



# Putting ochre to the test: replication studies of adhesives that may have been used for hafting tools in the Middle Stone Age

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## Abstract

Substantial frequencies of Middle Stone Age (MSA) lithics from Rose Cottage and Sibudu Caves in South Africa have red ochre on their proximal and medial portions. Residue studies suggest that the tools were hafted and that the ochre may be part of the adhesive used for hafting the tools. Replication studies show that ochre is indeed a useful loading agent for adhesive; however, there are other potential loading agents. It is also possible to use unloaded plant resin, but this agent is brittle and difficult to work with. It appears that people living in the MSA had wide knowledge of ingredients suitable for hafting tools, and that they chose different adhesive recipes because of the required properties of the adhesive. Brittle, unloaded adhesive allows a projectile head to disengage its haft and implant itself in an animal; robust adhesive keeps a spearhead safely in its shaft.

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## Introduction

This study has its roots in the observation, made some years ago, that many stone tools from Rose Cottage Cave, South Africa, have red ochre on them. Residue and macrowear studies of these MSA tools and similar tools from Sibudu Cave, also in South Africa, are described in this paper.

The positions of the ochre suggest at least three reasons for its presence: (1) some pieces are ochre-covered because they fortuitously rested on ochre-stained ground, (2) others seem to have been used to cut or scrape ochre, and (3) numerous tools have ochre on their bases. It is this latter group that I concentrate on in this paper. My working hypothesis is that many tools were hafted using an adhesive in which red ochre was an ingredient. My hafting replication studies were thus designed to investigate

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the usefulness of ochre as an ingredient in natural adhesives. If the ochre can be shown to have little purpose, then it is feasible that it was added to the adhesive for the sake of its color and possibly for symbolic purposes. Naturally, a symbolic role cannot be totally excluded if the ochre is found to be an advantageous additive to adhesives, but this scenario will suggest that it is unwise to automatically assume symbolism when ochre is present.

Coloring material is present early in African living sites: it was used systematically by about 285 ka at GnJh-15, Kapthurin Formation, Kenya (McBrearty, 2001), and possibly even earlier at Twin Rivers, Zambia, where pigments were found associated with a Lupemban Industry, dating to about 300 ka (Barham, 2002). Barham (2002: 186–187) estimated that about 60 kg of coloring material were recovered from the 1950s excavations. This large quantity of coloring is overshadowed by the tons of specular hematite that were mined from iron pods at Lion Cavern, in the eastern part of South Africa, perhaps earlier than 40,000 years ago. Mining hammers in the form of grooved, heavy-duty stones were found alongside Middle Stone Age (MSA) tools in one of the Lion Cavern adits (Beaumont, 1973: 140). It is difficult to imagine what people were doing with this amount of coloring material, but it looks as if the demand for coloring material increased between the Lupemban and the final MSA. I address the issue of densities of coloring material at the end of this paper.

Not only does the Lupemban Industry document the earliest substantial use of ochre in Africa, but it also has the earliest backed tools. At Twin Rivers, backing accounts for up to 15% of the retouched tools in the Lupemban Industry (Clark and Brown, 2001; Barham, 2002). It might not be coincidental that backed tools and quantities of ochre are found together; the reason for this comment will be made clear below. The Lupemban industry appears to be associated with fossil remains of *Homo heidelbergensis* (elsewhere called *Homo rhodesiensis*) at Kabwe, Zambia (Barham, 2002). There are important implications if these anatomically pre-modern humans were the makers of the backed tools and the users of ochre at Kabwe and at Twin Rivers (and possibly Kalambo Falls). Some archaeologists believe that ochre is always associated with

symbolic behavior (e.g., Knight et al., 1995; Deacon, 1995; McBrearty and Brooks, 2000; Watts, 2002), and others (e.g., Deacon, 1995; Wurz, 1999) consider backed tools to be hallmarks of modern behavior, embodying symbolic expression. If the ca. 300 kyr-old ochre and backed tools are indeed attributes of a symbolic system, then symbolism is not the exclusive property of anatomically modern humans, and archaeologists will need to redefine what it means to be a culturally modern human.

The common assumption about the use of large quantities of ochre in the MSA is that red coloring was used for symbolic body decoration. This conjecture is based on analogy with modern hunter-gatherers living tens of thousands of years later. For example, red body-paint was used for puberty and marriage rituals by !Kung girls in northwestern Botswana in historic times (Marshall, 1976: 277). There is, however, no way of testing whether ancient people practiced body painting, and the application of hunter-gatherer ethnography to the deep past can be problematic; as pointed out by Hovers et al. (2003), ethnographic analogy cannot be used as both a building block of a model and a test of the same model.

Powdered ochre was sometimes placed on the bodies of the dead in southern African Later Stone Age (LSA) sites dating to within the last 10,000 years (Wadley, 1997), but symbolic behavior is already well-documented by this time. In my opinion, the earliest unequivocal evidence for symbolic behavior in Africa comes from Blombos Cave, in the Western Cape, where shell beads were found in a layer that is dated to approximately 77 ka (Henshilwood et al., 2004). These beads are symbolic because they had the potential to play an active role in the articulation and manipulation of social relationships (Wadley, 2001, 2003). As personal ornaments, they were an index of social identity—either group or individual identity. Such expressions of identity are always symbolic. The earliest use of ochre for no clear functional reason comes from the same 77 kyr-old layer in Blombos Cave (Henshilwood et al., 2002). Here, several pieces of engraved ochre were found. The larger Blombos ochre tablet has a crosshatched design engraved inside several broken boundary lines. The decorated ochre was interpreted by

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