	87.7
Mid- & dark-browns	1.4	3.3
Black	0.3	0.2
Grey	0.2	-
Various colours	1.4	-
Total n	3957	489

Table 2: Colour proportions for the entire ochre sample and for utilised pieces found at Apollo 11, Hollow Rock Shelter, Boomplass, Klasies River, Umhlatuzana, Sehonghong, Rose Cottage Cave, Border Cave, Bushman Rockshelter, Mwulu's Cave, and Olieboompoort (Watts 2002, p. 9).

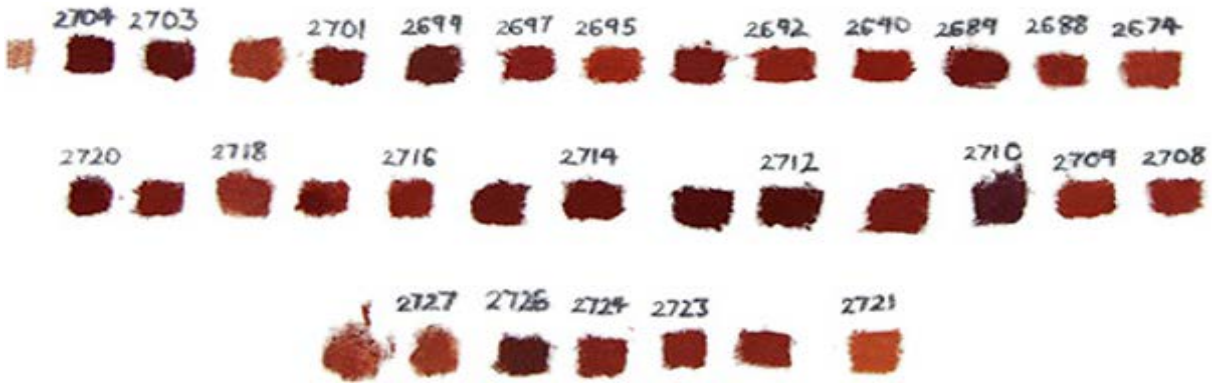

Figure 7: Pinnacle Point Cave 13B streak plate showing a range of pigments (Watts 2010, p. 396).

Ochre may have had a functional use for people of the MSA. Although suggestive of complex problem solving and planning (Lombard 2005, p. 297), it does not prove modern cognition. Lyn Wadley, Bonny Williamson and Marlize Lombard (2003, p. 662) argue tanning of hides may have been one use, or as an ingredient for hafting stone tools. To prove that MSA hominids were not cognitively modern, the archaeological record must show that ochre was only used for practical purposes.

Hide tanning is one possibility for non-symbolic ochre use during the MSA (McBrearty & Brooks 2000, p. 524). The theory, proposed by Wadley, Williamson and Lombard (2003), is based on ethnographic evidence of native Tasmanians and the Tehuelches of Argentina. They argue that ochre prevents decay, and red ochre dries and softens hide better than yellow. They used experimental archaeology to show that Late Stone Age bone tools from Blombos were likely stained dark red by transfer when piercing ochred hides. Despite this, red ochre selection matches that seen during the MSA. However, Watts (2002, p. 3) argues that African hunter-gatherers used ochre on hides, not for tanning, but as a decorative feature. In either case, advanced cognition for forethought and planning had to be involved to create the right compound to decorate or preserve the hides, implying transmission of information between individuals. While there is no direct evidence for ochre as a tanning agent, there is

another practical use for ochre, clearly visible in the MSA record – ochre was also one of the main ingredients of adhesive for hafting stone tools during the MSA's most innovative period.

This is seen on Howiesons Poort Industry stone tools (c. 80-50kya) from sites such as Rose Cottage Cave, Sibudu Cave and Umhlatuzana Rock Shelter (Hansen 2011, p. 4), and Twin Rivers (Barham 2005, p. 4). Wadley, Williamson and Lombard analysed these stone tools to prove a high frequency of ochre had been applied to their proximal and/or medial areas, locations where handles were likely to have been adhered (Lombard 2005, 2006; Wadley, Williamson & Lombard 2003; Figure 8). As no handles survive, Lombard's investigation of adhesives proved that ochre-loaded mastic was used on these tools. She demonstrated that a heated ochre adhesive was easy to work, water-proof, and produced resilient tools. Microfractures indicative of hafting were also discovered on tools at Sibudu Cave (Lombard 2005, p. 293). Watts (2009, p. 73; 2010, p. 409) argues available fillers such as plant fibres or dirt would have been more expedient, proposing ochre's inclusion in adhesive was for symbolic reasons. Perfecting a reliable adhesive paste would have required time, effort, attention, and an understanding of the ingredients involved, which is indicative of advanced, if not fully modern, cognition (Wadley, Williamson and Lombard 2003, pp. 672-673). The preference for the most saturated reds found on the tools seems to suggest that the paste was not purely functional (Henshilwood, D'Errico and Watts 2009, p. 29). Wadley, Williamson and Lombard agree that ochre use in hafting were both utilitarian and symbolic in nature (Lombard 2006, p. 65; Wadley, Williamson & Lombard 2003, p. 672-673).

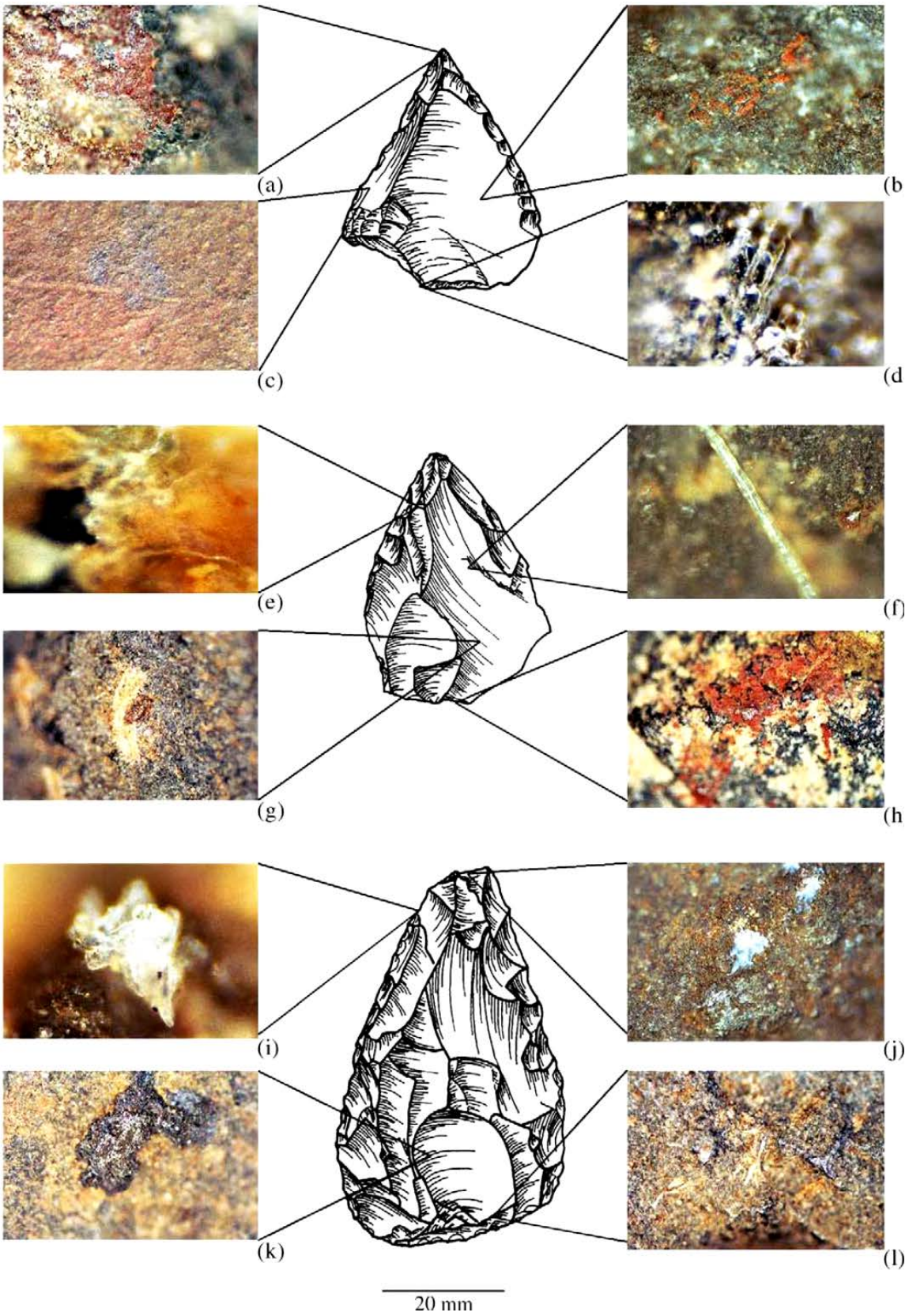

Figure 8: Microanalysis of three points from layer RSp (53,400G 2,100 years old) at Sibudu Cave showing (a) thick blood residue, (b) ochre smear, (c) ochre and plant exudate, (d) bark cells, (e) animal tissue, (f) animal hair, (g) woody residue trapped under resin, (h) thick ochre deposit, resin and macerated wood, (i) collagen with brown spots, (j) fatty deposit, (k) thick resinous deposit with wood imprint, and (l) woody fibres and resin. (Lombard 2005, p. 294)

This ongoing debate about the significance of the African MSA record is important because of links to behavioural modernity. Ochre was found at sites dating back to the Middle Pleistocene, before the appearance of *H. sapiens*. Archaeological debates regarding ochre reveal that its symbolic use predates the functional. A colour preference for bright red ochre is evident in the record from at least 130kya, and may be conceptually linked to blood. Decoration and hafting first featured during the MSA's innovative period, between 80-60kya, in a time frame associated with *H. sapiens*. Hunting tools hafted with red ochre also hearkens back to this colour being conceptually linked to blood. Possible evidence for hide tanning appears at Blombos Cave, but it postdates the MSA. Pigment selection clearly reveals that African hominids used colour symbolism by the middle of the MSA, and persuasively suggests that either *H. helmei* or *H. heidelbergensis* first developed behavioural modernity. This implies *H. sapiens* continued an earlier symbolic colour tradition, expanded upon with bursts of artistic and functional creativity during the MSA's most innovative period. Further investigation of hominid colour choice for ochre dating from the Middle Pleistocene to the mid-MSA is recommended. However, as shown by the aforementioned arguments, not everyone agrees that this proves that non-human species had human cognition. Until definitive evidence of human cognitive is found, debate about ochre use in pinpointing the origin of behavioural modernity is likely to continue.

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