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Investigating maintenance and discard behaviours for osseous projectile points: A Middle to Late Magdalenian (c. 19,000–14,000 cal. BP) example

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ABSTRACT

The importance of investigating maintenance and discard behaviours in Palaeolithic osseous technological systems is only now becoming clear, thanks to recent advances in our understanding of how these implements were repaired in various techno-complexes. While significant work has been completed on European assemblages, the issues of maintenance and discard behaviour have generally received only passing mention, and thus, the nature and frequency of Palaeolithic osseous projectile point rejuvenation and discard remains largely unknown. This paper presents the trace and formal analysis of more than 4400 Middle–Late Magdalenian antler projectile point artefacts excavated from two central datasets (Isturitz, Pyrénées-Atlantiques and La Vache, Ariège), and complemented by examination of a further 22 collections recovered from throughout France and southern Germany. Analysis of individual artefacts, collections, and regional samples resulted in significant new insights into the use life of the iconic Magdalenian barbed point, as well as single and double bevel based point technologies. These insights concern not only how the projectile points were resharpened, reworked, and reused, but also cultural ideals concerning point form, and even potential differences in functionality.

1. Introduction

The design and diversity of projectile weaponry is often central to discussions concerning Pleistocene subsistence practices, technical systems, social systems, and even the cognitive abilities of the subject population/s. This situation is not surprising when one considers that projectile weaponry are a technical solution ensuring the capture of vital nutritional and raw material resources used in various aspects of life, and therefore, provide essential data for investigating and discussing hunter–gatherer interactions with both the physical and social environment at various times and locations in the past. Understanding not only how and when these implements were made and used, but also where, when, and how they were maintained and discarded is consequently vital not only for building a comprehensive picture of past cultural attitudes towards projectile technology in different societies, but also for understanding prehistoric lifeways in general, not to mention disentangling assemblage formation processes (Ammerman and Feldman, 1974; Shott, 1989; Shott and Sillitoe, 2005).

Unfortunately, while the examination of maintenance and discard patterns for lithic technologies is well advanced (e.g., Andrefsky, 2006; Dibble, 1995; Flenniken and Raymond, 1986; Flenniken and Wilke, 1989; Hiscock and Attenbrow, 2005; Kuhn, 1989; Odell, 1996; Shott, 1996), similar work for osseous projectile technology remains in its infancy. Previously, studies of European Upper Palaeolithic osseous (antler, bone, ivory) projectile points have focused on detailed analyses of the form and decoration of these technologies (e.g., Julien, 1982; Knecht, 1991a,b, 1993a,b, 1997; Liolios, 2006; Weniger, 1992, 2000), although recent work has shifted in focus to use efficiency (Allain and Rigaud, 1986; Bertrand, 1999; Letourneux and Pétillon, 2008; Nuzhnyj, 1998, 2007; Pétillon, 2006, 2008; Pétillon et al., 2011; Pokines, 1993, 1998; Pokines and Krupa, 1997; Rigaud, 2006; Rozoy, 1992; Stodiek, 1990, 1991, 1993, 2000). In all these studies, the issues of maintenance and discard behaviour has received only passing mention (Arndt and Newcomer, 1986; Christensen and Chollet, 2005; Dobres, 1995; Hahn, 1988; Julien, 1977, 1982, 1999; Julien and Orliac, 2003; Knecht, 1991a,b, 1993a,b; Liolios, 2006; Pétillon, 2006; Pokines, 1998; Tyzzer, 1936; Weniger, 2000), though both Pétillon (2006) and Tejero (2013, 2014) have given more focused attention to these aspects of osseous projectile point use life. Thus, the nature and frequency of Palaeolithic osseous projectile point rejuvenation and discard remain largely unknown.

This situation extends to the best represented and most intensively studied of the European Palaeolithic techno-complexes, the Magdalenian (c. 21,000–14,000 cal. BP). Currently,

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only fork-based points (*pointes à bases fourchues*; Pétillon, 2006; Pétillon and Letourneux, 2003) and barbed points (*harpons*; Julien, 1982, 1999; Julien and Orliac, 2003) have been considered in any detail, neglecting the numerous bevel based and other unbarbed point forms recovered from sites dating to this period. Consequently, while we know a great deal about how Magdalenian projectile weaponry was manufactured and used (e.g., Allain and Rigaud, 1986, 1992; Averbouh, 2000, 2005; Bertrand, 1999; Cattelain, 2005; Rigaud, 2006), similar understandings of the second half of their use lives (repair, reuse, and discard) is lacking.

This paper aims to begin addressing this imbalance in the archaeological literature on osseous projectile weaponry by presenting an analysis of more than 4400 pieces of barbed and unbarbed osseous projectile point technology. Recovered from Middle to Late Magdalenian (c. 19,000–14,000 cal. BP) contexts in southwest Europe, this dataset is considered in a regional framework in order to transform the study from purely a description of maintenance evidence observed, to an anthropological interpretation of past behaviours. In particular, this approach resulted in the identification of inter-site and inter-regional differences in osseous point maintenance and discard behaviour during this late period of the Palaeolithic. These patterns are argued to arise from differences in raw material availability as well as differences in cultural ideals regarding point form and efficiency. It is hoped that this study demonstrates the usefulness of such analyses, which while requiring good knowledge of the techno-complex under study, can produce important insights into past technological systems and the societies that produced them.

2. Archaeological context

The Magdalenian is a chrono-cultural classification of a geographically widespread techno-complex dated to between c. 21,000 and 14,000 cal. BP (17,500–12,000 BP uncalibrated) (Langlais et al., 2012; Langley et al., in preparation; Straus, 2013; Straus et al., 2012). Magdalenian sites are found throughout Western Europe, from southern Spain to Poland, but are concentrated in France, northern Spain, Belgium and Germany. Deposits are found in a wide variety of topographical settings, from the limestone rockshelters and caves of Southern France to the relatively open river valleys and upland plains of Northern Europe (see for example: Miller, 2012; Utrilla et al., 2012; but see Straus et al., 2012 for a review).

The Magdalenian peoples exploited an array of terrestrial, aquatic, and avian species using a range of hunting (and collection) methods and technologies (Langlais et al., 2012; Straus et al., 2012). Similarly, a huge diversity of raw materials were collected and transported over a range of distances and transformed into both everyday necessities as well as the rich parietal and portable art lexicon for which they are best known (e.g., Bicho and Haws, 2012; Leesch et al., 2012; Pétillon, 2013; Pettitt et al., 2012). Another aspect which has received much academic attention is their extensive social and/or trade networks, as well as their apparently sophisticated social systems which may have included the periodic aggregation of regionally dispersed groups at 'super sites', as well as hierarchical social organisation (e.g., Bahn, 1982; Conkey, 1980; Jochim, 1987; Otte, 2012; Schwendler, 2012; Straus, 2013; Vanhaeren and d'Errico, 2005).

Magdalenian assemblages are rich in osseous weapons technologies and include foreshaft ('*prehampe*') components as well as a vast array of projectile points, including unbarbed points ('*sagaies*'), the well-known unilaterally and bilaterally barbed points ('*harpons*'), self-barbed points, fork-based points ('*pointes à base fourchue*'), half round rods ('*baguettes demi-rondes*'), *Foënes* and composite antler/lithic implements. These technologies are considered indicative of this archaeological culture and, as technologies that are central to subsistence, have provided a source of information concerning various aspects of Magdalenian economic and social life. Whilst reindeer (*Rangifer tarandus*) antler is the primary raw material utilised in the manufacture of these items, red deer (*Cervus elaphus*) antler, terrestrial mammal bone, mammoth (*Mammuthus primigenius*) ivory, and most recently identified, marine mammal bone (Pétillon, 2008, 2013; Langley and Street, 2013) were also used.

3. Study area and sites

A deliberate focus on Southwest Europe was chosen for this study as, unlike northern Europe which was unoccupied during the Last Glacial Maximum (LGM) and southeast Europe which saw only marginal use of antler for manufacturing various technologies throughout the Upper Palaeolithic, the southwest has an uninterrupted record of hunter–gatherer produced antler technology spanning 30,000 years – including the period of interest here (Pétillon and Ducasse, 2012). Two of the largest single site assemblages of Magdalenian osseous projectile weaponry excavated and recovered from this region were targeted for analysis: La Vache (Ariège) and Isturitz (Pyrénées-Atlantiques). Curated in the *Musée d'Archéologie Nationale* (St-Germain-en-Laye, France), the entire La Vache assemblage and in the vicinity of 80% of that excavated from Isturitz was examined in addition to material recovered from another 22 sites located throughout France and southern Germany (see Table 1 and Fig. 1 for complete list of sites included in study).

The La Vache cave is a renowned and intensively studied archaeological site located in the French Pyrenees several kilometres from the Ariège valley (Fig. 1). Excavated since the mid 19th century, a new room named the 'Salle Monique' was discovered during Robert's fieldwork in 1952 and has yielded the vast majority of the osseous projectile elements included in this analysis. The Salle Monique was excavated over a surface area of some 200 m^2 and contained a rich Late Magdalenian assemblage of osseous implements (c. 3500), lithics (c. 36,350) and portable art in addition to around 142,000 well preserved faunal remains from 29 mammalian and 21 avian species, 90% of which have been identified as ibex (*Capra pyrenaica*) and Ptarmigan (*Lagopus* sp.) (Averbouh, 2000; Clottes and Delporte, 2003; Pailhaugue, 1993, 1995, 1996, 1998).

Radiometric dates for this site indicate that it was used for a period of only a few hundred years (at most) around 13,500 years BP (during the Late Magdalenian; Clottes and Delporte, 2003; Pailhaugue, 1998), which incidentally falls into the period during which the iconic barbed points were utilised. Analysis of the faunal remains indicates that the cave was used primarily during the autumn and winter seasons, as well as the start of spring (Pailhaugue, 1993, 1995, 1996, 1998).

Technological analysis of the osseous assemblage (including refitting) has shown that unbarbed points, barbed points, and *baguettes demi-rondes* were all manufactured on site, while examples of *bâtons percés*, a likely projectile point making tool, were made elsewhere and brought to La Vache (Averbouh, 2000, 2005). Spearthrowers (*propulseurs*) are, surprisingly, absent from the site. Averbouh (2000) has argued that a seasonal production cycle tied to consumption was employed at La Vache with the large majority of unbarbed points, barbed points, and *baguettes demi-rondes* manufactured during the winter from antler beams shed by adult male reindeer. She also argues that these weapon tips were intended to last until the following winter when replacements would be manufactured. In contrast, *bâtons percés* and spearthrowers manufactured at Enlène (Ariège; around 30–40 km away) are argued to have been manufactured during the spring