Journal of Anthropological Archaeology 36 (2014) 158–180

Contents lists available at ScienceDirect

Journal of Anthropological Archaeology

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

Millennial-scale change in archaeofaunas and their implications for Mousterian lithic variability in southwest France

Eugène Morin [a,b,*], Anne Delagnes [b,c], Dominique Armand [b], Jean-Christophe Castel [d], Jamie Hodgkins [e]

[a] Trent University, Department of Anthropology, DNA Bldg Block C, 2140 East Bank Drive, Peterborough, Ontario K9J 7B8, Canada
[b] PACEA, Université de Bordeaux, Avenue des Facultés, bâtiment B18, 33405 Talence cedex, France
[c] Institute of Human Evolution, University of the Witwatersrand, Private Bag 3, Wits 2050, South Africa
[d] Musée d'Histoire Naturelle de Genève, Département d'Archéozoologie, CP 6434, CH-1211 Genève 6, Switzerland
[e] Department of Anthropology, University of Colorado Denver, College Administrative Building, 1201 5th St (W Colfax Ave), Denver, CO 80204, USA

ARTICLE INFO

Article history:
Received 13 November 2013
Revision received 16 May 2014
Available online 11 October 2014

Keywords:
Mousterian
Middle Paleolithic
Industrial variation
Faunal variation

ABSTRACT

The problem of Mousterian interassemblage variability is fundamental because it affects our models about social, technological and economic organization of Middle Paleolithic hominins. Particularly controversial is the issue of whether this variability reflects a chronological succession of industries or differences in ethnicity, site function, tool curation or raw material use, among others. Here, the chronological hypothesis is examined by correlating faunal data in southwest France with independently dated climatic events. In agreement with this hypothesis, our data show consistent patterns in lithic and faunal composition between sequences that are incompatible with scenarios assuming a coexistence or alternation of industries. Our results imply that industrial variability during the Late Pleistocene Middle Paleolithic follows distinct chronological stages not unlike those in later periods. Building on correlations indicating that archaeofaunas were tuned to climatic change induced by orbital forcing, we assess the implications of a new independently-derived chronology for our understanding of the Mousterian of France.

1. Introduction

How to interpret Mousterian interassemblage variability is one of the most enigmatic problems in Paleolithic research and has been the catalyst for considerable debates over the last six decades (Bordes and Bourgon, 1951; Binford and Binford, 1966; Bordes, 1981; Binford, 1983; Mellars, 1996; Bisson, 2000; Delagnes and Meignen, 2006; Wargo, 2009; Discamps et al., 2011; Jaubert, 2011; Jaubert et al., 2011; Richter et al., 2013a; Jelinek, 2013). The problem of interassemblage variability—sometimes referred to as the "Mousterian problem" or the "Bordes–Binford debate" in the Anglo-Saxon literature—is critical given its far-reaching implications with respect to the technological adaptation, economic behavior and social structure of Middle and Late Pleistocene hominins (Mellars, 1996). Central to the debates is the issue of whether the Middle Paleolithic differed from later periods in terms of mechanisms of lithic assemblage variation. As emphasized by Rolland and Dibble (1990), this debate has resonance far beyond southwest France and the Mousterian given that its raises questions about the fundamental assumptions that underlie change in lithic assemblages in the archaeological record.

The problem of industrial variability during the Mousterian takes its roots in Bordes' and Bourgon's (1951; Bordes, 1953) distinction in the early fifties of five basic lithic "facies" for the Mousterian of France. These facies were presumed to show non-overlapping frequencies of stone tool classes and, in the case of one of them, to contrast in technological aspects as well. Among the stone tool classes, differences in the proportions of sidescrapers, denticulates, notches and bifaces appear to account for most of the variations between the facies (Dibble, 1988). Following Bordes (1972, 1984), a high (>50) *Indice de Racloirs* (IR or sidescraper index) and frequent occurrences of tools with Quina retouch are considered diagnostic of the Ferrassie and Quina facies. According to this classification, the Quina facies differs from the Levallois-dominated Ferrassie facies by a unique "Quina concept" of flaking (Bourguignon, 1997) and a higher abundance of transverse sidescrapers. Typical Mousterian assemblages show moderate IR values (range: 30–65); while sidescrapers with Quina retouch, backed knives and bifaces are rare, if present. The Mousterian of Acheulean Tradition (*Moustérien de Tradition Acheuléenne* or MTA,

* Corresponding author at: Trent University, Department of Anthropology, DNA Bldg Block C, 2140 East Bank Drive, Peterborough, Ontario K9J 7B8, Canada.
E-mail address: eugenemorin@trentu.ca (E. Morin).

http://dx.doi.org/10.1016/j.jaa.2014.09.013
0278-4165/

evolving from an "A" to a "B" form according to Bordes) is associated with low to moderate IR values (<45) and comprises small bifaces, denticulates and "Upper Paleolithic" tools such as backed knives, endscrapers and burins. Less clearly defined, the Denticulate Mousterian is characterized by moderate to high frequencies of denticulates and notches, low IR values and lacks bifaces and backed knives (Bordes, 1972; Thiébaut, 2005).

Opinions quickly diverged about the meaning that should be ascribed to facies variation. The complex stratigraphic distribution of the facies in the long sequence of Combe-Grenal was claimed by Bordes (1972, 1984) to reflect the distinct cultural traditions of populations occupying sites in alternation. This "cultural" or "ethnic" interpretation was challenged by Binford who asserted that the facies simply encapsulate differences in the range of activities performed on-site (Binford and Binford, 1966; Binford, 1973). Whereas Bordes' interpretation met with considerable skepticism—the idea of several coeval populations sharing a small territory being unpopular—Binford's "functional" argument was contradicted by use-wear analyses which revealed no significant inter-facies differences in stone tool function (Beyries, 1987). Despite these difficulties, the Bordes–Binford debate about the significance of the facies has had an enduring influence on interpretations of Mousterian lithic variability (Wargo, 2009). Since the death of Bordes in 1981, other causal mechanisms have been explored, including environmental change and variations in the intensity of tool rejuvenation and raw material use (Rolland, 1981; Rolland and Dibble, 1990).

In these debates, Mellars' (1969, 1996) proposition, which emphasizes chronological change, is intriguing because it conflicts with the notion that the facies alternated. Mellars observed that, in the Périgord region, sequences always show the same succession of Ferrassie, Quina and MTA assemblages—in that order—although Denticulate and/or Typical Mousterian layers are sometimes intercalated between these facies. The fact that Mellars (1996) could, at least at some sites, anchor this succession into a relative and absolute chronology is critical to his argument as it undermined the scenario of independent alternation of facies championed by Bordes (1972) and Laville (1988) on the basis of sedimentologic and palynological correlations. However, Mellars (1996) was less successful concerning the Typical and Denticulate Mousterian facies and attributed their intricate temporal distribution to a lack of conspicuous index fossils.

In the last years, new studies of assemblages, the excavation or re-excavation of key sequences in karstic settings, the uncovering of a wide range of new open air sites by cultural resource management teams and advances in dating methods have fostered a resurgence of interest in the study of Mousterian interassemblage variability (Turq, 2000; Thiébaut, 2005; Delagnes and Meignen, 2006; Dibble and McPherron, 2006; Faivre, 2008; Guibert et al., 2008; Turq et al., 2008; Vieillevigne et al., 2008; Jaubert, 2011; McPherron et al., 2012; Richter et al., 2013a, 2013b; Brenet et al., 2014). Although Bordes and Bourgon's facies classification remains influential in these works, the discussion in southwest France is now increasingly shifting toward the comparative analysis of lithic technocomplexes (LTCs). The focus on LTCs—distinguished from each other on the basis of concept (e.g., Levallois, discoid), method (e.g., preferential, recurrent) and modality (e.g., bidirectional, centripetal) of production, as well as tool characteristics (Boëda, 1994)—is an improvement over previous classifications because it sometimes separates classes of assemblages that, in the Bordian system, would have been attributed to the same facies (Geneste et al., 1997; Delagnes and Meignen, 2006; Faivre, 2008; Discamps et al., 2011; Jaubert, 2011; Jaubert et al., 2011).

As part of a multidisciplinary program dedicated to the study of the Middle Paleolithic of southwest France, Jaubert (2011; Jaubert et al., 2011) revisited the chronological succession hypothesis using 240 lithic assemblages, including several samples analyzed, or reanalyzed, recently. A number of temporal patterns emerged from the seriation of the thirty or so distinct LTCs (e.g., discoid denticulate Mousterian; Quina concept of production with Quina tools) that he identified in this region. Like Delagnes and Meignen (2006), Jaubert noted the ubiquity of the Levallois concept during marine isotope stages (MIS) 7–5, in sharp contrast with the limited occurrence of this concept in the later Middle Paleolithic. Jaubert also stressed the highly diagnostic nature of "true" Quina assemblages—all attributed to MIS 4 and early MIS 3—which he distinguished from considerably older "Quina" assemblages that only share some features with them (e.g., the site of Petit Bost shows a Quina concept of production but lacks typical Quina tools). Lastly, Jaubert concluded that discoid denticulate Mousterian assemblages all postdate MTA assemblages. Because these trends are mutually consistent, they fit well with the hypothesis of a chronological succession of Mousterian technocomplexes.

Additional support for this view came from a faunal analysis by Discamps et al. (2011) focused on MIS 5–3. Their study pointed out the many similarities in taxonomic composition observed in pre-Quina ("AnteQuina" in their terminology, often dominated by red deer *Cervus elaphus*), Quina (dominated by reindeer *Rangifer tarandus*) and discoid denticulate Mousterian (dominated by horse *Equus ferus caballus* and steppe bison *Bison priscus*) assemblages, respectively. Correlations with paleoclimatic proxies suggest to Discamps and his collaborators that these variations were mediated by climate change. Their analysis also highlighted intra-technocomplex variability in the relative abundance of ungulate taxa that was attributed to geographical variation and the long duration of some of the LTCs. Despite this variability, the similar patterns in taxonomic composition documented by Discamps et al. (2011) within the above classes of assemblages are in line with the chronological hypothesis.

Both of these studies conflict with recent syntheses of radiometric dates from southwest France (Guibert et al., 2008; Vieillevigne et al., 2008; Richter et al., 2013a, 2013b), which provide evidence for a temporal overlap of at least three of the Bordian facies (Quina, Denticulate, MTA) during MIS 3. According to the chronometric syntheses, this temporal overlap, estimated to have lasted a minimum of 10 ky (kilo-years), would falsify the chronological hypothesis. However, the authors of these syntheses are quick to point out that given the limitations of dating methods for the period beyond ^{14}C dating, their conclusions should be considered with appropriate caution. This last point emphasizes the importance of a sound chronological framework for solving the problem of Mousterian industrial variability.

In the remainder of this paper, we reassess the chronological patterning of the Mousterian technocomplexes in southwest France. In doing this, we build on the findings of Discamps et al. (2011) by examining variations in faunal and lithic composition at a finer degree of resolution using a different, independently-derived, chronology. Two types of analyses are presented here. A first set of analyses compares a composite archaeofaunal time series spanning most of the Late Pleistocene with highly-resolved paleoclimatic sequences from the marine and glacial domains. These cross-correlations are useful because they help to anchor the key Middle Paleolithic sequence of Combe-Grenal into an absolute and independent chronology. To test the representativity of the archaeofaunal time series, a second set of analyses investigates faunal and lithic cross-correlations within a larger sample of 10 Middle Paleolithic sequences that includes Combe-Grenal. In the final section of this paper, the results from both sets of analyses inform a reevaluation of chronological patterning during the Late Pleistocene Middle Paleolithic of France.