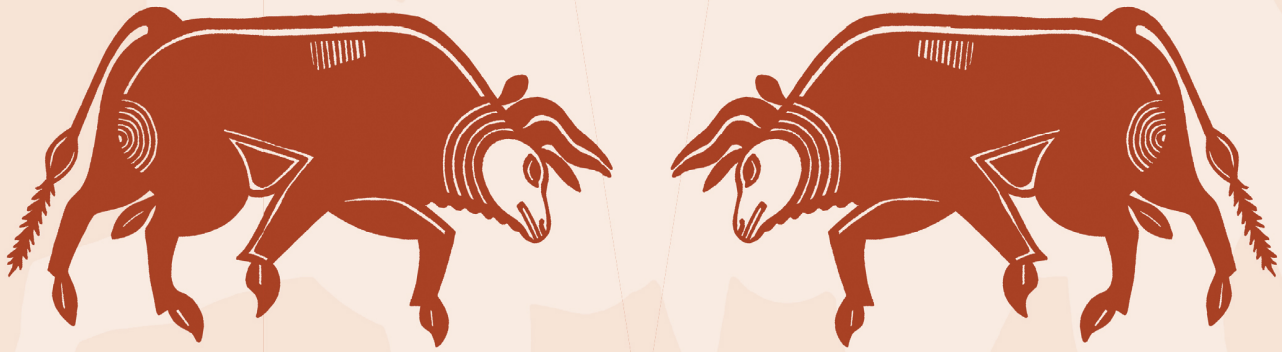
Archaeobiology 3

# ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII



Proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7–10, 2017

edited by

Julie Daujat, Angelos Hadjikoumis, Rémi Berthon, Jwana Chahoud, Vasiliki Kassianidou, and Jean-Denis Vigne

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## Archaeobiology

*Series Editors*

Sarah Whitcher Kansa
Justin Lev-Tov

Number 3

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Group photo of the 13th ASWA[AA] meeting June 8th 2017
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**Part 2: Subsistence Economies of Early and Late Complex Societies in Southwest Asia and Adjacent Areas**



**Part 3: Beyond Subsistence: Animals in the Symbolic World of Southwest Asia and Adjacent Areas**

# FOREWORD

The 13th ASWA conference was hosted by the University of Cyprus, one of the youngest of Europe's universities. In 2019, it was only thirty years since its foundation. Nevertheless, this is a thriving academic institution, which currently consists of eight faculties, twenty-two departments, and eleven research units.

In 1991, and just two years after the university's foundation, the Archaeological Research Unit (ARU) was founded by decree from the Government of the Republic of Cyprus, following the issuance of the dependent legislation by the House of Representatives. The decision to establish the ARU was based on the recommendation of the Interim Steering Committee of the University of Cyprus, which stated the following:

1. Cyprus is offered for primary research in the field of archaeology thanks to its distinctive cultural signature and history, as well as due to the fact that Cypriot archaeology and archaeological research on the island already has a distinguished tradition and international reputation;

2. The subsequent international recognition of the importance of archaeological research in Cyprus should comprise one of the first incentives for choosing the University of Cyprus as a center for postgraduate studies, and will pave the way for the exchange of students and academics between the University of Cyprus and academic institutions overseas.

The faculty members of the ARU, who are also part of the Department of History and Archaeology academic staff, have contributed immensely over the past 28 years to the achievement of the aforementioned objectives for the study and promotion of Cypriot cultural heritage through their research, their teaching, and the practical training they have been providing to students at undergraduate and postgraduate levels. The active study of other regions of the Mediterranean world have not been overlooked either, as members of the ARU academic staff have been carrying out excavations and research projects in Greece, Turkey, and France.

The members of the ARU are actively carrying out research in Pre- and Protohistoric Archaeology, Classical and Byzantine Archaeology but also Archaeometry and Environmental Archaeology, Maritime Archaeology, and Western Art. In the course of the past 28 years, the ARU has laid very stable foundations in all aforementioned specialisations of the archaeological discipline, none of which existed at academic level in Cyprus before the unit's establishment. Through their teaching at undergraduate and postgraduate levels, all members of the ARU academic staff have been contributing to the formation of a new generation of Cypriot archaeologists, equipped with all the necessary knowledge and practical experience needed to excel in this scientific field.

Over the years, the ARU has been very active in organizing international conferences and workshops. The ARU has organized over 50 international conferences, while members of the academic staff have published the proceedings of over 20 scientific meetings held at the ARU.

Thus, when Jean-Denis Vigne came to my office several years ago with the suggestion to co-organize the 13th Archaeozoology of Southwest Asia and Adjacent Areas conference I gladly accepted. The meeting in Nicosia brought together colleagues from all over the world and offered a venue where new results from the field or the laboratory could be presented and discussed. The publication of the conference proceedings enables colleagues who were unable to attend the conference to read about the latest developments in the archaeozoology of this culturally important region.

I would like to close by thanking all the members of the 13th ASWA organizing committee for all the work they have put into bringing so many scholars to Cyprus, many of them for the first time. I would also like to thank the co-editors of this volume for all the work they have put into the publication of the proceedings.

Professor Vasiliki Kassianidou
Director of the Archaeological Research Unit,
University of Cyprus
Nicosia, August 2019

# EDITORS' PREFACE

Due to their location at the meeting point of the three Old World's continents—Africa, Asia, and Europe—Southwest Asia and its adjacent areas played a pivotal role in the history of humanity. They received successive waves of our species—*Homo sapiens*—out of Africa. Different processes in several areas of this large region brought about the transition to the Neolithic, and later on the urban revolution, the emergence of empires bringing with them important subsequent religious, cultural, social, and political consequences. Southwest Asia also played a major role in the interactions between East (Asia) and West (Europe) during the last two millennia. The unique importance of Southwest Asia in the history of humanity is strengthened by the, also related to its location, fact that this area is a hotspot of biodiversity, especially in mammals, which were—as everywhere in the world—tightly associated to the history of civilizations in a diversity of roles: game, providers of meat and milk, traded raw material, symbol of prestige and wealth, pets, etc.

Everywhere in the world, the biological and cultural interactions between humans and animals often remain under-evaluated in their heuristic value for understanding complex social and biological interactions and trajectories. This is why, almost half a century ago, archaeologists who were carrying out research and reflecting on such themes founded a very active nonprofit world organization named the International Council for Archaeozoology (ICAZ). This is also why the ICAZ working group "Archaeozoology of Southwest Asia and Adjacent Areas" (ASWA[AA]) was one of the first ones created within ICAZ, constituting one of the largest and most active of ICAZ's working groups.

The ASWA[AA] was formed during the 1990 ICAZ International Conference in Washington, D.C. Its purpose is to promote communication between researchers working on archaeological faunal remains from sites in western Asia and adjacent areas (e.g., Northeast Africa, Eastern Europe, Central Asia, and South Asia). It carries out its mandate mainly through the sponsoring of biennial international conferences. Since 1998, these meetings have alternated in being hosted in Europe or in Southwest Asia: Paris (1998), Amman (2000), London (2002), Ankara (2004), Lyon (2006), Al Ain (2008), Brussels (2011), Haifa (2013), Groningen (2015).

Ongoing armed conflicts and political tensions in several countries of Southwest Asia made it difficult to locate a safe and convenient place that would enable the organizing the 13th ASWA[AA] meeting in within that region. Although Cyprus is currently a member of the European Union, in (pre-)history Cyprus was embedded in the eastern Mediterranean "world." Because of its location, Cyprus was indeed at the confluence of African, Levantine, Anatolian, and Greek cultural streams and, as is common for islands, recombined them in different but always original ways all along its history. Archaeozoology recently provided one of the most convincing illustrations of the tight connection between Cyprus and Southwest Asia, demonstrating that the earliest domesticated mammals, especially cats, pigs, cattle, sheep, and goats, were introduced to the island very shortly after their first incipient domestication on the near continent, that is, during the ninth millennium BC. For all these reasons, Cyprus represented an ideal place to host the 13th ASWA[AA] conference.

Despite the illegal military occupation of part of its territory by a foreign country, the option of hosting the meeting in Cyprus was enthusiastically embraced by all members of the working group, especially because it is open to all nationalities and maintains good diplomatic relationships with a large majority of countries in Southwest Asia. These facts contributed towards the 13th ASWA[AA] meeting in Cyprus (June 7–9, 2017) becoming one of the best-attended ASWA[AA] meetings. It brought together 80 scientists coming from 25 different countries: from Southwest Asia (6 countries), Europe (14 countries), North America (2 countries), and Japan.

They presented their results in 36 oral and 32 poster presentations. They debated the long-term interactions between humans and biodiversity, about the beginning of animal domestication and husbandry, the strategies of animal exploitation from the Paleolithic to modern times, and the symbolic and funeral use of animals through time. They also greatly enjoyed the numerous social events organized, in-

cluding a fantastic Cypriot mezze dinner, enhanced by a local folk-music band, and a nice excursion to the archaeological sites of Amathous, Kourion, and Khirokitia, and to the museums of Nicosia and Larnaca, which provided ample opportunities for scientific exchanges in a friendly atmosphere.

The hosting of the conference at the new campus of the University of Cyprus was another major reason to the meeting's success. This campus was a convenient and pleasant venue for such a conference, and the strong support of the University of Cyprus, as well as its valuable experience for the organization of such meetings were deeply appreciated by both the scientific organizers and the delegates. Several other partners contributed to the organization: the French archaeological mission "Neolithisation—Klimonas," which is itself strongly supported by the French School at Athens, the Cyprus Department of Antiquities, the French Institute of Cyprus, the French National Center for Scientific Research (Centre National de la Recherche Scientifique [CNRS]), and the French National Museum of Natural History (Muséum national d'Histoire naturelle [MNHN]).

The present volume brings together the texts of 18 of the 68 presentations of the meeting in Nicosia. The editorial board collected the papers and organized their review and editing. We are very grateful to Sarah Kansa (and Open Context), Justin Lev Tov, and Lockwood Press for their constant support in bringing this volume to fruition.

Julie Daujat
Angelos Hadjikoumis
Rémi Berthon, Jwana Chahoud
Vasiliki Kassianidou
Jean-Denis Vigne

# 1.9 | Osseous Artifacts from the Late Iron Age Site of Kale–Krševica (Southern Serbia)

## Seasons 2013–2016

Selena Vitezović* and Ivan Vranić*

Abstract

The bone industry from the Iron Age of southeast Europe is still insufficiently explored. This paper presents some preliminary results on the osseous artifacts from the Late Iron Age site of Kale–Krševica, situated in the vicinity of the town of Vranje in southeastern Serbia. Systematic archaeological excavations revealed settlement remains, including fascinating architectural features, as well as rich portable material strongly reminiscent of settlements from ancient Macedonia and northern Greece. Excavations and finds analyses are still ongoing. In this paper, we present the osseous artifacts from seasons 2013–2016. Raw materials include bones, antlers, teeth, and mollusk shells. The typological repertoire includes some common, widespread artifact types, such as awls and needles, but also modified astragali, a few ornamental items, and similar items. Manufacturing debris was also noted, including sheep horncores with traces of cutting, suggesting that the keratinous horns were also used. In this paper we discuss raw material choices, aspects of production, the typological repertoire, and the place of the osseous industries from Kale–Krševica within the wider geographical and cultural context.

Keywords

*Late Iron Age, Kale–Krševica, southern Serbia, Mediterranean influences, osseous industry, osseous technology, manufacturing techniques, modified astragali, mollusk ornaments*

## Introduction: Archaeological Background

The site of Kale is situated deep in the Balkan hinterlands, in the village of Krševica in the vicinity of the town of Vranje, southeastern Serbia (Popović 2006, 2012; Figure 1.9.1). This fortified Iron Age (IA) settlement was located on a dominant hill next to a small stream, the Krševička *reka*—that is, river. After small-scale initial excavations in 1966, systematic research at Kale–Krševica began in 2001 and is still in progress. The settlement covered an area of about five hectares and about six percent of the settlement has been revealed to date. The excavations unearthed structures built in accordance with Late Classical and Early Hellenistic Greek architectural technology—that is, ashlar and mud-brick ramparts, a barrel-vaulted water reservoir, and other finds with Greek-like characteristics The architecture indicates an important, yet unnamed, settlement dating from the beginning of the fourth until the first half of the third century BC. The communities that inhabited this settlement had strong yet not sufficiently comprehended social, cultural, and economic connections with the Mediterranean world (Popović 2006, 2008, 2012; Popović and Vranić 2013; Vranić 2012, 2014a, 2014b, 2018).

The site consisted of an acropolis located on the plateau with several building horizons. The last phase consists of a complex of public buildings and domestic dwellings surrounded by fortifications and a deep, wide trench oriented toward the mountain Rujen. After a detailed field survey, small-scale excavations, and geophysical testing, it was concluded that the major part of the settlement was in fact

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situated on the slopes and at the foot of the hill descending toward the river (Popović 2005, 2006). Hence, the largest area was investigated at the foot of the site, about 1,100 m$^2$, where a large fortified complex was discovered, with buildings, walls, many post holes—which once held posts to support horizontal wooden beams—as well as domed ovens. The most prominent structure here is a subterranean barrel-vaulted water reservoir built in accordance with the Early Hellenistic period architectural technology related to Macedonian royal burial chambers (Vranić 2019).

During the excavations, numerous finds were recovered that shed some light on the organization and way of life in Krševica, allowing for some detailed insights into the complexity of Late IA cultural dynamics and interrelations. A large proportion of the material consists of locally produced wheel-made Gray Hellenized ceramic vessels, in addition to numerous imports of Attic Red Figure and Early West Slope ware, followed by a kind of painted pottery ascribed to North Aegean workshops. Numerous amphorae were also imported, mainly originating from Thasos, Mende, Chios, and other wine-producing centers (Krstić 2005; Popović 2005, 2006). The major part of the repertoire, however, consists of various forms of locally produced tableware, cooking, and storage vessels (Vranić 2009).

The metal finds are less frequent, and exist mainly in the form of various pieces of jewelry, such as hinged and Thracian fibulae, and similar items (Popović 2007a), as well as tools, parts of bronze vessels, iron clamps, nails, small knives, and similar items (Popović 2017). Besides a few spearheads, weaponry was not found at the site. Numismatic finds are represented by a dozen pieces spanning from Phillip II, silver drachms of Alexander the Great, to a silver piece of Pelagia (Popović 2007b). Also, one early Damastion tetradrachm and one of the Paeonian rulers, Audoleont, were found in the vicinity of the site (Mitrović and Popović 2009).

A large number of weights (about 3,000), recovered from various parts of the settlement, indicates intensive weaving activity (Popović and Vranić 2006). The presence of the necessary resource—wool—is testified by the zooarchaeological analysis that confirmed the relatively high percentage of sheep (*Ovis* comprised about 36% of the assemblage; Blažić 2005:273–275).

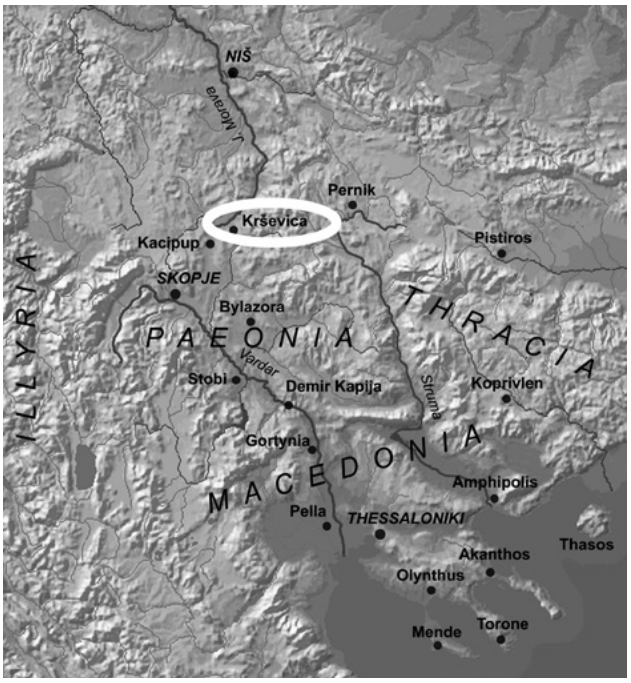


Figure 1.9.1 Map showing the position of the Kale–Krševica site and several roughly contemporary sites in the region. (Map after Popović and Vranić 2013.)

The preliminary results of faunal analysis revealed a predominance of domestic fauna, about 90%, with Bovidae being the best represented (40–53% in different features). Also, domestic pigs were noted, as well as a few elements of domestic dog and bones of equids—*Equus caballus* and *Equus asinus*. Wild fauna accounted for only 10% of the collection, mainly red deer and wild boar, and just a few bones from bear, roe deer, wolf, and others (Blažić 2005).

## Materials

### *Bone Artifacts*

Apart from other portable finds, the site of Kale–Krševica also yielded artifacts made from osseous raw materials—bone, antler, teeth, and mollusk shells (Vitezović and Vranić 2017). Both finished and used objects were discovered in addition to manufacture debris. The analysis is still ongoing, and at present only the results from the seasons 2013–2016, encompassing almost 50 artifacts, are available. These artifacts were recovered from the acropolis area of the settlement and belong to the phases dating from the last decades of the fourth and the beginning of the third centuries BC.

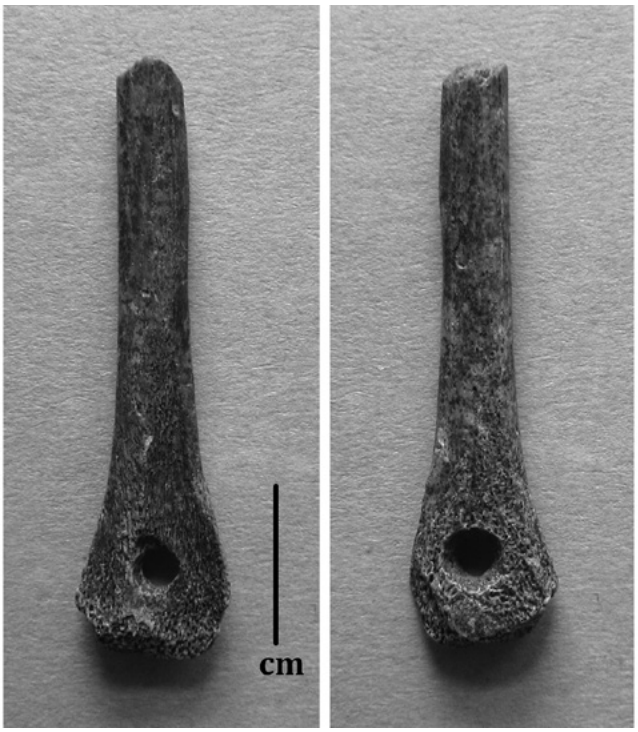


Figure 1.9.2. Pointed tool—needle—with perforation, from a pig fibula. (Photograph S. Vitezović.)

Besides finished, easily recognizable artifacts, and identified as such during the excavations, the entire faunal assemblage was also double-checked for pieces with less prominent marks of modification. Traces of manufacture and use wear were interpreted following established methodology (Semenov 1976) and experimental results (e.g., Campana 1989; Christidou 1999, 2008; Cristiani and Alhaique 2005; Legrand and Sidéra 2006; Maigrot 2003). Thus far, these objects have only been examined with low magnification (10–20x), with detailed microscopic studies yet to ensue.

The typological repertoire is not very diverse; therefore, the elaborated classification is still incomplete. For the time being, artifacts were grouped following the widely accepted typological classification for prehistoric artifacts, based on the work of H. Camps-Fabrer (1966, 1979; see also Vitezović 2016 and references therein), with some modifications.

### *Raw Materials*

The most common raw material is bone: mainly from long bones and astragali, followed by other bones, from sheep/goats, cattle, red deer, and occasionally pigs. Red deer antlers were also used. Teeth and mollusk shells occur in small numbers. In addition, the presence of horncores from horns of both sheep/goats and cattle with *débitage* traces should be mentioned, suggesting keratinous horns were used as well.

## Results: Techno-Typological Repertoire

### *Group of Pointed Tools*

Pointed tools are not very numerous; they consist of a small number of fine- and medium-sized pointed tools—that is, needles and awls. They were made from long bones, mainly long bones from small ungulates, such as metapodials or ulnae. Some of them have a fine perforation at the base, usually made with a metal perforator.

Especially noteworthy is a fragmented needle made from the fibula of a young domestic pig. Its proximal epiphysis was used as the basal part, the medial portion was minimally modified, and the distal end is missing. It has a fine perforation at the base—only 2 mm in diameter—and polish from use is observable, although is not very well preserved. Such a fine needle could have been used in textile production (Figure 1.9.2).

### *Groups of Objects with Special Use*

Several astragali with traces of manufacture and/or use were discovered, exclusively from even-toed ungulates—sheep/goats, cattle, red and roe deer. Modified and used astragali are known in numerous prehistoric communities, since the Neolithic and in historical periods, especially in Greek and Roman Antiquity (e.g., Armandry 1984; Bozbay 2012 and references therein, 2013; Carè 2013; De Grossi Mazzorin and Minniti 2013; Poplin 1984). They are often interpreted as dice used for gaming and/or oracles, following analogies with Classical Antiquity and the ethnographic record (see Bozbay 2012, 2013; Sidéra and Vornicu 2016 and references therein), although it has previously been suggested that they could have had different purposes (Carè 2013), including being related to textile manufacturing activities (Rísquez and García Luque 2007, cited in De Grossi Mazzorin and Minniti 2013:378). However, the only thing these objects have in common is the skeletal element, and to a certain extent the form, dictated by the natural morphology of the bone, but they dis-

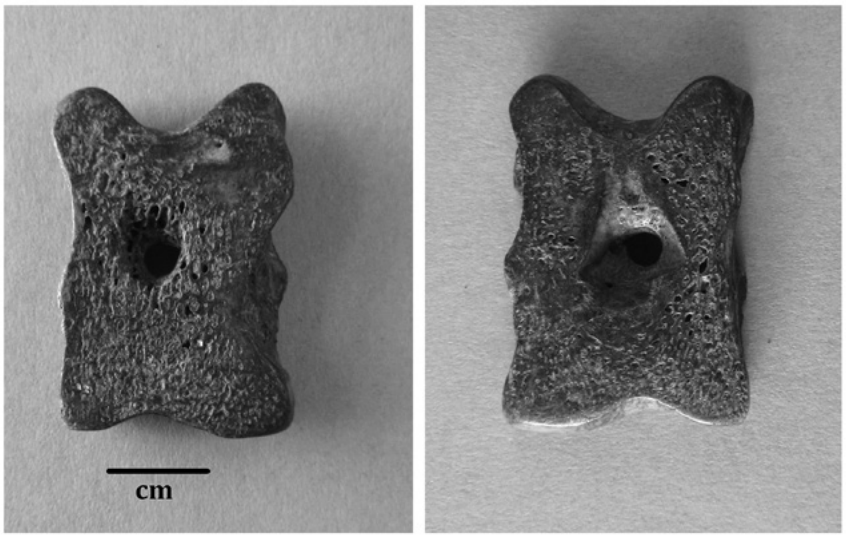


Figure 1.9.3 Ground, small ungulate astragalus with perforation in the center. (Photograph S. Vitezović.)

play a variety of modifications and use-wear traces, which clearly show that these artefacts were used for very different purposes. However, they display a variety of modifications and use-wear traces, which clearly show that these artifacts were used for very different purposes. Modified astragali differ not only in time and space, but they can also display diverse traces within a single site (e.g., Carè 2013).

In the case of Kale–Krševica, we distinguished several subtypes according to morphological and use-wear criteria.

The first subtype is astragali that were heavily modified by grinding and burnishing. They were then transformed into rectangular and completely flat objects. They come from both small and large even-toed ungulates. Their surfaces display traces of modification: they were probably abraded with a (metal) rasp, but the exposed spongy tissue was also compressed, polished, and worn from use. Some of them have perforations placed in their center. One such astragalus, from a small ungulate—most likely sheep or goat—is only 5–6 mm thick (Figure 1.9.3). Fine parallel lines and shallow grooves, perpendicular to the bone, can be noticed. These are traces of grinding done in order to make the object thinner and flat. These traces are most visible at the ends, while the medial portions on both surfaces—ventral and dorsal—are heavily worn and polished, with intensive shine; the spongy tissue is barely recognizable. This astragalus presents a slightly worn perforation of 3 mm in diameter at its center. These astragali probably served as some kind of burnishers or polishers on soft, organic materials, such as leather hides or plant fibers (Legrand 2007; Peltier 1986; Semenov 1976).

The second subtype is astragali with traces of use located only on their condyles. They often have a centrally positioned perforation. Within the analyzed contexts, astragali from small even-toed ungulates predominate, but the ratio may change once the remaining material is examined. The extent and intensity of use wear is not even; some have minimal traces on their condyles, while on others a significant volume loss can be observed. These astragali were perhaps used as loom weights or for some tasks connected with fiber processing. Experiments with astragali as loom weights have previously been successfully attempted (Grabundžija et al. 2016). However, still more experiments are needed to establish with certainty what type of use wear results from their use in textile activities.

The third subtype is astragali from large even-toed ungulates with deep holes that are differently positioned. One *Bos* astragalus in particular should be mentioned (Figure 1.9.4). It has one perforation in one of the condyles—more or less perpendicular to the bone axis—and two deep holes: one ventral and the other on the dorsal side. The holes are circular and up to 1.2 cm in diameter. One of the holes shows changes in color: inside are well-preserved traces of some black substance, most likely residues of material with which they were once filled. These astragali could have been gaming pieces, but they could as well have been used as weights for careful measurements.


Figure 1.9.4 Modified *Bos* astragalus with perforation and holes. (Photograph S. Vitezović.)

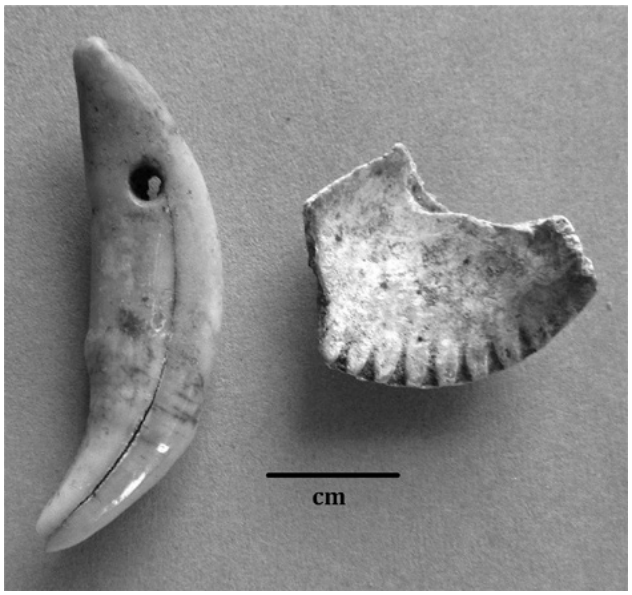


Figure 1.9.5 Decorative items: left, pierced tooth, probably used as a pendant; right, fragment of a *Cardium* shell, probably a fragment of an appliqué or pendant. (Photograph S. Vitezović.)

As mentioned above, differently modified astragali are found in large numbers throughout the Mediterranean. Heavily abraded astragali are encountered, for example, at the sites of Lapis Nigra, Varranone–Poggio Picenze, Populonia, and many more (see De Grossi Mazzorin and Minniti 2013). A particularly rich set of astragali was discovered at the site of Locri Epizefiri, a Hellenistic necropolis in southern Italy, partially contemporary with our site (Carè 2013 and references therein).

Astragali similar to the examples from Kale–Krševica are noted, among others, at sites such as Lapis Nigra and Locri Epizefiri (Carè 2013; De Grossi Mazzorin and Minniti 2013). These astragali were heavily abraded and flattened on both or just one side (ventral or dorsal). Some presenting perforation in their center are frequent at both of these sites (Carè 2013:Figure 4; De Grossi Mazzorin and Minniti 2013). Finds from Locri Epizefiri also include astragali filled with lead (Carè 2013).

Astragali discovered at the site of Pistiros, in Bulgaria—roughly contemporary with our site (see Figure 1.9.1)—were completely flattened by abrasion, therefore similar to our first subtype, but occasionally had deep holes like in our third subtype, and some of them had inscriptions in Greek, although usually just a few letters (Domaradzka 2013). Perhaps the purpose of this variant of worked astragali was to serve as some sort of weights, and a metal filling was needed to adjust the bones to the desired weight. Further studies, which will include experimental work as well, will hopefully shed more light on these enigmatic objects.

### *Decorative Items*

Two artifacts probably were personal ornaments, that is, jewelry (Figure 1.9.5). One is a fragmented piece of a *Cardium* shell valve, perhaps some kind of pendant.

The other find is a canine tooth from a domestic dog, with a small two millimeter diameter perforation at the apex: it is round in shape, made by drilling from both sides, and slightly polished from use.

Also, one fragment of antler with perforations represents some kind of decorative piece. The object in question is completely preserved: it is rectangular in shape, cut out from the cortex of an antler beam, and is entirely flat—the shape of a small tile. Fine traces of sawing are observable on its edges. It has circular perforations at both short ends. The surfaces are smoothed, and the outer surface of the antler has traces of scraping—a result of smoothing the naturally rough surface—while the inner side has traces of burnishing, probably with a rasp. Traces of manufacture are still clearly visible but no use wear is recognizable, suggesting this piece may have been unfinished—perhaps decoration still needed to be executed—or at least unused. It was probably intended for the decoration on a wooden box or something similar.

### *Manufacture Debris and Technical Pieces*

Particularly interesting is the relatively high amount of manufacture debris. Bone workshops or working areas are generally difficult to identify on prehistoric sites for numerous reasons. Beside site taphonomy, it is also difficult to recognize the manufacturing debris during excavations as well as afterward, during analysis, if preservation is not very good. As for the IA, only a few workshops have been recognized in the Mediterranean area so far. Special mention can be made of the workshop from the site of Tell eṣ-Ṣâfi/Gath in Israel (Horwitz et al. 2006; Maeir et al. 2009), where 141 pieces of worked bone were discovered in a single context.

Manufacture debris and technical pieces from Kale–Krševica include large segments of long bones and ribs with traces of cutting, sawing, and breaking, horncores with traces of cutting and sawing at the base, and segments of antlers with different traces of manufacture.

Bone manufacture is represented by debris of ribs with traces of transversal cutting and sawing, and long bone segments with traces of cutting, chopping, and hacking. These traces were distinguished from butchery marks by their position—they are usually on the medial portions, not near the joints—and by the nature of traces: cutting and sawing marks are especially clear, carefully made and executed from one end of the bone to the other, meaning that the remaining portion was not roughly broken off, but the bone was carefully divided into segments (criteria for comparison with butchery marks after Fisher 1995; Lyman 2001:294–353, and references therein; Poulain 1976:44; Reitz and Wing 2008:128–129).

Similar traces were also recorded at the above-mentioned workshop at Tell eṣ-Ṣâfi/Gath. These can be classified as coming mainly from the primary, and to a lesser extent the secondary, stages of production (Horwitz et al. 2006:170). These stages represent initial processing of unworked bones into smaller, workable pieces, and conversion of these pieces into blanks and rough-outs.

Antler debris represents manufacturing waste without doubt, and includes tine and cortex segments with traces of cutting and sawing. The presence of horncores is particularly interesting, since it testifies to the use of horns' keratinous segments, which otherwise are not preserved in archaeological contexts (see MacGregor 1985). Use of horns as raw material is known only for later periods and/or when preservation is exceptionally high, as seen, for example, in premodern times (e.g., Rijkelijkhuizen 2013) and from ethnographic examples. For earlier periods, however, only indirect evidence may be found—for example, the Roman period workshop at Apulum contained several such horncores with sawing traces (see Ciugudean 2001). In our case, horncores of both cattle and sheep/goats have traces of careful sawing or traces of more irregular cutting with an axe or adze. These traces are located at the very base of the horn, suggesting their purpose was to extract the largest possible segment of the keratinous horn. As for what types of artifacts were made out from this, we can only guess.

All these finds clearly show that a workshop for production of diverse osseous artifacts existed at Kale–Krševica's settlement. However, these finds were not located within a single context, therefore the exact position of the workshop cannot be detected. Furthermore, pieces in a final stage of production or finished, but unused objects, are missing among the finds discovered so far. Further analyses of osseous artifacts and other portable material, as well as excavations on other portions of the site will, hopefully, reveal more details about the process and organization of the production of osseous artifacts at the site of Kale–Krševica.

## Discussion and Concluding Remarks

Bone industries from the Late IA period are poorly studied, especially in southeastern Europe. This is a very interesting period, since it is a time of preliterate societies that had very complex social, economic, and cultural connections with the Mediterranean. Analyses of bone objects may provide additional information on the organization of craft production, trade and exchange patterns, and other aspects of economy. Furthermore, as Kale–Krševica has very rich archaeological remains connected with the Greek civilization, future research will also be able to include analyses of similarities and differences of these forms of material culture with the contemporary sites from both the Balkan Hinterland and the Mediterranean.

Preliminary results show that osseous raw materials were still rather important in this period, despite a widespread belief that the bone industry went into decline following the introduction of metallurgy. Raw materials were rather diverse including bones, antlers, horns, and occasionally teeth and mollusk shells. Red deer antlers were relatively well represented, suggesting that, although red deer were only occasionally hunted, antlers were recognized as an important source of raw material, and their collection was probably a planned and systematic activity. This assemblage also provided information on the use of the keratinous raw materials, otherwise almost or completely invisible in the archaeological record. Raw materials were mainly those obtained locally—bones from domestic animals and horns. However, they also included those obtained in the vicinity of the settlement—antlers and wild animal bones—and, rarely, those that were obtained through some sort of trade or exchange—for example, marine mollusk shells.

Typologically, some of the artifact types represented here find analogies in contemporary sites of the Mediterranean area, especially Hellenistic period sites. It is, however, at present difficult to assess what is typical or atypical among the technological types found at the site, since there are only a few studies of bone assemblages from contemporary sites in the area.

Further studies may show whether some of them are characteristic for the wider region and/or for this period, or if there are any traits specific to the Kale–Krševica settlement.

Some of the artifacts can be related to textile production, which seems to have been a particularly important activity at the Kale–Krševica settlement, perhaps even one of the major activities (Popović and Vranić 2006). Future research may provide more information on craft production in general and in particular on activities related to textile processing.

Finally, it is important to note that bone tool manufacture was carried out at the site, suggesting the presence of craftspersons who practiced bone working, either only occasionally or on a more regular basis.

Future, more detailed research on the bone artifacts—including microscopic examination, experiments, and similar—will, hopefully, reveal more detail regarding the production as well as the use of bone artifacts.

Similarities and differences with comparable sites from the Balkan interior as well as the Late Classical and Early Hellenistic period settlements from the northern Aegean will help in studying the social, economic, and cultural relations between these regions. Furthermore, information obtained from bone assemblages, which have never been the focus of previous researches, which were interested in more prominent material culture remains, will most certainly shed some light on Late IA cultural dynamics.

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