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USE-WEAR ANALYSIS OF TWO ACHEULEAN HANDAXES FROM WONDERWERK CAVE, NORTHERN CAPE*

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ABSTRACT

Wonderwerk Cave, in the northern Cape, is one of few cave sites in southern Africa to contain a Stone Age sequence ranging from the Acheulean up until historic times. The Acheulean artefacts are associated with well-preserved bone remains and calcified plant material. Two chert handaxes, predating ca 350 000 BP, were selected for the examination of use-wear traces. The indications are that the handaxes were used to process vegetal materials.

INTRODUCTION

Acheulean handaxes are found throughout southern Africa in virtually every geographical region and environment (Sampson 1974, Fig. 40). Unfortunately, these implements are found mainly in the open and are heavily patinated, which prevent any microscopic examination to determine their possible function. Although a few cave sites in southern Africa do contain Earlier Stone Age implements, these are usually manufactured of local quartzites or other raw materials which are not suitable for microscopic investigation. However, recent excavations at Wonderwerk Cave in the northern Cape yielded Acheulean handaxes manufactured of chert which are suitable for microscopic examination. Together with techniques developed in recent years mainly by Keeley (1980), it is now possible to examine and study the wear traces on stone tools to gain some insights into possible functions of stone tools. Keeley established from experimental use of stone tools that different materials, such as wood, bone, hide, antler and meat leave distinct wear traces on the surfaces of stone tools. These wear traces can be identified between 200x and 400x magnification.

Handaxes were first discovered in Wonderwerk Cave during excavations by B.D. Malan & L.H. Wells in 1943 (Malan & Wells 1943). Excavations with the aim of investigating the Acheulean levels were resumed in 1978 by Peter Beaumont.

THE MIDDLE PLEISTOCENE LEVELS AT WONDERWERK CAVE

Wonderwerk (Miracle) Cave (27.50.47S; 23.33.19E) is situated on the farm Wonderwerk, about halfway between the towns of Kuruman and Danielskuil, in the Kuruman District of the northern Cape (Fig. 1). The tunnel-like cave runs for 139 m horizontally into the base of a low ridge which is part of the Kuruman Hills. Descriptions and previous investigations at Wonderwerk Cave are detailed in Thackeray (1981), Humphreys & Thackeray (1983) and Beaumont (1990).

The Middle Pleistocene sequence has been probed by Peter Beaumont in two excavations in different areas of the cave (Excavations 1 & 2). At Excavation 1 the sequence is approximately three metres deep and is divided into eight handaxe strata (Beaumont 1979, 1990). The second-youngest handaxe stratum in Excavation 1 is Uranium-Thorium dated to greater than 350 000 BP and is tentatively linked to the Kathu Pan phase of the Acheulean. Amino acid assays on three unburnt ostrich eggshell pieces from Excavation 2, indicate that the uppermost handaxe level there, associated with the Fauresmith phase of the Acheulean, predates 200 000 BP (Beaumont 1990).

The Fauresmith phase of the Acheulean refers to aggregates produced prior to 200 000 BP, distinguished by handaxes which tend to be small and broad, a variety of refined prepared cores, and a flake component that

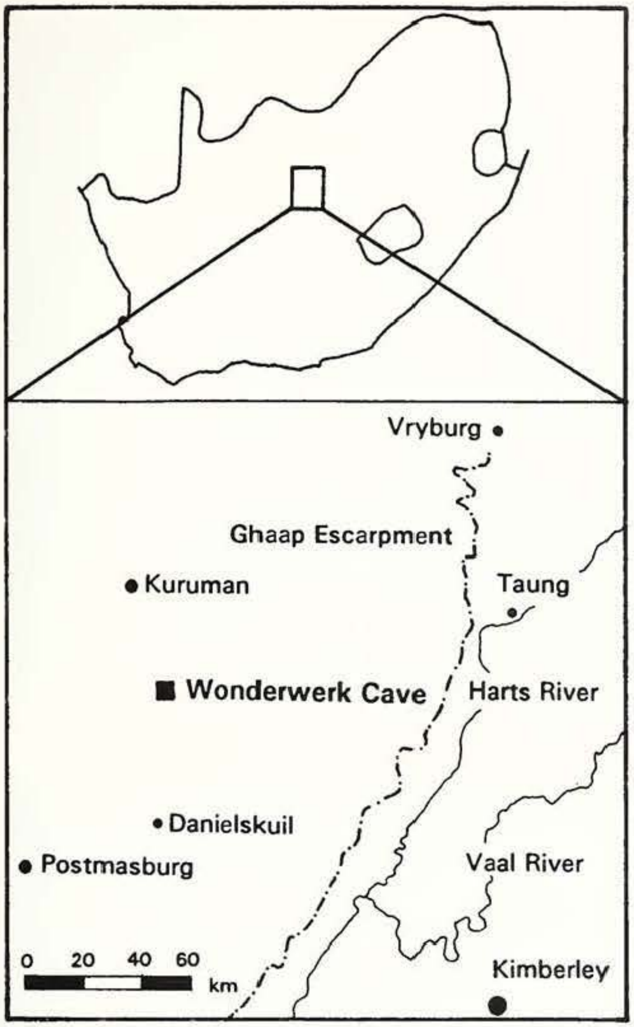

Fig. 1. Location of Wonderwerk Cave.

includes end-struck irregulars, narrow blades and convergent points. The Kathu Pan phase of the Acheulean refers to aggregates produced prior to 350 000 BP, that are distinguished by very refined 'classical' handaxes, the absence of any form of prepared core, and a flake component that is limited to approximitely 'square' irregulars with a modest incidence of dorsal cortex.

The dates from Wonderwerk Cave, especially the one from Excavation 1, could suggest that the base of the sequence, which is approximitely 2,5 m further down, may extend back to before the onset of the Bruhnes Chron at 720 000 BP (McElhinny 1973). This may possibly permit the bottom strata to be dated by means of palaeomagnetism applied to the exotic iron oxide-coated quartz grains of aeolian origin (Butzer *et al.* 1979), which forms a major component of many of the Acheulean levels.

The Acheulean strata in Excavation 1 & 2 have produced vestiges of vegetation and perfectly preserved macro- and microfauna (Beaumont 1979). The plant remains consist of charred or calcified grass stem and shrub branch tip fragments which sometimes cover extensive lenses (greater than 10 square metres) that are best interpreted as 'bedding' areas (Beaumont 1990). Large mammal bones are present throughout the succession and are invariably very fragmented, with a preliminary study showing little or no evidence for rodent or carnivore damage. This suggests that the fragments were brought in mainly by people. The range of prey taxa (Beaumont 1990) indicates that predation was directed at essentially the same spectrum of species as that represented in the Holocene levels. Evidence for the regular manufacture of fire in the cave, has been recovered throughout the Acheulean sequence in the form of diffuse ash, distinct ash levels, charred-calcised bone and fire-shattered stone.

USE-WEAR ANALYSIS

Of the four Acheulean handaxes initially received for analysis, two from the Kathu Pan phase predating ca 350 000 BP, were selected (Fig. 2) for analysis. The techniques used have been detailed elsewhere (Binneman 1982).

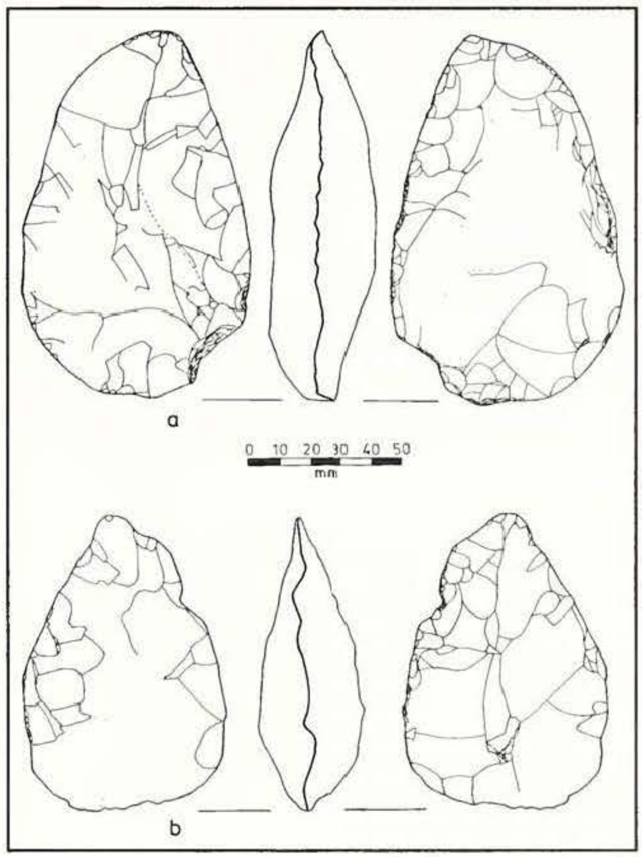

Fig. 2. The two Acheulean handaxes from Wonderwerk Cave examined for use-wear traces.

Handaxe No. 1. Excavation 1. Layer 8.

The handaxe is manufactured of chert and is ovate in shape; the obverse face, (face displaying secondary retouch along the lateral edges) is relatively flat in comparison with the reverse face which is more rounded in section. Both faces are extensively flaked, displaying large flakes removed to obtain the desired shape of the handaxe (Fig. 2a).

Both lateral edges of the obverse face are retouched, the right lateral edge in particular displays a series of large, steep, interlocking step-flaking scars and a second set of small half-moon breakages or 'crushing' along the immediate working edge. These macrowear patterns are similar to those found on Later Stone Age adzes (Binneman & Deacon 1986). Crushing of the working edge is a characteristic of stone hammer retouch and it is therefore difficult to establish with any certainty whether the crushing originated due to utilisation or from retouch.

Handaxe No. 2. Excavation 1. Layer 8.

This handaxe is also manufactured of chert and is inclined to be slightly more triangular in shape (Fig. 2b). Step-flaking occurs along most of the left lateral edge of the obverse face. A large notch, lined with small, step-flakes and crushing along the direct edge, occurs near the point. Little secondary retouch and/or utilisation damage are present along the lateral edges of the reverse face.

Wear traces

Both handaxes display a high degree of microwear traces on both faces, but these are best developed along the lateral working edges and on the higher microtopograph, such as the ridges of the flake scars on the reverse faces. The microwear polish is well developed on both handaxes with abundant striae running across the polished areas at different angles. It is apparent that the implements were used extensively over a relatively long period of time. The striae range from short, broad, deep, U-shaped to short, long, shallow V-shaped (Figs 3 & 4). The ridges between the flake scares and working edges are well rounded (Fig. 5).

The microwear polish is relatively bright, but 'rough' in appearance. The reason for this may be that the numerous striae which were created continuously by dirt

Fig. 3. Microwear polish and U-shaped striae. 200x.

and other abrasive agents during use, probably prevented the microwear polish from forming smoothly and evenly. There are, however, a few patches of smooth 'undisturbed' polish visible.

Fig. 4. Microwear polish and V-shaped striae running at different angles to the working edge. 200x.

Fig. 5. Microwear polish, striae and rounded working edge. 200x.

DISCUSSION

Despite the 'roughness' of the polish present on the implements, it closely resembles that of experimental polish resulting from working plant material. The microwear polishes present on both the implements are notably different from experiments which were conducted under 'clean' conditions. For example, the microwear polishes which resulted from working 'clean' plant materials such as wood, reed and sedge tended to form smooth areas while striae tend to be absent (Binneman 1982; Binneman & Deacon 1986). Experiments conducted on 'clean' plant materials with hornfels collected from the Ecca Formation near Matjiesfontein, produced microwear polishes which varied in appearance. Dry plant materials produced a smooth 'dull' polish (Fig. 6) and fresh plant materials a smooth 'greasy' polish (Fig. 7).

Fig. 6. Experimental dry wood polish created under 'clean' conditions. Shave. 20 minutes use. 200x.

Fig. 7. Experimental fresh wood polish created under 'clean' conditions. Shave. 25 minutes use. 200x.

Similar experiments conducted under 'dirty' conditions, where abrasives were artificially added, produced a microwear polish visibly different from that obtained under 'clean' conditions (Figs. 8 & 9). In this case it is not possible to distinguish between fresh and dry plant material. Polish resulting from 'dirty' conditions, however, is still bright, though rough in appearance and similar to polishes found on adzes from Later Stone Age contexts (Binneman 1982, 1983; Binneman & Deacon 1986).

There are at least three experimental plant material polish types which closely resemble the microwear polishes present on both the handaxes. The first type of polish, which most clearly resembles the microwear polish present on the handaxes, is that of sedge worked under 'dirty' conditions (Fig. 10). When Figure 10 is

Fig. 8. Experimental fresh wood polish created with added abrasives. Shave. 20 minutes use. 200x.

Fig. 9. Experimental dry wood polish created with added abrasives. Shave. 20 minutes use. 200x.

compared with Figure 3, the similarities between the experimental polish and that on the handaxes are remarkable. The second type of polish is that which resembles 'clean' plant polishes. Compare Figures 11, 6, and 12. Figure 11 is a patch of smooth polish present on handaxe No. 2. Figure 6 is an experimental, dry wood polish created under 'clean' conditions and Figure 12 is an experimental fresh sedge polish also created under 'clean' conditions. Reed also produces a similar type of polish. Of the two experimental plant polishes, sedge polish resembles the polish on the handaxe the closest. The wood polish, even though smooth, generally has a pitted appearance which is absent from the archaeological polish. The third type of polish is that of wood produced in the presence of abrasive materials. If Figures 8 & 9 are compared with Figure 5, the similarities between the experimental and archaeological polishes may not be apparent at first glance. However, if the micrographs are examined closely along the rounded edge of the

Fig. 10. Experimental fresh sedge polish created with added abrasives. Shave. 20 minutes use. 200x.

Fig. 11. A patch of smooth, bright plant polish on handaxe No. 2. 200x.

implement where the contact was more intensive than further back, it is clear that the experiment polish is very similar to the archaeological polish. The experimental implement was used for only 20 minutes, but even after this short period of use the experimental polish shows

Fig. 12. Experimental fresh sedge polish created under 'clean' conditions. Shave. 10 minutes use. 200x.

marked similarities with the polish present on the handaxe.

From the orientation of the striae it would appear that the handaxes were used in many different ways and directions. The striae run at all angles and parallel to the lateral edges. From this it may be assumed that the handaxes were used for shaving/planing activities and possibly also for the cutting/sawing of plant materials.

CONCLUSIONS

The sample of handaxes examined for use-wear traces is too small to allow general statements to be drawn regarding the function of all handaxe types. However, both handaxes examined in this study displayed similar macro-morphological use-wear features; these closely correspond to those found on Later Stone Age adzes of the Wilton Industry, which were actively used in working vegetal materials, such as wood. It is therefore not surprising to find that the micropolishes present on the two handaxes closely resemble those of Later Stone Age adzes. On the basis of this analysis, one of us (JB) would, although the sample is very small, propose that handaxes could be devided into different classes by means of edge use-wear characteristics.

At least two types of vegetal material were processed with the handaxes, notably wood and sedge. The plant material associated with the handaxes may be an indication that the cave was used during the Middle Pleistocene as a home base, to which the occupants returned on a regular basis. Some of the plant remains may represent sedge types which were cut with the handaxes and transported to Wonderwerk Cave and used as bedding material or for other, unknown purposes. Although it is not possible to ascertain whether wooden tools were manufactured with the handaxes, we may speculate that the implements were most probably used in the manufacturing and maintenance of pointed sticks and spears. An example of possible worked wood comes from the excavations of H.J. Deacon at Amanzi Springs near

Uitenhage in the eastern Cape (Deacon 1970:152, Fig. 15).

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