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Macro- and micro-traces of hafting on quartz tools from Pleistocene sites in the Sierra de Capivara in Piaui (Brazil)

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ABSTRACT

A series of attributes observed on a number of quartz tools from Pleistocene deposits in Sierra de Capivara (Piauí, Brazil) are described. These attributes or traces are mainly notches, retouching and fractures on non-active parts of the tools which were possibly made in order to haft those implements in some way. These morphological alterations and other probable microscopic traces are identified and described as hafting wear and are compared with the traces attributed to the use of the tools in other productive tasks.

1. Introduction

Functional analysis applied to artefacts at sites in Sierra de Capivara (Piauí, Brazil) has shown not only that this type of analysis was feasible on quartz tools (Knutsson, 1986, 1988; Knutsson and Lindé, 1990; Knutsson et al., 1988; Tapiale, 2012; Tapiale et al., 2014; Clemente et al., 2014, in press) but also that the use-wear traces are well-preserved in those sedimentary deposits (Boëda et al., 2014). Although this macro- and microscopic analytical method has examined the use-wear on artefacts from several sites in the region, such as Boqueirão da Pedra Furada, Vale da Pedra Furada, Sitio do Meio, Tira Peia, Toca da Pena and Toca da Janela da Barra de Antonião (Boëda et al. 2013), this study is based mainly, but not exclusively, on the data obtained at Vale da Pedra Furada (Fig. 1), one of the sites where the largest number of objects have been studied and whose chronology has been clearly established (Lahaye et al., 2015). The studies recently published, following E. Boëda's appointment as head of the Franco-Brazilian research project in the region in 2008, contribute towards clarifying the issue of a possible early human population in America. This had already been proposed by the first excavators and researchers in the area of Capivara (Guidon and Delibrias, 1986; Guidon, 1989; Parenti et al., 1996).

At these archaeological sites, the lithic implements are made mainly from quartz. The raw material consists of cobblestones from a Cenozoic beach, now located in the highest parts of the mountain range. These fall towards the valleys where the prehistoric sites are located. As a result, some researchers consider that the remains found at the sites are geofacts, although experimentation and technological and functional analysis has now succeeded in clearly establishing the differences between artefacts and geofacts (Boëda et al., 2014; Clemente et al., in press). At a technological level, several types of tools have been differentiated: "rostrums", becs, denticulates and transversal edges (Boëda et al., 2013, 2014). The tools may often have been used unhafted (Fig. 2), either because their size allowed them to be used held in the hand or because of their shape or the task being performed. Thus, massive and practically unmodified tools may have been used in work connected with hide-processing (Fig. 2: 4 and 5). One of the faces of the cobble or slab was used, together with sandy sediment with a high iron content as an abrasive. In these cases, the tools may have been geofacts used directly or with one or two retouches to make the edge more effective (Fig. 2: 4). Other tools that may have been used without a haft are those involved in animal butchery and wood chopping and cutting; these cobblestones with an edge formed by several removals had an edge that was sharp enough to be used in such tasks by percussion (Fig. 2: 1 and 2). Other implements with a transversal edge may have been used in transversal actions on medium-hard and hard substances (e.g. wood, hard animal matter), by using the cortical part as the face in contact with the substance

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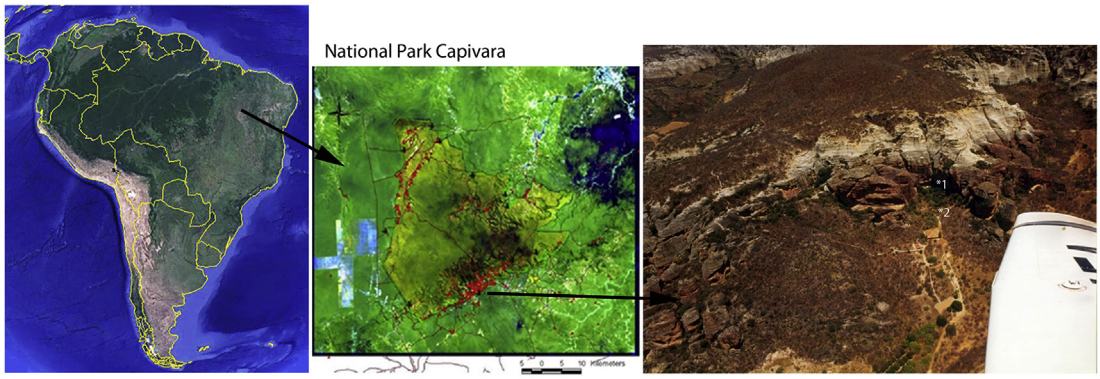

Fig. 1. Location of Serra da Capivara National Park in Piauí (Brazil). The aerial photograph on the right shows the positions of the archaeological sites of Boqueiro da Pedra Forada (*1) and Vale da Pedra Furada (*2).

(Fig. 2: 3 and 7). Finally, some of the objects classified as "becs" were undoubtedly used as perforators to drill wood and/or hard animal matter by rotating the tool bidirectionally. These must also have been used without hafts.

2. Macroscopic traces attributed to hafting

Traces caused by the way of holding and hafting tools have been duly described and identified over a wide chronological range (Rots, 2010). For Middle Palaeolithic tools, several aspects have been described that help to determine whether or not a tool had been hafted. These include residue of the adhesives used for that purpose (Boeda et al., 1998, 2008; Márquez and Baena, 2002; Mazza et al., 2006; Pawlik and Thissen, 2011), trimming the object by unifacial or bifacial retouching so that it might be inserted in the haft (Anderson-Gerfaud and Helmer, 1987; Porraz, 2002; Clemente, 2013), and the distribution of use-traces and the appearance of certain wear, such as "G-type" polish (Moss, 1987; Rots and Van Peer, 2006).

In the present case, during the study of the tools from the Pleistocene levels at the sites, a series of factors were observed mainly on cutting tools that suggested they had been fastened to a haft. This evidence was normally located on two or three parts of the tools, particularly on the sides opposite the active edge (Fig. 3). In this way, a cord could be wrapped around those three parts in order to fix the tool to the haft. Retouching (Fig. 3: 1 and 2), notches (Fig. 3: 5–10) and fractures, even the frequent "siret-type" fractures occurring when the raw material is knapped (Fig. 3: 3 and 8), were used for this purpose. Other times, the natural shape of the tools might allow them to be hafted without needing to make any modification (Fig. 3: 4).

In the course of experimentation with hafted tools of this kind (Clemente et al., in press), after several attempts it was verified that it was possible to haft these objects in a similar way to the method proposed by S. Grimaldi for the Proto-Aurignacian knives from Riparo Mochi (Grimaldi, 2014). At first, the tools were tied to the wooden handle without passing the cord through cracks in the wood, but they came undone after few minutes' work. However, when the cord was passed through the centre of the wood, it was possible to use the tool for a prolonged time without the lithic artefact becoming detached (Fig. 4). Notches, retouches and fractures in the lithic object, together with the cracks in the wood, help to fix it firmly in the haft and the productivity of the tool is increased greatly.

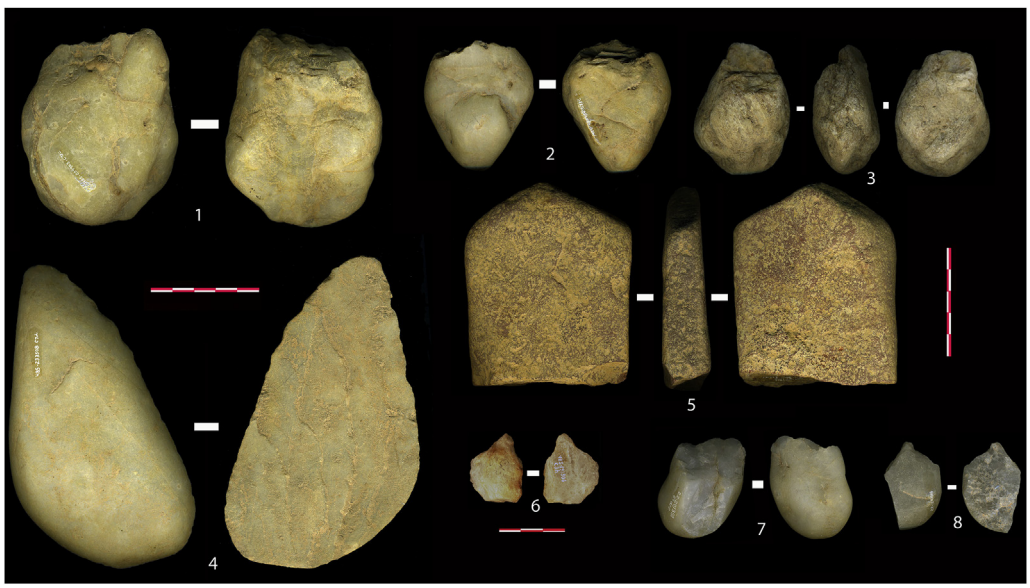

Fig. 2. Massive tools and other implements from Vale da Pedra Furada that were used unhafted.

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