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Bevel-ended tools on large ungulate ribs during the Bronze Age in northern Italy: Preliminary result of functional and experimental analyses

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ABSTRACT

Functional analyses and experimental works on animal hard materials artefacts have been sparsely applied in the Italian territory, especially in Bronze Age contexts. Recent researches, carried out on several sets of artefacts coming from sites dated between the Middle and Late Bronze Age in north-eastern Italy, have highlighted a good amount of bevel on large ungulate ribs.

This paper aims at identifying the function of these objects through an experimental work, in order to reproduce the same category of artefacts that have been utilized on different materials and in different ways. The analyses of the archaeological remains and the experimental artefacts were performed at low magnification using a stereomicroscope Leica EC3 S6D with an integrated digital camera. Then, the surface analysis at high magnification was carried out by using a metallographic microscope in reflected and transmitted light (Optika Met: 50×–500×).

The experiments were carried out using the experimental tools on various hard materials, such as wood (fresh and dry) and antler (dry and wet) and elastic ones (fresh and dry skin). During the testing phase, the time of use, the state of the material processed, the gestures employed (direction and quantity) were monitored and recorded. All the archaeological artefacts bear almost similar use-wear patterns. Some of them have fractures and micro-chipped areas on the distal margin that indicate contact with a hard and durable material. The remaining artefacts, however, present edges slightly smoothened and with less evident anomalies. On the upper face, use-wear ends after about 5 mm from the distal edge, while on the lower face it seems to be slightly larger, about 1 cm from the edge. Under the microscope, very dense longitudinally-oriented striations are visible on the distal edge, while in the mesial portion of the artefact, they proceed to become rarer and often oblique. Under high magnification, the analysed surfaces are fairly uniform near the edge and more irregular at farther distances from it. The experimental work has allowed us to hypothesize that some of these artefacts were used for the removal of fresh and dry bark. In fact, experimental use-wear presents macro-and micro-morphologies compatible with the ones detected on the archaeological remains.

1. Introduction

This paper purposes a design for integration of technological studies with functional analyses of animal hard materials from some Bronze Age settlements of western Po Valley (north-eastern Italy). The aim of the project was to investigate the manufacturing and transformation processes of animal hard materials in an area and a chronological period scarcely investigated from this point of view (Bertolini, 2014). The first technological analysis began only at the end of '80s in the last century, and developed in the next decade thanks to the studies of N. Provenzano (1988, 1996–97, 1997, 2001) who investigated animal hard materials artefacts from excavations of Terramare, Emilia region (Middle/Late Bronze Age; northern Italy). These works are fundamental for other studies that from the 21st century slowly developed for other contexts of northern Italy (Aimar and Gregoriani, 2000; Malerba et al., 2006a, 2006b, 2012; Thun Hohenstein and Bertolini, 2010; Zuolo and Thun Hohenstein, 2010; Petrucci et al., 2012; Thun Hohenstein et al., 2012a,b; Cilli et al., 2013; Epifani, 2013; Bertolini, 2014).

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The project, initially devoted to technological analysis of several hard animal materials artefacts (Bertolini, 2014), revealed the opportunity to analyse their function, studying the surfaces at low and high magnification and combining the study of archaeological finds with an experimental activity designed to create a reference use-wear traces collection.

This paper presents the results of a functional study deriving from the investigation on bevel-ended artefacts of large ungulate rib fragments. This category of objects was first studied by Provenzano (1997, 2001) from a technological point of view, investigating on animal hard materials industries of Terramare. This author called these objects "spatulas" for their morphology, characterised by a more or less expanded and thinned end, and a clear detachment between the handle and their active part (Provenzano, 1988). These artefacts have a geographical distribution limited to the central-eastern Po Valley, and a reasonable chronological duration from the Early to the Late Bronze Age (2200–1200 B.C.). Functional and experimental studies on this category of tools have never been performed until today throughout the Italian territory. In agreement with what already suggested by Provenzano (1997, 2001), only a preliminary study conducted on this type of artefacts at Lavagnone settlement (Cilli et al., 2013) assumes that the more plausible functional interpretation is that of "spatulas" or smoothers.

1.1. Cultural context

The Bronze Age in Italy is characterised by a great cultural phenomenon called "Pile-Dwelling–Terramare". In agreement with Cupitò et al. (2012), this is marked by two principal components: pile dwelling and Terramare that blend at a certain point of their history.

The "Pile-Dwelling–Terramare" culture represents an important historical and demographic phenomenon inside the European Bronze Age (Bernabò Brea et al., 1997; Cardarelli, 1997, 2009; De Marinis, 1997, 1999; Cremaschi, 2009; Cupitò et al., 2012), and develops among the regions of the oriental Lombardy, western Veneto and Emilia during about two millenniums, more precisely from the last decade of the third millennium BC to the first half of the twelfth century BC.

The most ancient phase of the Bronze Age (Early Bronze Age, EBA 2200–1650 BC) is distinguished by a settlements concentrated North of the river Po, and particularly near the Garda Lake and the little intra-moraine lakes of the Pre-Alps.

The settlements are all pile-dwellings and their characteristic material culture is almost homogeneous and defined as "culture of Polada" based on ceramics and bronze artefacts (De Marinis, 2009).

In a later EBA phase, conditions of stability and abundance of resources in the settlements led to a great demographic increase. This is quite visible with the colonisation of great part of the Po plain North of the Po river according to the principal fluvial arteries.

This phenomenon can be interpreted as resulting from the expansion of pile-dwelling populations who were looking for environments with physiographic characteristics similar to those of Garda lake (Balista and Leonardi, 2003).

Based on archaeological data, this area shows a net increase in population density, whereas in the South of the Po the residential evidence is very little during this period.

A constant predilection of the marshy areas continues also during the Middle Bronze Age despite the environment typology is often suffering from sudden climatic variations and the increasingly high requirement for wood and craftsmen for pile dwelling construction (Peretto et al., 2004; De Marinis, 2009).

The Middle Bronze Age (MBA I 1650–1550) coincides with the beginning of Terramare cycle. This new settlement typology shows structural elements similar to those of pile dwelling. The typical Terramare structure can be defined as a quadrangular settlement surrounded by an earthwork and a ditch in which the water was canalised from a near river (Cardarelli, 2009). The function of these evidences is both defensive and intended to water redistribution. The appearance of this new settlement typology is interpreted as the beginning of a colonisation process of the Po Plain according to different routes. The idea of a new cultural contribution is based on the ceramic typology that since the most ancient phases is characterised by elements from Polada in North Italy, Grotta Nuova in Central Italy, and other oriental influences.

During the MBA 2 (1550–1450 BC) a great increase in the number of Terramare settlements is observed. The Po plain turns out to be completely colonised, with huge settlements characterised by a certain structural homogeneity. Each Terramare covers an area of about 2 ha and a distance one each other ranging about 1–2 km.

This great demographic increase is the direct consequence of the population expansion during the most ancient Bronze Age phases. From the perspective of material culture, this period is characterised by a strong uniformity both Northern and Southern of the Po river.

The apogee of Terramare appears during the transition between MBA3 and RBA1 (Recent Bronze Age). In this phase, the archaeological evidences of settlements become more substantial indicating a period of great abundance of resources and an increase of trade. The continuous demographic growth leads to the creation of a territorial system with large to small settlements. The mean dimension of the smallest settlements seems to increase when these are satellites of the larger ones with a central economic and political role (Cardarelli, 2009; Cupitò et al., 2012).

The sites of Tombola and Vallette (Western Veneto), and Larda I and II that provide the materials of this study, are well included in this cultural and settlement context. The first two sites are in the most oriental area of Valli Grandi Veronesi, a wide Po plain area located between the rivers Adige, Tartar and Po, characterised by wide marshy zones evolved thanks to the abundance of rivers during the Bronze Age.

The villages have been partially investigated, with a distance between them of about 1 km as the crow flies and, according to the plain population phenomenon during this phase of the Bronze Age, their location follows the north–south axis. The accumulated layers, according to their characteristics and conformation, seems attributable to the disposal of materials derived from anthropic activities inside the settlement. In the explored area, a total of 73 wooden elements has been found in Tombola, and 164 in Vallette including mainly vertical piles and oak timbers orientated according to a north-east/south-west axis. Being a small area, there are no clear elements pertaining the existence of a perimeter around the settlements, and this can represent an obstacle to a correct identification of the settlement typology (pile dwelling or Terramare) and their role (central or satellite) in the territory.

A dendrochronology study was carried out thanks to the abundance of wooden elements in Tombola, obtaining a mean curve of 106 years with the wiggle-matching technique for the radiometric dating with ^{14}C on three samples. The series is positioned between 1520 and 1413 cal BC, with an error of ±15 years (1σ), and characterised by at least two episodes of demolition (piles 8 and 54) dating the first 1425 ± 15 cal BC and the second 1413 ± 15 cal BC (Martinelli, 2005).

Considering the material culture, the sites have numerous affinities with the artefacts of MBA 3 characterising the plains of Emilia, Lombardia and Veneto. The ceramics show distinctive vase shapes evolved respect to those of preceding periods to which the

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