

УДК 903.02 599.6/73

NEW DATA FOR THE LATE GLACIAL'S FAUNA IN THE NORTH OF FRANCE. ALIZAY, THE LOCUS 28704¹

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Over the last ten years, sites dated to the end of the Late Glacial, and particularly of the Belloisian have become more common in the north of France. But only a few sites yielded faunal remains, which explains that the discovery of the Alizay attributed to the Belloisian is therefore crucial. The faunal assemblage is composed of 402 remains but only 65 could be clearly identified. Only two species were identified: aurochs (*Bos primigenius*) and reindeer (*Rangifer tarandus*). One of the most striking contributions to the knowledge on practices related to bone materials is the presence of the complete operational sequence of fracturing long bones, including the employed tools. This paper focuses on it.

Keywords: archaeozoology, Last Glacial, Belloisian, Aurochs, reindeer antler, hunt, bone fracturation, anvil, hammer.

Presentation of the site

Alizay is located in Normandy in the valley of the Seine River (fig. 1) and was discovered in a quarry during a large rescue operation in 2011 (under the responsibility of M. Marcigny (Marcigny, Mazet (dir.), 2016). 120 000 artefacts and more than 2000 features were excavated and dated from the Palaeolithic to the Middle age. The Locus 28 704, presented here, was excavated by M. Marcigny and his team (Biard in Marcigny, Mazet, 2016; Bemilli *et al.*, 2014). The occupational layer is embedded between the white silt deposits of the younger Dryas and the first preboreal floor and dated from 9960±40BP to 9860±40BP.

The scatter of the vestigial remains display a feature, circular in shape, measuring six meters in diameter and north-east of this concentration a strip of four meters in length can be added mainly composed of animal remains. Along the same axis, a concentration of flints objects completes this occupational layer. Outside the circular concentration, the density of the material decrease considerably.

Locus 28 704

In Locus 28 704, the scatter of the vestigial remains displays a feature, circular in shape, measuring 6 meters in diameter, and north-east of this concentration a strip

of 3.4 meters in length can be added, mainly composed of faunal remains (fig. 2). Along the same axis, a concentration of flint objects completes this occupational layer. Outside the circular concentration, the density of remains decreases considerably.

This occupational layer is embedded between the white silt deposits of the Younger Dryas and the first pre-boreal soil and it is dated between 9960±40BP and 9860±40BP.

It provides a good quality production of laminar and lamellar artefacts (fig. 3, 4). The debitage is made with soft mineral hammer from two opposite striking platform. The domestic equipment is dominated by scraper (32%) and bruised blades (20%) and the lamellar debitage is dedicated to the manufacture of armatures. There is some bitruncature and some “Blanchères” points, which is unique in Normandy. Many knapping tools, crushing tools and anvil where discovered on the site (fig. 2). The armature microlithisation associated with a significant lamellar production tend to place the site among the extreme end of the late glacial sliding slowly in the beginning of the Holocene.

The faunal assemblage

The several hundreds of bone remains unearthed at the site are in poorly condition

¹ The research was supported by a joint Russian/French project from the Russian Foundation for Humanities (project 14-21-17003/Fra) and the national research Foundation of France (CNRS) “Special properties of osseous material as one of the main types of raw materials and the osseous industry in the ancient cultures of Eurasia” within the framework of CNRS’s international Research group “Prehistoric exploitation of osseous materials in Europe” (GDRI PREHISTOS)

(fig. 5). Only teeth survived from the mandible and maxilla bones. Strong alteration of the bone surface produced by rootles and dissolving can be observed. The total number of identifiable remains is low. Various reasons explain this poor state of preservation of the faunal materials. The bones were embedded in clay deposits which are probably responsible for their dissolving. It is also possible that substantial fragmentation stems from phenomena related to soil compaction. The material did not allow evaluating the potential impact of weathering or exposed to frost. The substantial fragmentation of the bone has certainly favored taphonomic agencies. In addition, adverse weather conditions and absence of protective structures during the excavation further damaged this already poorly preserved material. All this explain why no cut marks could be recorded.

This assemblage is composed of 402 remains but only 65 could be clearly identified (tab. 1). About thirty faunal remains were only determined anatomically but could not be specifically attributed to species. These pieces were not incorporated into the analysis. Only two species were identified: aurochs (*Bos primigenius*) and reindeer (*Rangifer tarandus*).

The aurochs were identified based on morphological characteres of teeth and metacarpal bone (Brugal, 1983). The proximal width of the metacarpal bones compared to the measurements in the reference corpus of Danish aurochs and domestic cattle (Degerbøl & Fredskild, 1970) indicates that the pieces stemming from Alizay clearly fit aurochs and more particularly male animals.

Reindeer is attested by a single specimen, a shed antler belonging to a female, discovered in clear association with the other remains (fig. 2). It has been radiocarbon dated to 9660 BP±40 BP. The recent dating of a metatarsal bone of reindeer clearly discovered in situ at the Mesolithic site of Rottenburg-Siebenlinden 1 (Drucker *et al.*, 2011) to 9110±80 BP (ETH-8265, 10,160 e10, 510 calories BP1, Kind, Drucker in 2003, op cit) allows to be less sceptical towards the dating of Alizay obtained on antler to 9860±40 BP

(Beta - 333640 - 18.7 o / oo 9960±40 BP 15N/14N = +2.7 o / oo).

Yet reindeer was not documented for France at such a late date (Bridault *et. al.*, 2000), although it is still present in Belgium (Cordy, 1991), Great Britain (Lewis, 1991) and especially in Germany (Baales, 1996) at that period. However, with regard to palaeoenvironmental and chronological issues, caution is required when using this bone to attest to the presence of reindeers at the site or in its surroundings. Indeed, this antler could have been collected anywhere and even at a large distance from the site during displacements of the group. It is very hard to determine the function of this piece. Are we dealing here with a finished object, a manufacturing waste or a discarded piece? The state of the burr and its polished surface suggest that the antler was used as a soft hammer for percussion or retouching (fig. 6). This is indicated also by low angle retouch recognized on the end-scrapers. This type of retouch can impossibly stem from hard hammer percussion made with a stone (or. Com M. Biard). The different stigmata observed on this antler may explain why it was discarded by the occupants of Alizay: it was possibly brought to the site with the aim of manufacturing the tools necessary for the processing of hunted animals (skin and/or bones) and it was too severely damaged (fig. 7) to be exploited later.

Aurochs is represented by 64 bone fragments (tab. 1; fig. 8). The skeletal parts are very unequally distributed. Nonetheless it should be noticed that all the anatomical regions except for the axial column are represented. The absence of elements from the axial column may be reconsidered given the presence of a rib fragment amongst the bones undetermined to species (tab. 1). The surviving rates of the bones shows that the teeth are the best preserved anatomical parts, alongside the scapula, metacarpal bones and the tibia (fig. 8). The rates do not, however, exceed 25 % of the total number of bones expected for the skeletal parts stemming from six individuals.

The elements of the postcranial skeleton elements belong to only one individual, while the analysis of dental remains reveals the presence of 6 individuals of aurochs. By

comparison of the dental ages it is possible to assume even 7 individuals given the presence of a deciduous tooth. This is the only element attesting to the presence of an aurochs calf, younger than three years. The wear stages of the 6 third molars stemming from adult individuals indicate an age older than three and a half years. The six adults are very close in age. There is no indication on the bones permitting to determine the gender of the individuals, except for the measurements of the proximal width of the metacarpal bones matching those of male individuals.

Several historical sources dated to the sixteenth century enable us to understand the behaviour of this extinct species. Most of the year, the animals formed three distinct configurations: on the one hand: small herds composed of cows with their calves and young bulls; on the other hand: groups of adult bulls and finally, solitary bulls. The mating season took place during the months of August and September, the only period during which mature males approached the female herds to mate. The calves were born in May/June of the following year (Van Vuur, 2002). At the Alizay site, the presence of a calf supposes the presence of cows, but as one bull at least is documented, this composition probably mirrors the situation during the mating season and thus indicates an occupation of the site during late summer (August / September). Given the strict homogeneity of the slaughter ages, it seems to be obvious that a selection was made amongst the killed animals.

The bones do not enable us to estimate the height of the aurochs at Alizay. However, earlier studies including the work of P. Méniel (1984), allow estimating the live weight for this species ranging from 450 to 850 kg due to particularly marked sexual dimorphism. Based on an average weight of 750 kg per individual, it is possible to estimate the amount of meat available for the Alizay hunters to about 1500 kilograms. And in addition to the meat, the carcasses provided skins, horns, fat and other organs suitable for varied uses.

It is clear that the processing of this amount of meat implicates important technical constraints and the need for water has probably forced the hunters to build a tempo-

rary camp next to the river, in an area exposed to floods.

One of the questions raised by the site and on which partly depends its interpretation, is the time required to process the six animals hunted at Alizay. This can be a determining element within our approach. We can try an approach through comparison with current hunting practices (personal references), or through archaeological experiments like the one recently performed at Toulouse (PCR "Traces and Men", 2012), but also through ethnographic comparison with other societies of hunter gatherers. However, several factors may distort this approach. The disadvantage of current experiments is that the specialists are little experienced in butchering techniques. It is obvious that prehistoric hunters perfectly mastered the most efficient operational sequence and that they worked more rapidly (by the way, the record of skinning a seal within one and a half minute is held by an Inuit woman with..). The preparation techniques of the consumable parts are multiple and depend on the purposes, the preparation time can be quite varying (depending on whether the meat is deboned or not, whether it is "peeled" (peeling consisting in the removal of the nerves and fascia of the muscle), or sliced for a particular processing (drying, smoking)

An empirical project, based on ethnographic sources related the Indians of the Great Plains of Northern America and on recent experiments (like cutting a buffalo by the PCR "Traces and Men" at Toulouse in 2012), was carried out in order to estimate the time needed to process the carcasses. The data collected on the practices of native North American hunters indicate that "*a plain Indian could completely butcher a buffalo in about one hour ...*" (Wheat, 1972. P. 117). Moreover, it can be argued that the cutting (skinning, dismembering and deboning) of the 6 aurochs at Alizay would not have taken more than one day for a group of three people. However, additional time is needed for the preparation of the skin, possibly of the organs and the viscera, as well as for the crushing of the bones for marrow extraction and the preparation of the pieces of meat. A stay limited to a few days only can be assumed which

explains the presence of a protective structure built by the hunters against adverse weather conditions and/or scavengers. This observation matches the hypothesis of a short-term occupation.

As the surface of the bones is no more readable in order to identify cut marks, it is not possible to accurately trace back the different stages of carcass processing. Nonetheless, an impact recognized on a fragment stemming from the coxal bone shows that dismembering took place. On the other hand, the characteristics of the fractures on the long bones and several stigmata of point impacts reveal the intentional fracturing of the bones to extract marrow. This stage of processing has already been evidenced during excavation by identifying a bone crushing area within the feature. The anvil and hammers used for this activity were still lying there (fig. 2). Experiments made in June 2012 within the TECHNOS program perfectly illustrate this technique (it could more particularly be demonstrated the need to scrape the periosteum for more efficiency). Actually, the remains from Alizay allow us to schedule new experiments to have a better idea about the “size” of these hammers.

The exploitation of the marrow and the fat raises the question of its purpose, of the constraints related to storage and possibly transport, as well as of the processing of hundreds of kilos of meat generated by this hunting. The area delimited by the scatter of the vestigial remains covers a surface of about 25 m² square meters (fig. 2). To process large game of the size of the aurochs butchered at Alizay, a large space is needed for the skinning of the animal, allowing to walk around the carcass and to turn it around. Recent experience made during the cutting of a bison has shown the need for 15 to 20 square meters to turn the carcass and to move around (personal communication S. Costamagno), this matches the surface of the locus. However, the density of the remains within the occupational layer contributes to exclude this hypothesis: the hunters had not enough space to move, to cut and to crush the bones. The removal of the viscera, the skinning and the primary cutting are not time-consuming. These stages probably took place outside the butchery site and only portions of the carcasses were brought

back. It is tempting to consider that the presence of numerous scrapers within the occupational layer may indicate the processing of animal skins. Yet this assumption seems to encounter the same reservations as made for the cutting process, this means the space available for such a task. The question of the function of these scrapers and their use has also been mentioned above and may be related to the fracturing of long bones.

It is important to examine the outside areas of the occupation, especially as these are not void of vestigial remains: two findless areas are observed on the northern and western side, separated by a few lithic elements O/N/M/5 (fig. 2). Given that the heap of knapping waste located in P/O/9 (and composed of sharpening flakes) was in situ, it testifies to activities that took place outside the area with the highest density of remains (fig. 2). Therefore, the assumption that other working places connected to the primary processing of game were located outside the principal area appears to be quite plausible.

Conclusion

In conclusion we could ask “where the bone industry is?” It could be seen that only a few of the Belloisian sites contained faunal remains and that none of them yielded bone artefacts. But some indications stem from the preceding Azilian culture. From the site of Le Closeau - Rueil Malaison, near Paris a site that was occupied during a longer period of time than the Alizay site, three awls were recovered (Bemilli, 2000). This is a very small number compared to the preceding Magdalenian bone production and to the Mesolithic period that follows. Yet, we have no answer to this question but it should be considered.

The analysis of locus 28704 at Alizay is only at its start. The interpretation potential it offers is quite large, but one of the most striking contributions to the knowledge on practices related to bone materials is the presence of the complete operational sequence of fracturing long bones, including the employed tools, the anvil and hammers for which the size is known. This is an important aspect, not only with regard to butchering methods but also to the production of objects made from hard animal materials.

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НОВЫЕ ДАННЫЕ ПО ФАУНЕ ПОЗДНЕГО ГЛЯЦИАЛА НА СЕВЕРЕ ФРАНЦИИ. АЛИЗЕЙ, МЕСТОНАХОЖДЕНИЕ 28704²

С. Бемилли

На севере Франции в последнее десятилетие обнаружены стоянки, датированные поздним гляциалом, в частности, беллусиантом. Но лишь некоторые из них содержали фаунистические остатки, поэтому многочисленные находки фауны в Ализей представляют большой интерес. Фаунистический комплекс состоит из 402 костей, но только 65 экземпляров могут быть четко определены. Были идентифицированы только два вида животных: зубр (*Bos primigenius*) и северный олень (*Rangifer tarandus*). Большой научный интерес представляют находки, иллюстрирующие способы последовательных операций по расчленению длинных костей, что и является предметом данной статьи.

Ключевые слова: археозоология, позднеледниковье, Беллусиан, зубр, рог северного оленя, расчленение костей, наковальня, отбойник.

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Tabl. 1. Alizay, Locus 28704. Composition of faunal remains.

		NISP	% NISP	MNI
Aurochs	<i>Bos primigenius</i>	64	16	7
Reindeer	<i>Rangifer tarandus</i>	1	0	
Total determined NISP		65	16	
indetermined		337	84	
NISP		402	100	

² Исследование выполнено при поддержке совместного российско-французского гранта РГНФ (проект 14-21-17003/Fra) и Национального фонда научных исследований Франции (CNRS) «Особенности кости как одного из основных видов сырья и значение костяной индустрии в древних культурах Евразии» в рамках работы международной группы исследователей CNRS “Prehistoric exploitation of osseous materials in Europe” (GDRI PREHISTOS).



Fig. 1. Localisation of the site of Alizay (Eure), in France.

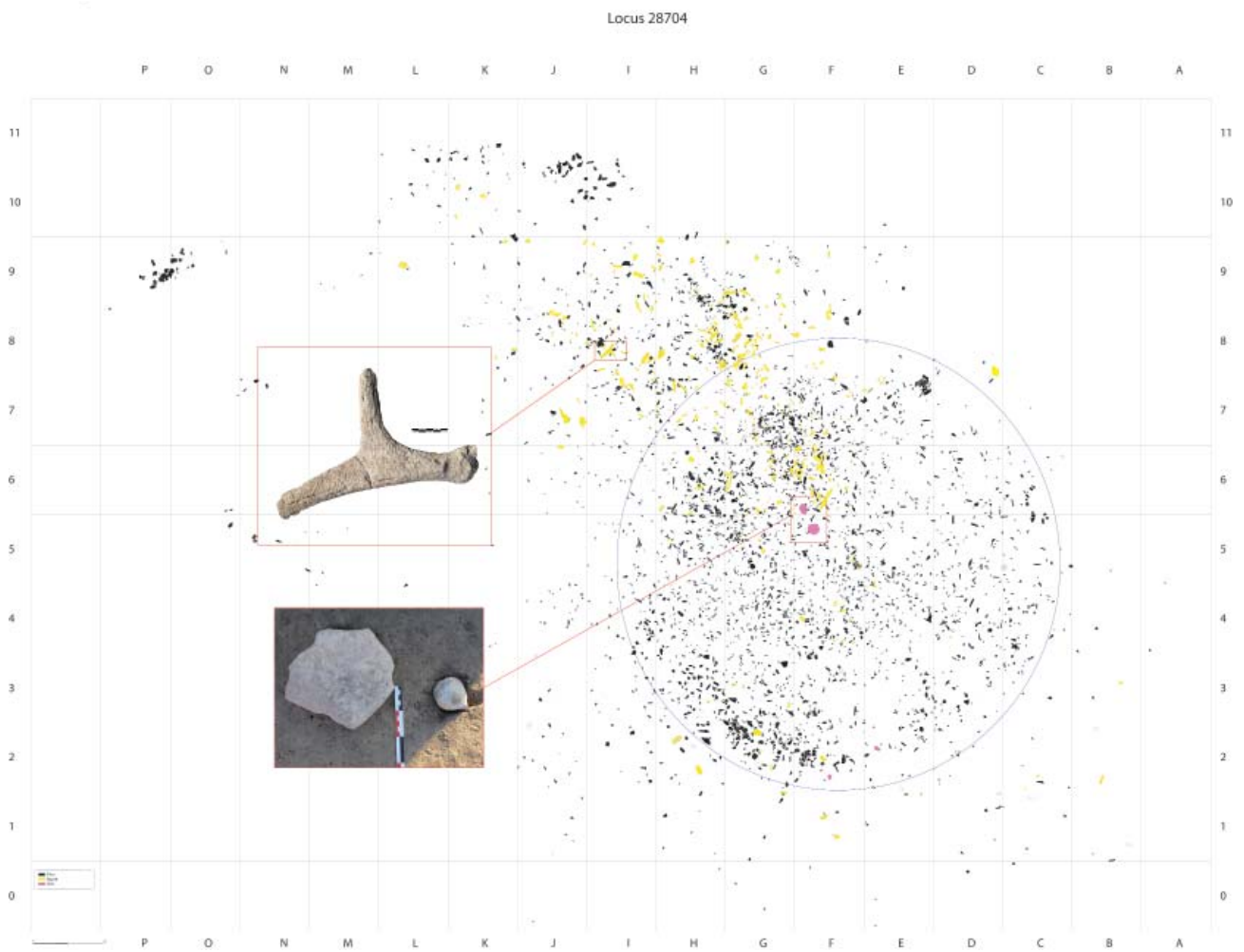


Fig. 2. Alizay, Locus 28704. Distribution of the artefacts.

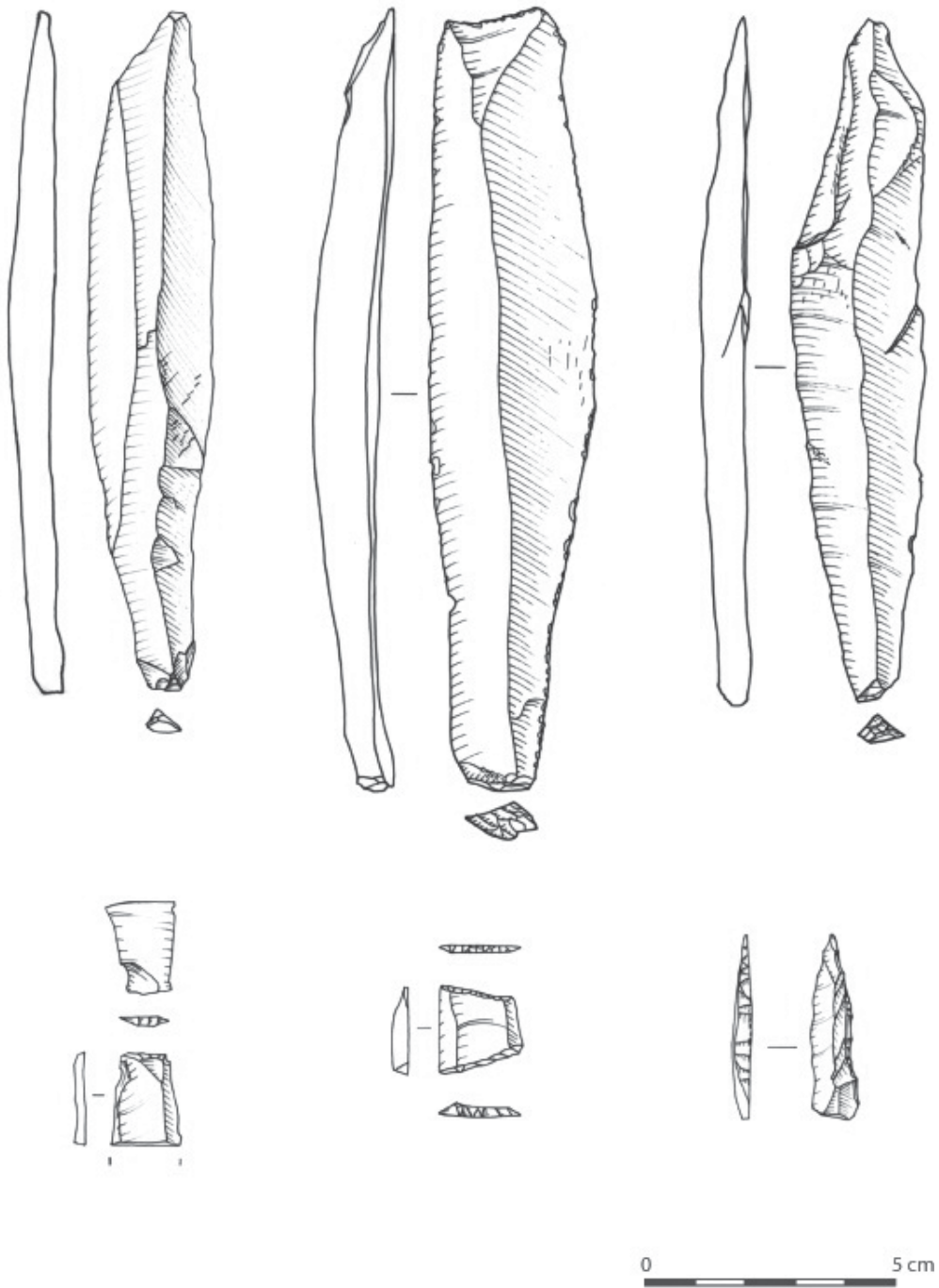


Fig. 3. Alizay, Locus 28704. Favourites blades and armatures (drawing by D. Prost).

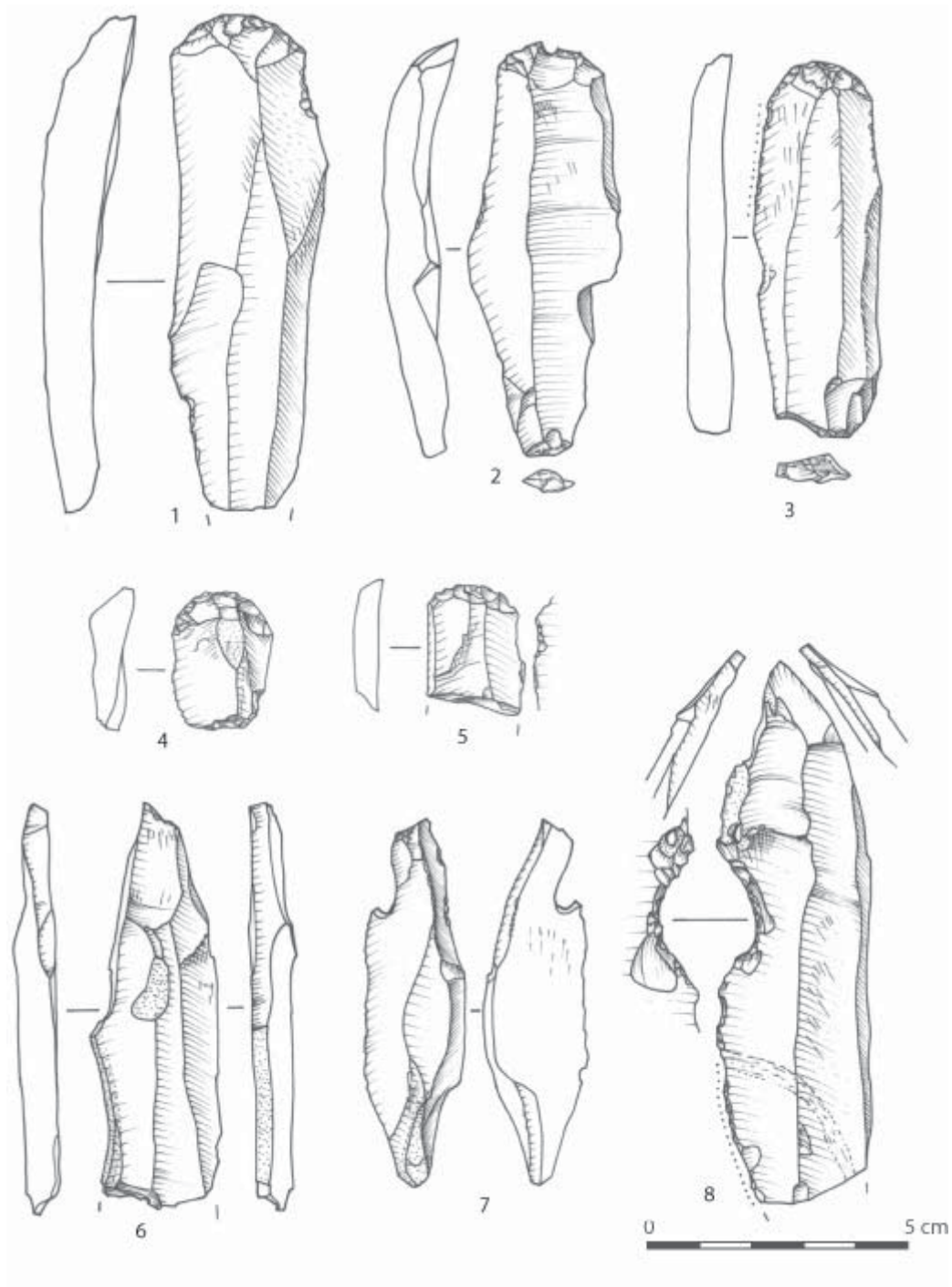


Fig. 4. Alizay, Locus 28704. Scrapers and burins (drawing by D. Prost).



Fig. 5. Alizay, Locus 28704. Example of bone preservation in situ.



Fig. 6. Alizay, Locus 28704. Reindeer antler.



Fig. 7. Alizay, Locus 28704. Details of the Reindeer antler.

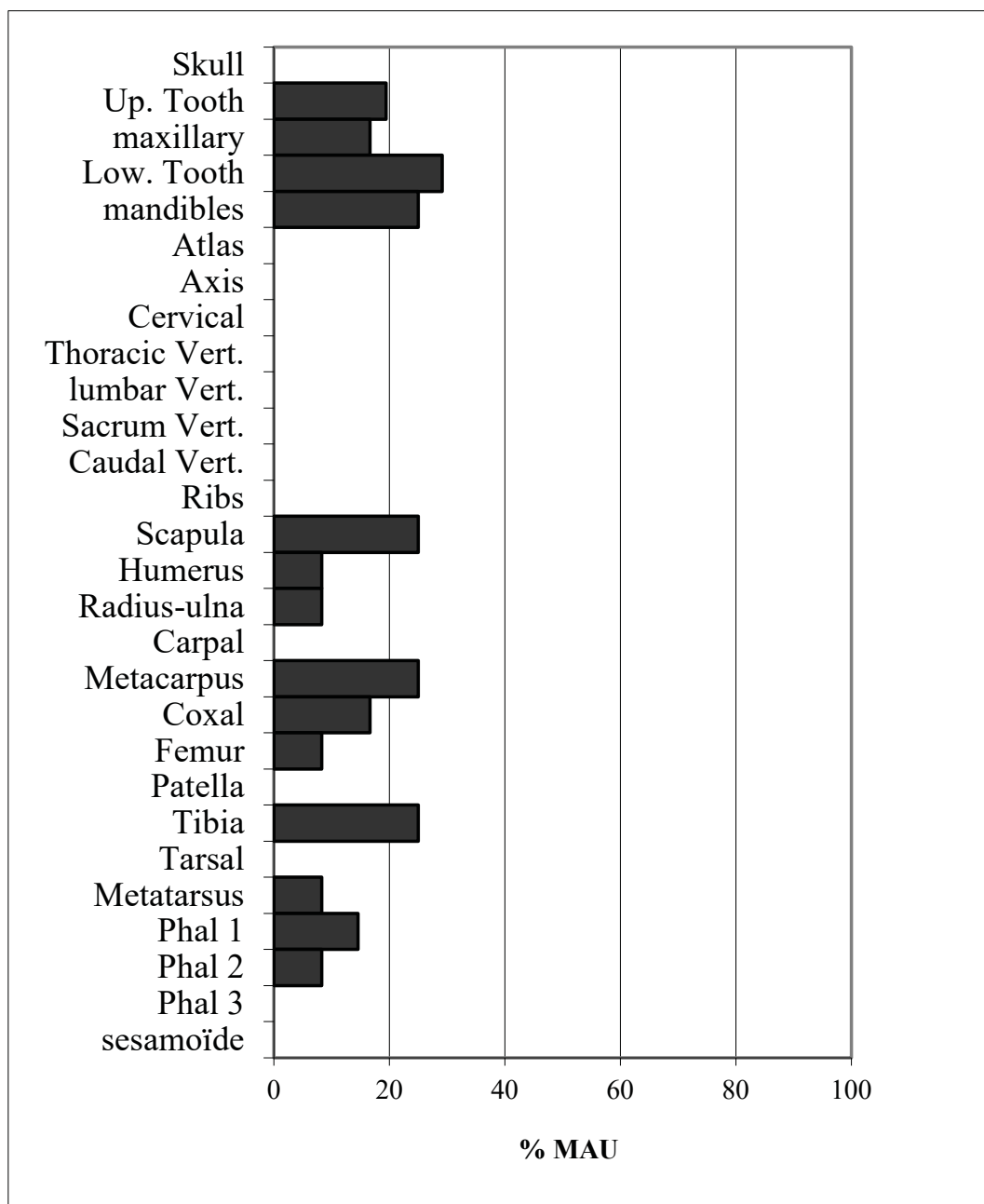


Fig. 8. Alizay, Locus 28704. Survival rates of aurochs bones.

УДК 903.3 599.6/73

GROTTA PAGLICCI, (RIGNANO GARGANICO, FOGGIA, SOUTHERN ITALY), AN OVERVIEW ON THE BONE AND ANTLER PRODUCTION

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The evidence of the bone and antler exploitation at Paglicci Cave (Rignano Garganico, Foggia, Southern Italy) are presented in the article. The analysis of the 104 osseous artefacts found in the Upper Palaeolithic sequence of the cave has allowed the authors to reconstruct the choices made by the prehistoric hunters both in terms of hunting and exploitation of hard animal materials for tool fabrication. Only some hunted animals bones were chosen for making the tools: deer, horse, aurochs and wild boar. A noteworthy observation concerns the lack of an interconnection between the kinds of species represented in the faunal assemblages and those used for the production of bone (and antler) tools. Even though the small number of pieces in each individual layer did not allow for statistical inferences, the authors could draw some interesting conclusions on the morpho-technological features of the artifacts, finding that some tool types appear to be linked to particular periods.

Keywords: archaeology, archaeozoology, Upper Palaeolithic, Paglicci Cave, osseous artefacts, bone technology.

Introduction

Grotta Paglicci is a Palaeolithic site located on the western slope of the Gargano promontory (Rignano Garganico, Apulia, Southern Italy) at about 143 m above sea level (fig. 1: 2).

The Upper Palaeolithic sequence excavated in the atrium of the cave (12 metres thick) is one of the most complete in Europe. Above the deepest levels, relating to the Late Middle Pleistocene, layers from 24A1 to 3A embrace indeed a period that includes, without significant interruption, the Aurignacian with marginal backed bladelets (layer 24), the Gravettian (Ancient: layers 23-22; Evolved: layers 21-19B, Final: layer 19A-18B), and the Epigravettian (Ancient: layers 18A-12A, Evolved: layers 11D-8A, Final: layers 7C-3A (Palma di Cesnola, 2001, 2006, 2007, 2007-2008; Lami, Palma di Cesnola, 2005; Wierer, 2013; Ricci *et al.*, 2016) (fig. 1: 1).

Intensity of human occupation is testified by the large quantity of stone tools and by abundant fauna remains, as well as plans of bones and hearts, sometimes structured. Two Gravettian burials and an incomplete Epigravettian one were also brought to light as well as numerous isolated human remains (Mezzena and Palma di Cesnola, 1972, 1989-90; Condemi *et al.*, 2014; Ronchitelli *et al.*, 2015; Posth *et al.*, 2016; Fu *et al.*, in press).

The personal ornaments and mobiliary art objects are frequent too (Palma di Cesnola,

1999, 2001; Arrighi *et al.*, 2008, 2012a, 2012b).

Grotta Paglicci is also the only site in Italy where evidences of Upper Palaeolithic parietal paintings were discovered so far: the subjects of the paintings are some horses and hands located in an internal hall. These are dated back to the final Gravettian or the beginning of the Epigravettian (24/19ka cal. BP) (Zorzi, 1963; Mezzena, Palma di Cesnola, 1992; Ricci, Boscato, Ronchitelli, 2017; Palma di Cesnola, 2000; Ricci and Ronchitelli, 2016).

There are also clear evidences of plant collection and processing for dietary purposes among Gravettian hunter-gatherer populations (Revedin *et al.*, 2015; Mariotti Lippi *et al.*, 2015).

The analysis of the osseous artefacts found in the Upper Palaeolithic sequence of the cave, as well as recent studies on faunal remains, have allowed us to reconstruct the choices made by the prehistoric hunters both in terms of hunting and exploitation of hard animal materials for tool fabrication.

Materials and methods

This study comprises those specimens found at the site showing manufacturing traces or use traces, on their active or/and proximal ends (as handling traces), that have enabled them to be identified as tools or as