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Blind tests shed light on possibilities and limitations for identifying stone tool prehension and hafting

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Abstract

Prehensile wear has never formed the focus of a blind test in microwear studies and doubts remain about the formation, identification and interpretation of diagnostic prehension and hafting wear. The results of the presented blind tests demonstrate that prehension and hafting traces do form and that their formation is sufficiently systematic and patterned to allow valid and reliable interpretations. A combined approach, involving macroscopic, low power and high power analyses, is suggested as the most meaningful approach for consistent inferences.

Keywords: Blind test; Microwear; Hafting; Prehension; Stone tool

1. Context

People have always been interested in what stone tools were used for. Semenov [25] was the first to systematically deal with the question and to come up with a microscopic technique that made answers conceivable. Since then, use-wear analysis has gone a long way. Different levels of magnification were tested (e.g. [13,5,6,1,10,3]) and a methodology gradually developed. Blind tests were crucial throughout this development. A blind test is an objective means to evaluate the accuracy of information retrieved by a specific method. Several blind tests were executed at the beginning of functional research, a few applying low magnification [15,26,27], several applying high magnification (e.g. [8,4,9,11,29,2]). Recently, a blind test was also undertaken for residue analysis [31].

Prehensile wear, which is defined as traces resulting from either prehension (hand-held use without any intermediate material) or hafting (the use of a wrapping of some sort or the attachment of a handle to the lithic tool) has never before formed the focus of a blind test. Despite an agreement on its importance (e.g. [7]), prehensile wear was not expected to form, at least not in a consistent and systematic way. Only Odell attempted to propose valid distinctive criteria (e.g. [12,14,15]). Recently, the work of Odell was extended on a larger and more systematic basis [16]. Based on a large experimental reference set, criteria were proposed for a distinction between hand-held and hafted tools and for the interpretation of the hafting arrangement used [16–18,20]. Several blind tests were undertaken throughout this research and they form an important argument in the discussion concerning the formation and interpretability of prehensile wear. Blind tests are also extremely instructive and provocative for the analyst and they can pinpoint interpretative problems not realized before. Blind tests thus form an important tool for quality improvement and accuracy of the designed method. Therefore, tests should be undertaken on a regular basis, from the start of one's research, despite the risk of bad test results. However, it is evident that in order to make a strong case, results need to be good. This brings one to an impasse. On the one hand, experimental results need to be examined on their validity as quickly as possible, but on the other hand, test results may suffer from inexperience and incomplete methodological groundwork. Based on these considerations, it

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Notes for the understanding of the variables included in the tables

Haft limit: value concerns the distance from the butt to the haft limit and represents the intrusion of the stone tool in its haft (if it was hafted).

Haft material: material out of which the handle is made in contrast to other materials that may be used for fixation, like bindings or resin.

Wrapping: material a tool may be wrapped in after which it may be mounted on a handle.

Haft type: two main haft types are relevant, a juxtaposed one in which the stone tool is mounted next to the handle and a male one in which the stone tool is inserted in a handle. The latter can be further divided into a male handle sensu strictu when the tool is inserted into a hole or a male split haft when the tool is inserted into a cleft.

Hafting method: describes the contact between the lithic tool and its haft, when it is direct, there is no material in between the stone tool and its haft, when it is indirect, there is (e.g. wrapping).

Tool placement: position of the tool with regard to the handle: latero-distal = at the end of a bent handle, terminal = at the end of a straight handle, lateral = at the side of the handle.

Tool direction: orientation of the stone tool with regard to the axis of the handle: transversal, axial or oblique.

Orientation of the active part: orientation of the working edge with regard to the axis of the handle: perpendicular, parallel or oblique to it.

was decided to undertake blind tests at different stages during the research, from the beginning onwards. Interpretative problems could thus be highlighted, making a direct contribution to a further methodological development. Mistakes should be viewed in this light.

2. Methods

Three separate and consecutive blind tests were undertaken. L. Pirnay, P. Pirson and O. Baudoux produced, hafted (Plate 1) and used (Plate 2) each stone tool without providing any information to the functional analyst (V. Rots). Only flint was used as a raw material (both fine- and coarse-grained). Tools were handed over to the analyst after de-hafting and cleaning. The analyst re-cleaned all tools before starting the analysis. For cleaning, a short immersion in an HCl-solution (10%) was used and during analysis tools were cleaned with acetone or alcohol. For the first test, a few strict guidelines were formulated: if the tools were used, it could be for one function only, tools were to be used – in the hand or hafted – with a minimal duration of 30 min, tools needed to be freshly

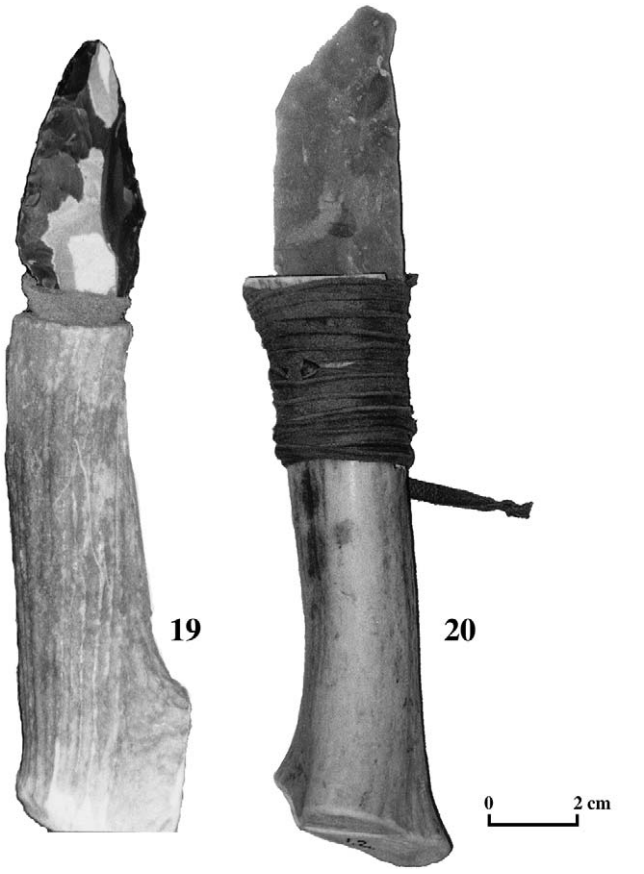

Plate 1. Examples of hafted stone tools: indirect hafting in male antler haft with leather wrapping of BT19, direct hafting in male split antler haft of BT20 and fixation with leather bindings.

prepared, without possible external friction (they could not be transported, trampled, etc.). All other parameters were left up to the experimenters (i.e. worked material, activity, hafting, etc.). For the remaining two tests, no restrictions were formulated. While the first test is an explorative test, focused on the general interpretability of hafting wear, both other tests may be considered as testing the method itself for deriving inferences concerning prehension and hafting. For none of the tests, guidelines were provided for the minimal

Plate 2. Sawing dry antler with BT20.