Quaternary International 403 (2016) 79–89

Contents lists available at ScienceDirect

Quaternary International

journal homepage: www.elsevier.com/locate/quaint

Osseous technology as a reflection of chronological, economic and sociological aspects of Palaeolithic hunter-gatherers: Examples from key Aurignacian and Gravettian sites in South-West Europe

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ARTICLE INFO

Article history:
Available online 12 February 2016

Keywords:
Technology
Osseous industry
Aurignacian
Gravettian
France
Spain

ABSTRACT

Typological studies applied on the osseous industry developed slowly in France following the pioneering work of H. Camps-Fabrer and the technological renewal that F. Billamboz and D. Stordeur brought to this field in the 1970–1980s. This field has been thriving since the 2000s. Technology represents part of a systemic approach where each component of a technical system is analysed as to its purpose, its structure and its connection to other components of the socio-economic system. Nevertheless, technology is not an end in itself. Any technological observation must be considered in its sociological and palaeohistorical context in order to understand, not only the activities that took place during the occupation of a site, but more broadly to translate these data into "a realistic story of human behaviours". That is why reducing osseous technology to analysis of technical stigmata alone oversimplifies the potentials of this approach. We will illustrate this topic using Aurignacian and Gravettian examples from a few key French and Spanish sites. By showing technical and conceptual differences in the manufacturing of osseous projectile points (e.g. split-based points) in assemblages usually considered homogeneous, we can infer the existence of different techno-typological traditions and discuss if they are – or not – representative of different cultural traditions. Various technical details such as splitting base preparation by scraping, are significant indicators allowing discussion of whether there was diffusion of ideas and/or human groups from one side of the Pyrenees to the other at the beginning of the Upper Palaeolithic.

1. Introduction

How can technology help us to overcome the lack of new osseous industry data from archaeological sources? And how can technology of bone assemblages allow us to look at technical choice as a reflection of cultural boundaries? These are the questions we want address in this paper from two different but complementary technological angles.

First, we will see how technology allows us to re-evaluate the representativeness of osseous assemblages from old excavations: highlighting stratigraphic, taphonomic and technological inconsistencies (Goutas, 2004; Pétillon, 2006; Lacarrière et al., 2011; Tejero, 2013). Secondly, we will show how the technology of production of worked osseous material can and should be a "privileged partner" of lithic technology and other kinds of material culture data for the chrono-cultural and regional seriation of Palaeolithic groups (Averbouh, 2000; Goutas, 2013a, 2013b; Tejero, 2014; Pétillon et al., 2015; Tejero and Grimaldi, 2015). We will use two examples to illustrate our point of view. The first example will focus on the traditions of shaping of Aurignacian split-based points (synchronic and regional approaches). The second example will be a diachronic approach dealing with the tradition of antler debitage by comparing the different ways employed during Aurignacian and Gravettian to remove particular kinds of blanks: the rods. These rods were mainly (Gravettian) and sometimes exclusively (Aurignacian) involved in the manufacturing of hunting weapons.

Discussing the technological approach and its methodological, palethnological (*sensu* Leroi-Gourhan) and paleohistorical (*sensu* Valentin, 2006) implications requires first revisiting a number of concepts and definitions that are closely linked with it, starting

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http://dx.doi.org/10.1016/j.quaint.2015.11.143
1040-6182/

with typology. Similarly, we cannot consider technology as a way to identify cultural traditions without discussing knowledge and know-how (*sensu* Pelegrin, 1991). As pointed out by Choyke (2009: 21) "individual and collective memory expressed by and through the traditional material culture surrounding and exploited by people is one way both individuals and social groups maintain social cohesion".

The identification of techno-economic traditions (in terms of acquisition, processing and use) implemented in the work of hard animal materials in a given territory and time, is thus one of the objectives and objectified means to report on the existence, the variability, the evolution, the maintenance or the disappearance of cultural identities. In this sense, these technical traditions represent a way to highlight real social interactions between different human groups.

The acquisition of a technique (in the anthropological and archaeological understanding) or a language, necessarily implies a social setting, because it is always "socially learned" and "socially transmitted" and not the result of "an inspired creation that came from the nothingness" (Haudricourt, 1965: 36). "In technology, as elsewhere, there is no creation *ex nihilo*, a sudden jump. Every invention, every innovation is only the combination of pre-existing elements borrowed from the surrounding environment, from already known techniques" [authors' translation] (Haudricourt, 1965: 33). This is what F. Sigaut illustrates through the "myth of Robinson Crusoe, the shipwrecked man, able to rebuild his society on his own" [authors' translation] (Sigaut, 1987: 10).

2. Technology *vs* typology?

Typology refers to the science of analysis and description of typical forms in a complex reality, permitting classifications to be defined. Typology can be applied to the living as well as non-living world, materials as well as non-material entities.

In its application to prehistoric archaeology, typology refers to different concepts depending on the historical context and the epistemological point of view. Typology, as a tool for classifying stone and osseous equipment, came into being in the second half of the nineteenth century with the work of G. Mortillet and his concept of "index fossil" (Groenen, 1994). Interest in the morphology of archaeological objects and their ornaments supersedes the knowledge of know-how required for their processing, and becomes the main tool for the elaboration of chrono-cultural seriations. This genealogical classification aimed to account for the real historic relationship between human groups was also applied to the study of techniques (Haudricourt, 1964) and reflects a historical or evolutionary view of the object (Haudricourt, 1968: 732).

This epistemological approach to typology long influenced research in prehistoric archaeology in France as well as other European countries. Typology remains a very useful tool for classifying archaeological objects on the basis of common formal and functional or aesthetic attributes (material, shape, size). The classification of assemblages by class, category and tool types, permits a global understanding, and thus, highlights differences or correlations in the manufacturing and consumption activities in various sites or various archaeological levels of the same site.

During the second part of twentieth century a significant paradigm shift in the recognition of the archaeological artefacts took place. Studying the "garbage" of prehistoric groups, the knapping waste, the tools used until exhaustion, the production failures became an efficient means for understanding the vast majority of archaeological objects. Thanks to the concept of *chaîne opératoire*, archaeological and ethnographic objects have been given a real dynamic dimension. Henceforth, it is possible to transcend the shape of the tool to apprehend the know-how possessed by the studied human groups, that is to say the invisible, unobtrusive, collective unconscious part inherent within every single object (Leroi-Gourhan, 1943, 1964; Pelegrin, 1991; Lemonnier, 1993; Perlès, 2012). The concept of *chaîne opératoire* was used for the first time in 1964 by André Leroi-Gourhan (Inizan et al., 1999), and was subsequently formalized by ethnologists working on techniques (as Creswell, Lemonier, Haudricourt etc.), something that was to give rise in 1974 to the creation of the research laboratory (ER) 191 "Techniques et culture" and then to the scientific journal of the same name in a context of full development of "cultural technology" (Coupaye and Douny, 2013; see also Pelegrin, 1991).

The *chaîne opératoire* is a key analytical tool for technology studies. M. Mauss is acknowledged to be the first scholar to introduce technology into social anthropology to describe the study of the material activity of human groups, and more globally, any activity enacted through the human body (Mauss, 1947; Inizan et al., 1999). According to M. Mauss, technology is a fully-fledged discipline that we need to distinguish from economy (Haudricourt, 1968: 731). With the concept of "body techniques", that is to say any muscular custom that is socially acquired (Mauss, 1936), M. Mauss introduced the innovative idea that our daily life gestures are the result of social heritage and can therefore be identifiers of a given human group (Haudricourt, 1964). The ambition to promote technology to the rank of science in its own right is visible in the writings of Haudricourt, who defined it as a science of "productive forces", a "science of human activities". Through the human point of view in object manufacturing and use, we can understand the laws governing its emergence and its transformation (Haudricourt, 1964: 28; for a detailed discussion of the different historical and epistemological points of view concerning the analysis of technical activities, see; Haudricourt, 1968).

According to M.-L. Inizan, J. Tixier, H. Roche and their colleagues, some of the initiators of knapped stone technology studies in France, "no typology can be fully operative if it does not take techniques into at least partial account. We do not therefore consider substituting technology for typology, for they represent two distinct approaches developed to meet different ends; they can however be used concurrently, and great benefit can be derived from the comparison of the results they yield" (Inizan et al., 1999: 13).

In a recent article, Valentin (2008: 189) defends another epistemological position, where he criticizes the complementarity of typology and technology which suggests a methodological equivalence that does not actually exist, especially because very early on, the typological approach to lithic objects integrated technological criteria in addition to morphological criteria. Secondly, because according to this author typology not only amounts to a classification of tool and weaponry morphology, but must also be considered in its first etymological meaning (see above). Thus, typology as an analytical tool in prehistoric archaeology must be reconsidered to be a fully-fledged science of the analysis and description of shapes of any kind. Therefore, typology can and should be tied to the "procurement choices", the "knapping methods", the "manufacturing and use methods of tools" (Valentin, 2008: 189).

Narrowing typology to a strictly classificatory approach of equipment morphology, and thus, to a "strictly enumerative typology" contradicts the reality of archaeological research of the last decades (Valentin, 2008: 190), in the field of lithic analysis (eg: Pigeot, 1987; Valentin, 1995, 2006; Bodu, 1993; Christensen and Valentin, 2004; Klaric et al., 2009; Simonet, 2011) as well as in the field of osseous industry (Averbouh, 2000; Pétillon, 2006; Goutas, 2008). Many recent studies are now developing