



The bone industry in the Capsian and Neolithic contexts of Eastern Maghreb: A technological and functional approach



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ABSTRACT

Tools manufactured from hard animal materials were widely used in North Africa both in the Epipaleolithic and in the Neolithic. This article discusses how a methodology based on the technological, typological and functional analyses of several Capsian series from the Tébessa region (Algeria) lead to identification of specific techno-economic indicators of bone production suggestive of a vivid cultural exchange among groups living in the same territory. Over time, the application of the same methodology on a larger number of samples might possibly establish whether the technical tradition on animal hard material identified in the Tébessa region is all there is to the Capsian culture or whether it is only one among diversified practices.

The juxtaposition of the data collected for this study with those from the Neolithic bone Rivière Collection (Capéletti Cave, Algeria) has revealed innovative techno-economic indicators along all the steps of the *chaîne opératoire*. The partial change that the hard animal material manufacture underwent from the Epipaleolithic to the Neolithic phase is also in line with the transformation by other cultural material categories during the same period. The introduction of allochthonous elements along the North African coast during the Neolithic phase had an impact on the local settlement and economy.

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1. Introduction

According to the literature, the main elements characterizing the Neolithic sphere diffused North Africa starting from the Near Eastern “nuclear” area, where plants and animals were firstly domesticated. The Nile Delta and Red Sea coast regions to the East and the western Mediterranean region of the Alboran played a mediating role in the introduction and diffusion of these Neolithic traits along North Africa (Close, 2002; Wendrich et al., 2010; Ballouche et al., 2012; Linstädter et al., 2012; Lucarini, 2013; Barich, 2014; Vermeersch et al., 2015).

The Capsian hunter–gatherer tradition was well established in the Algerian territory. This tradition survived up to the 8th millennium cal BP, right when in neighboring Morocco the first Neolithic components appeared. Caprines, cattle and domesticated plants are but a few of the allochthonous Neolithic resources that, according to Ballouche and Marinval, 2003; Barich, 2014; Kherbouche et al., 2014; Merzoug, 2014 were assimilated by the local Epipaleolithic economy. The above authors have defined a

“Neolithic of Capsian Tradition” (NCT), thus emphasizing the continuity between the two periods (Vaufrey, 1955; Roubet, 1971). New types of chipped and polished stone tools, along with innovative categories of products, such as pottery, tortoise bin appeared during the Neolithic, whereas ostrich eggshells, bones, and teeth continued to be used as raw materials exactly as they were in the Epipaleolithic tradition.

This article focuses on the study of artifacts made from animal hard materials. Despite the importance of these latter in North African pre-pastoral and pastoral contexts, for a long time their study has been dealt with only marginally by scholars, possibly because of the limited attention paid to ecological issues during the first half of the 1900 and to the post-depositional conditions, which sometimes have hindered the finding of such materials in open-air sites. In the past, bone industry items, if collected, were simply inventoried (Vaufrey, 1955) and their presence in archeological contexts was only used to further validate the definition of cultural complexes (i.e. Upper and Typical Capsian, Ellassolithic, Columbian) previously reconstructed on the basis of lithic typology (Camps, 1974). More recently, namely from the second half of the XX century to date, animal materials have been subject to a more traditional morpho-typological classification (Camps-Fabrer, 1966;

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Roubet, 1979). This approach has hindered the development of a scientific method able to identify techno-economic indicators that might be diagnostic of the producing groups.

The species usually selected by such groups; the anatomical elements they preferably manufactured and the use of the implements they produced will therefore be object of interest of this article. I will tackle these elements combining different types of analysis (i.e. technological, typological and functional) and I will argue that they are the most emblematic constituents of the producing groups' cultural traditions.

In this essay, I will show the effectiveness of the method I have used to investigate the above mentioned bone category in each collection. The robustness of the results obtained suggests that this method could successfully be applied to other ancient collections.

I will compare three collections dating back to the Upper Capsian with one from the Neolithic of Capsian Tradition in Algeria. My goal is to elaborate a preliminary definition of the manufacturing methods and a provisional description of how bone crafts were used both in the Epipaleolithic and in Neolithic period. In addition, the comparison between bone productions dating back to both periods will allow to diachronically observe changes in the behavioral practices within the Algerian territory.

2. Methodology

I carried out the analysis of the bone artifacts utilizing the methodological approach and terminology already widespread in European and Near East contexts in the past decades (Sidéra, 1989, 1993, 2000, 2012; Christidou, 1999, 2005; Legrand, 2007; Legrand and Sidéra, 2007). All the stages of the *chaîne opératoire* were observed: raw material butchering, selection of species and anatomical elements; manufacturing; use and disposal of items (Leroi-Gourhan, 1943, 1945). Recently, the same approach and methodology have been applied to the study of other North African contexts (Mulazzani and Sidéra, 2013; Petruccio and Legrand, 2013; Petruccio, 2014a,b, in preparation).

As for the raw materials, the zoo-archaeological analysis of the bone samples provided clear information regarding both the preferred species and the anatomical elements used as a matrix for tool production. This approach also yielded clues about *débitage* procedures applied to raw materials (Sidéra, 1989, 1993, 2000). In addition, it clarified whether butchering techniques took into account the possibility of subsequently using the bones to create implements.

The technological approach herein used to reconstruct the manufacturing process was based on the identification of macro wear. It was therefore possible to distinguish traces caused by post-depositional factors from those resulting from tools manufacturing. A very detailed description of the alterations in the raw materials completed and complemented the observations (Petruccio, 2014a). At the same time the cross-section shape of the analysed items and the organization of the technological traces detected on the objects clarified the *débitage* procedure followed in the partitioning of the production matrix (Sidéra, 1989; Mulazzani and Sidéra, 2013).

The author carried out the analysis at the *Service d'Imagerie et de Microscopie Optique de la Maison Archéologie et Ethnologie, René-Ginouvès, Nanterre (CNRS USR 3225)*. Each item was observed at various magnifications. Technological scars and use-wear were analysed by means of a stereoscopic microscope (Nikon SMZ1500, magnification lens from 5× to 130×) and a metallographic microscope (Nikon DSRI-1 photo camera and Nis-Elements BR 3.2 software). The resulting highly definition imagery permitted, in some cases, identification and description of the orientation of the hand movement, the magnitude of its pressure and the tool used during both *débitage* and shaping. The technique identification procedure

was performed using an experimental collection to which the archeological artifacts were compared. In order to define a typology, taxonomic identifications, raw materials, anatomical elements, *débitage* methods and stylistic features were used as classification criteria.

Before introducing a more detailed description of the investigated materials and the results of this study, a short description of its lexicon will help avoid misunderstandings arising from the occurrence of terms already used in lithic industries with a different meaning. The “matrix of production” corresponds to the whole anatomical element, i.e. metapodia, rib, humerus etc. The “blank” is the chunk of bone extracted from the matrix of production. *Débitage* is an operation, performed on the matrix: it allows the manufacture of blanks which will be subsequently shaped. The *débitage* can be either bifacial, when it affects both faces of the bone (ventral and dorsal), or bilateral, when it involves both sides of the bone (lateral and medial). The “shaping” is the operation through which the final shape of the object is obtained. It is often carried out on the blank, but it can directly affect the matrix of production. The “matrix partition” corresponds to the number of parts into which the matrix is segmented during *débitage*.

The extension, combination, and sequence of techniques allowed us to understand and describe both *débitage* and shaping methods, thus revealing the cultural *savoir-faire* of the groups under analysis (Sidéra, 2000; Christidou, 1999). In the analysed collections, “cutting” (sawing and grooving) and “breaking” (direct percussion, indirect percussion, and flexion) are the main *débitage* techniques, whereas “grooving” and “scraping” are the most relevant shaping techniques.

3. Collections

The Upper Capsian series come from the open-air sites of Dra-Mta-El-Ma-El-Abiod, Khanguet el Mouhaâd and Aïn R'fana in the Tébessa region (Eastern Algeria) (Fig. 1). Such sites belong to a long phase of occupation, which occurred between the 9th and the 8th millennia cal BP. They were excavated on a number of occasions by Debruge, Latapie, Vaufrey and Morel during the first and second half of 1900 (Debruge, 1910, 1911, 1912, 1921–1922, 1930; Latapie, 1912; Reygasse and Latapie, 1912; Morel, 1953, 1974, 1976; Vaufrey, 1955; Camps, 1966, 1974). The Neolithic collection comes from Rivière's excavations in the Capéletti Cave during the first half of XX century. The site is located in the Aurès region, in Northern Algeria, and it showed an occupation phase which spanned from about the mid VIII to the mid VI millennium cal BP (Roubet, 1979; Bachir Bacha, 1996).

The selected Capsian collections come from some of the most representative and best documented pre-pastoral sites of the Maghreb. Similarly, the Rivière collection is one of the most famous examples of cave-site utilization by pastoral groups in the Aurès region (Roubet, 1979). Currently, all these collections are stored at the *Muséum National d'Histoire Naturelle – Musée de l'Homme* in France.

The Capsian corpus is comprised of 252 items. Among them, 207 provide information concerning manufacturing processes. The rest is represented by fauna or other items very poorly preserved, hence unidentifiable. The Neolithic collection comprises 124 items. Due to the difficulty in accessing the materials gathered during the early excavations, re-studying the faunal remains of the latter was impossible. Typologically speaking, all the artifacts from the Upper Capsian series meet the characteristics of points; while those coming from the Neolithic reveal a more diversified morphology.

The pre-pastoral sites analyzed were all open-air. The excavations performed using a vertical stratigraphic technique did not allow observation of a horizontal distribution of artifacts on the

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